Title

Current Experiments in Elementary Particle Physics

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DISCLAIMER

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Abstract – This report contains summaries of 568 current and recent experiments in elementary particle physics. Experiments that finished taking data before 1988 are excluded. Included are experiments at BEPC (Beijing), BNL, CEBAF, CERN, CESR, DESY, FNAL, INS (Tokyo), ITEP (Moscow), IUCF (Bloomington), KEK, LAMPF, Novosibirsk, PNPI (St. Petersburg), PSI, Saclay, Serpukhov, SLAC, and TRIUMF, and also several underground and underwater experiments. Instructions are given for remote searching of the computer database (maintained under the SLAC/SPIRES system) that contains the summaries.

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INTRODUCTION

This report contains summaries of 568 approved current and recent experiments in elementary particle physics. A glance at the summaries in the body of the report will show the kind of information given. Experiments at the following laboratories are included:

BEPC (Beijing)
BNL (Brookhaven)
CEBAF (Newport News)
CERN (Geneva)
CESR (Cornell U.)
DESY (Hamburg)
FNAL (Batavia)
INS (Inst. for Nucl. Study, Tokyo)
ITEP (Inst. of Theor. & Exp. Phys., Moscow)
IUCF (Indiana U.)
KEK (Tsukuba)
LAMPF (Los Alamos)
Novosibirsk (Inst. of Nucl. Phys.)
PNPI (Nucl. Phys. Inst., St. Petersburg)
PSI (Paul Scherrer Inst., Villigen)
SATURNE (Saclay)
Serpukhov (Inst. of High Energy Phys.)
SLAC (Stanford U.)
TRIUMF (Vancouver)
Underground experiments
Underwater experiments

We exclude experiments for which the data collection was completed before 1988. The rationale for thus *in*cluding many rather old experiments is that many of them are still producing papers; note that a summary includes a list of journal papers resulting from the experiment.

We also exclude experiments mostly of interest to nuclear physicists, dealing with nuclear levels or other nuclear-structure measurements. There are of course experiments at the fuzzy borderline between particle and nuclear physics, and we have tried to make sensible choices about what experiments to include here.

Sources of information — Our first information about an experiment usually comes from the proposal for the experiment. Then we follow the progress of the experiment as best we can in laboratory reports such as "Experiments at CERN." Finally, a few months before an edition of this report is to appear, we send copies of the summaries of the experiments to the spokespersons for checking and updating. If a reply is received — as was the case in more than two-thirds of the experiments — there is a "✓" next to the spokesperson on the summary. Since current experiments are often in flux, we rely heavily on these replies to be up to date: no ✓ by the spokesperson means the summary may be inaccurate or incomplete. (For a handful of experiments, we verified our information with a local member of the experiment, not the spokesperson, but for simplicity put a ✓ by the spokesperson. For experiments with more than one spokesperson, all the spokespersons are checked even if only one of them replied.)

Computer database — This report is produced from a computer database maintained at SLAC under the SPIRES database management system. The database, named EXPERIMENTS, also contains information from earlier editions of this report about many experiments completed before 1988 (going back to about 1975, and including experiments at Argonne and Rutherford). See page 3 for a guide to using the EXPERIMENTS database via the remote server QSPIRES and World-Wide-Web (WWW).

Summaries — Each summary lists several dates related to the experiment: the date of the proposal, the approval date, and when the data-taking began and was completed. The title of the proposal and the most recent list of participants are given. The detector used in the experiment is identified either by a generic name (*e.g.*, counter) or by a widely known acronym (*e.g.*, SLD). The most important reactions and particles studied and the beam energy or momentum are listed where known. A brief comment describing the apparatus and the main goals of the experiment may follow. A summary ends with a list of any journal articles on results or instrumentation of

the experiment and a list of related experiments, similar either by methods used or by a subject of study. Where known, an e-mail contact address and the WWW uniform resource locator (URL) are given.

Abbreviations — To keep the summaries brief, abbreviations are used to indicate journals, kinematic variables, accelerators, and detectors. The abbreviations are usually obvious but are defined near the beginning of the report. The abbreviated forms are needed for searching the EXPERIMENTS database online.

Acknowledgments — M. Doran, G. Harigel and M. Varela Diaz (CERN), P. Yamin (BNL), J. Parker (Fermilab), and D. Buckle (CEBAF) kindly provided computer files with data on experiments from their respective institutions. We thank G.S. Wagman (LBL) for his help with processing the database. We also thank the hundreds of spokespersons who took the time to reply to our inquiries.

Comments and requests — We invite comments pointing out omissions, obscurities, out-of-date information, and errors. We also encourage spokespersons to send us proposals and letters of intent of their future experiments. Comments and other material should be sent to:

EXPERIMENTS (c/o H. Galić)
SLAC Library, Mail-Stop 82
SLAC, P.O. Box 4349
Stanford, CA 94309, USA
e-mail: `expbase@slac.stanford.edu`

Requests for additional copies of this report from the Americas, Australasia, and the Far East should go to:

EXPERIMENTS
Particle Data Group (50-308)
Lawrence Berkeley Laboratory
Berkeley, CA 94720, USA

Requests from other areas should go to:

CERN Scientific Information Service
CH-1211 Geneva 23
Switzerland

SEARCHING THE "EXPERIMENTS" DATABASE VIA QSPIRES SERVER AND WWW

The summaries of current and many earlier experiments related to particle physics are contained in a computer database called EXPERIMENTS, maintained at SLAC under the SPIRES database management system. You can access the EXPERIMENTS database even if you do not have a computer account at SLAC. In the first part of the section we discuss the e-mail searching of the database via the remote server QSPIRES. Note that authorization for QSPIRES searching is no longer required. An extensive *Guide to QSPIRES* is available from the SLAC Publication Department (see the address below). In the second part of the section we describe the access to EXPERIMENTS via a hypermedia-based Internet tool for accessing information worldwide, the World-Wide-Web (WWW). Some other computer-reachable sources of interest to experimental physicists are mentioned in the concluding paragraphs.

E-mail QSPIRES searching — You may reach the QSPIRES server at SLAC through e-mail, by sending a message to `qspires@slac.stanford.edu` or to `qspires@slacvm.bitnet` . Leave the *subject* line in the header of your letter empty, and send only one search request per letter. A search request should have the form

< your-search-command > (IN EXPERIMENTS

for example,

FIND TITLE SPIN TRANSFER (IN EXPERIMENTS

QSPIRES will answer through e-mail as soon as it gets your message. Even if a search result is zero, you will still receive an answer ("No records found which match search criteria"). If, on the contrary, a search result contains too many records, QSPIRES may send you a warning to reformulate your request by adding more criteria. It is in your best interest to avoid ordering too many records: big files travel relatively slowly and may even get lost at some gateways. Therefore, be sure that your search request is as detailed as possible by combining several search criteria. For example, change the above command by adding the accelerator's name,

FIN TITLE SPIN TRANSFER AND AC TRIUMF (IN EXPERIMENTS

If you add the word **'RESULT'** after the phrase **'(IN EXPERIMENTS'** , the server will send you only the information on the *number* of retrieved records, but not the records themselves. If you do not have a feeling on how big a search result may be, it is a good idea to use the option RESULT in your first search request. Based on QSPIRES' answer, you can decide whether you want to order these records (by simply repeating the command but dropping the word RESULT), or, perhaps, make a new, more restrictive search.

More on search commands — The main part of your search request is the search command. In the following text the **BOLDFACE UPPER CASE** letters denote the minimum part of a command. Note, however, that QSPIRES is case insensitive, and in an actual search you may use both lower and upper case characters and may enter either the minimum or full commands.

> Important note: whenever a term you wish to find contains characters, ')' , '>' , '<' , or '(' , the entire search value must be enclosed in double quotes (**see examples below**)

FINd is not the only command verb you can use via QSPIRES. Two other useful command verbs are **SHO**w and **BRO**wse. You can formulate a variety of search commands by using these three verbs. For example,

SHOw **IND**exes

(Shows the available search terms, e.g., AUTHOR, PAPER, EXP, etc. Use these terms in your search request to BROwse and FINd, e.g., BRO AUTHOR ... , or FIN PAPER ... , etc.)

BROwse Author **TRILLING**

(Displays values in the author-name index surrounding the stated value.)

BROwse **EXP**eriment-num

(No search value for EXP is given. QSPIRES returns several random values of experiment code-names.)

BROwse **EXP**eriment-num **DESY**

(Displays values in the code-name index alphabetically surrounding the specified value. Useful if you do not know the exact form or spelling of a search value.)

FINd Author **RUBBIA, C** or

FINd Author **C RUBBIA**

(Finds experiments in which the stated author has participated. The first-name initial is optional: FIN A RUBBIA will also work fine.)

FINd **EXP**eriment-num **SATURNE-258**

(Finds the record corresponding to the specified value.)

FINd **PAPER "PR D37 (1988) 1131"**

(Finds the experiment reported in the stated reference. Note that the reference has spaces but no commas between the elements. Double quotes are obligatory, see the box above.)

FINd **RE**action **"E+ E− −−> MU+ MU− X"**

(The "arrow" is composed of two minus signs and a 'greater-than' sign. Note the obligatory quotes.)

FINd **AC**celerator **KEK-TRISTAN**

(Finds experiments using the stated accelerator.)

FINd **DE**tector **MARK-II**

(Finds experiments using the stated detector.)

FINd Title **CP PHASE DIFFERENCE**

(Finds experiments with the words CP, PHASE, and DIFFERENCE in the title. The order of title words in a search command is unimportant.)

FINd **AF**filiation **RUTGERS U**

(Finds experiments in which people from the stated institution participated.)

FINd Particle **D+**

(Finds experiments studying the specified particle.)

The following search commands are also allowed:

FINd Author **PRE**fix **PATTERS**

(Finds authors whose last names begin with the string PATTERS, e.g., Patterson.)

FINd **AF**filiation **PRE**fix **NORTHWEST**

FINd **RE**action **PRE**fix **K+ N**

FINd **EXP**eriment-num **SLD**

(For most of the large experimental collaborations you may type just the collaboration name instead of the full experimental number)

Compound searching is not only possible, but also desirable, because it keeps search results smaller:

FINd Author **PROKOSHKIN AND EXP**eriment-num **PRE**fix **CERN**
FINd **AF**filiation **MOSCOW, ITEP AND NOT** Date **BE**Fore **1992**
FINd Particle **J/PSI OR "PSI(2S)"**

A search command is not the only element in a QSPIRES search request. As we have seen earlier, a command has to be supplemented with the instruction **'(IN EXPERIMENTS'** . This additional instruction directs QSPIRES to the EXPERIMENTS database rather than the default HEP database.

Interactive QSPIRES searching — From many Bitnet nodes an alternative to e-mail searching is available: QSPIRES may also be reached interactively. (Interactive communication with QSPIRES is **not** possible from non-Bitnet nodes). A typical interactive search request contains one-line text of the form:

TELL QSPIRES AT SLACVM < your-search-command > (IN EXPERIMENTS

'TELL' is an executive command for sending interactive messages from an IBM machine running the VM operating system. The corresponding phrase on a VAX system may be **'SEND QSPIRES@SLACVM'** . For other systems, ask your local system manager for instructions. If your search request ends with the phrase

'**(IN EXPERIMENTS RES**ult' , QSPIRES will notify you interactively on the number of retrieved experiments, but will not send the data. Here is an example of a search session:

TELL QSPIRES AT SLACVM FIN AC PRE CESR (IN EXPERIMENTS RES
FROM SLACVM(QSPIRES): * Result 3 Experiments

If you now want to get the records, you may repeat your search request but drop the option **'RES'** ,

TELL QSPIRES AT SLACVM FIN AC PRE CESR (IN EXPERIMENTS

or you can use a short-cut command,

TELL QSPIRES AT SLACVM OUTput

Note that no database selection is needed with the **OUT**put command.

Searching problems — Occasionally a QSPIRES search may fail. With some care you can reduce the unsuccessful searching to a minimum: (*i*) Remember that any search value containing any of the special characters) , > , < , (, **must** be enclosed in double quotes. See the examples above for PAPER, REACTION, and PARTICLE searches; (*ii*) Use the 'correct' form of a search value: a database adopted particle name (*e.g.,* K+, not KPLUS), proper experiment code-name (*e.g.,* FNAL-761, not FNAL-E761), *etc.* To find the correct form, use first the BROWSE command for the index you are searching, or look in the lists of names and abbreviations beginning on page 20. Note that in reaction and particle searches an antiparticle name is formed by adding the suffix BAR to the corresponding particle name. Thus the antiproton in these searches is written as PBAR. In title searches, particle names are somewhat variable in their spelling and several forms should be tried; (*iii*) Do not forget to select the EXPERIMENTS database. Always append the selection '(IN EXPERIMENTS' to your QSPIRES search request; (*iv*) Try using 'SEND' or 'BSEND' if your interactive 'TELL' does not work. Be sure Bitnet is licensed on your computer.

Guide to QSPIRES — The 220-page publication *Guide to QSPIRES and the Particle Physics Databases on SLACVM*, SLAC-Report-393, describes searching and access to SLAC public databases. Although written in pre-WWW days, the *Guide* may also be a useful source for WWW users, because commands for QSPIRES and WWW searching are almost identical. To obtain a free copy of the *Guide* write to: Technical Publication Department, Mail-Stop 68, SLAC, P.O. Box 4349, Stanford, CA 94309, USA (`techpub@slac.stanford.edu`), and request SLAC-Report-393. Do not forget to include your postal address.

WWW searching — If your computer is linked to the Internet, you should be able to use the World-Wide-Web (WWW). WWW was brought to life in the early nineties by Timothy Berners-Lee and collaborators at CERN. Free WWW software is available for various platforms and various needs, from PC's to large computer systems, from simple line-mode software to sophisticated full-screen browsers. Learn from your local computing center where and how to obtain the WWW software or use Telnet to reach `info.cern.ch` (no password needed).

The EXPERIMENTS database and many other SPIRES-based SLAC databases are searchable via WWW. They all can be reached from the SPIRES WWW home-page, at

`http://www-slac.slac.stanford.edu/find/spires.html`

If you do not know how to enter the above URL, find a pointer to SLAC home-page (there is likely to be one in some of your favorite WWW documents), and then select 'Other (SLAC Library) databases'. Once in EXPERIMENTS, you can use the same search commands described above in the QSPIRES searching. There is one exception, however: there is no need to append the selection '(IN EXPERIMENTS' to your WWW search request.

While search commands are almost identical, WWW offers much more than QSPIRES in the way of presentation. QSPIRES answers with a text, WWW with hypertext. For example, items in the list of journal papers resulting from an experiment are "clickable" on WWW, pointing to a more thorough bibliographic description (from the HEP database) and often to a full-text postscript version of the article. Similarly, related experiments are directly accessible on WWW, and if there exists a WWW home-page of an experiment, you will find the link. Such a home-page may be an important, up-to-date source of pertinent data, pictures, and documents.

Other SLAC-SPIRES databases — Several other SLAC public databases are available via QSPIRES. They are also listed on the SPIRES WWW home-page: (1) HEP database is a joint project of SLAC and DESY libraries, and contains almost 300,000 bibliographic entries on particle physics papers (preprints, journal articles, reports, theses, conference papers, *etc.* This is the default database for QSPIRES searching, and the selection '(IN HEP' is **not** needed in your search request; (2) ABSTRACTS contains abstracts of papers posted on many particle-physics-related bulletin boards. It is updated daily. In a QSPIRES search, append '(IN ABSTRACTS' to your search request; (3) BOOKS contains bibliographic summaries of more than 20,000 textbooks, conference proceedings, monographs, *etc.*, covering high-energy physics and related topics. Select '(IN BOOKS' in your QSPIRES search request; (4) CONF lists past and future conferences, schools, and meetings of interest to the particle-physics community. In a QSPIRES search, select '(IN CONF' to reach this database; (5) HEPNAMES contains almost 25,000 e-mail addresses of people working in high-energy physics. In both QSPIRES and WWW searching use the command 'QUERY <last-name>' . Additions and corrections should be sent to: `hepnames@slac.stanford.edu` ; (6) Database INST lists about 3,000 addresses, and, often, phone and fax numbers of institutions related to high-energy physics. In a QSPIRES search, select '(IN INST' .

Other computer accessible sources — Find a complete, well-documented list of computer accessible sources of interest to particle physicists in the latest edition of the *Review of Particle Properties*, Phys. Rev. D50 (1994) 1173. We list here only some of the sources closely related to experimental physics:

RPP database contains Full Listings from the *Review of Particle Properties.* The database is searchable and can be reached by making a Telnet link to: `muse.lbl.gov` (or SET HOST 42062, on Decnet), password PDG_PUBLIC. The full-text postscript version of the *Review* may be found on the Berkeley Particle Data Group WWW server at `http://www-pdg.lbl.gov/`.

Clones of the EXPERIMENTS database are maintained at the Yukawa Institute (Kyoto-SPIRES), Durham University (Durham–RAL BDMS), and IHEP (Protvino BDMS). Two former SPIRES databases, REACTIONS and DOCUMENTS, are no longer available at SLAC. The REACTIONS database contains the reaction numerical data including total and differential cross sections. The DOCUMENTS database lists bibliographic references sorted by momenta, reactions, and other criteria. One of the places where you can find and search these databases is the HEPDATA center at Durham. Use Telnet to reach `durpdg.dur.ac.uk` (or SET HOST 19788, on Decnet) and login as PDG, password HEPDATA. On WWW, go to `http://cpt1.dur.ac.uk/HEPDATA` . Check the *Review of Particle Properties* for other ways of reaching these databases.

Experimental physicists are encouraged to post their papers to the HEP-EX bulletin board and preprint archive. To receive detailed instructions on submitting and retrieving papers, send a blank e-mail message with the *subject* HELP to: `hep-ex@xxx.lanl.gov` . E-mail listings of experimental physics preprint titles and abstracts submitted to the archive can be received daily by sending a blank e-mail with the *subject* SUBSCRIBE *your-name* to `hep-ex`. The listings and papers can also be accessed through the WWW link `http://xxx.lanl.gov/` . See also the ABSTRACTS database at SLAC, described above.

A WWW document called EXPERIMENTS-ONLINE is a guide to home-pages of various high-energy physics collaborations. It is updated weekly. To add your experiment's home-page to the document, write to `expbase@slac.stanford.edu` . Find EXPERIMENTS-ONLINE at

`http://www-slac.slac.stanford.edu/find/explist.html` .

BEAM/TARGET/MOMENTUM INDEX

Beam-target	Lab momentum (GeV/c)	Experiment
γ p	<350	FNAL-683
γ p	0.5–2.30	CEBAF-93-033
γ p	0.6–2.25	CEBAF-91-008
γ p	0.8	CEBAF-91-015
γ p	0.9–1.80	CEBAF-89-004
γ p	1.60	CEBAF-91-015
γ p	2.40	CEBAF-91-015
γ p	3.00–3.60	CEBAF-93-031
γ p	?	CEBAF-89-024
γ deut	0.5–1.50	CEBAF-93-017
γ deut	0.8–1.50	CEBAF-93-008
γ deut	0.8–4.00	CEBAF-89-012
γ deut	1.00–3.00	SLAC-NE-17
γ He	0.1–0.4	INS-ES-120
γ He	0.2–0.3	INS-ES-116
γ He	0.8–1.50	CEBAF-93-008
γ ^{3}He	0.1–0.4	INS-ES-123
γ ^{3}He	0.4–0.7	INS-ES-124
γ ^{3}He	0.8–1.12	INS-ES-134
γ ^{3}He	0.8–1.50	CEBAF-93-008
γ ^{6}Li	0.2–0.4	INS-ES-127
γ ^{12}C	0.5–1.00	INS-ES-137
γ ^{12}C	0.7–1.10	INS-ES-132
γ ^{12}C	0.8–1.10	INS-ES-125
γ ^{12}C	0.8–1.50	CEBAF-93-008
γ ^{12}C	?	INS-ES-129
γ nucleus	<1.00	INS-ES-121
γ nucleus	<1.00	INS-ES-126
γ nucleus	<250	FNAL-831
γ nucleus	<350	FNAL-687
γ nucleus	0.2–1.00	INS-ES-130
γ nucleus	0.2–1.00	INS-ES-135
γ nucleus	0.3–1.05	INS-ES-118
γ nucleus	5.00–25.0	SERPUKHOV-170
γ nucleus	?	CEBAF-91-014
γ crystal		CERN-NA-046
MOMENTUM RANGES FOR NEUTRINO BEAMS ARE NOT DEFINED VERY SYSTEMATICALLY		
ν e^-	?	UNDERGROUND-KAMIOKANDE-I
ν e^-	?	UNDERGROUND-LVD
ν e^-	?	UNDERGROUND-SUDBURY
ν n	250	FNAL-815
ν deut	?	UNDERGROUND-SUDBURY
ν C	1×10^{-5}–0.3	LAMPF-1173
ν C	?	UNDERGROUND-LVD
$\overline{\nu}$ C	?	UNDERGROUND-LVD
ν_e e^-	<70.0	SERPUKHOV-152
ν_e e^-	1×10^{-5}–0.05	LAMPF-1173
ν_e deut	?	UNDERGROUND-SUDBURY
ν_e C	1×10^{-5}–0.05	LAMPF-1173
ν_e C	?	UNDERGROUND-LVD
ν_e ^{37}Cl	?	LAMPF-1213
ν_e ^{37}Cl	?	UNDERGROUND-HOMESTAKE
ν_e ^{71}Ga	?	UNDERGROUND-GALLEX
ν_e ^{71}Ga	?	UNDERGROUND-SAGE
ν_e ^{127}I	?	LAMPF-1213
ν_e nucleon	<70.0	SERPUKHOV-152
ν_e nucleon	5.00–30.0	SERPUKHOV-136
$\overline{\nu}_e$ p	?	UNDERGROUND-KAMIOKANDE-I
$\overline{\nu}_e$ p	?	UNDERGROUND-LVD
$\overline{\nu}_e$ p	?	UNDERGROUND-SUDBURY
$\overline{\nu}_e$ deut	?	UNDERGROUND-SUDBURY
$\overline{\nu}_e$ C	?	UNDERGROUND-LVD
$\overline{\nu}_e$ nucleon	5.00–30.0	SERPUKHOV-136
ν_μ e^-	<70.0	SERPUKHOV-152
ν_μ e^-	5.00–100	CERN-WA-079
ν_μ p	1×10^{-5}–0.3	LAMPF-1173
ν_μ p	5.00–20.0	SERPUKHOV-145
ν_μ n	5.00–20.0	SERPUKHOV-145
ν_μ C	1×10^{-5}–0.3	LAMPF-1173
ν_μ nucleon	<70.0	SERPUKHOV-152
ν_μ nucleon	3.00–30.0	SERPUKHOV-128
ν_μ nucleon	5.00–30.0	SERPUKHOV-136
ν_μ nucleus	<500	FNAL-733
ν_μ nucleus	<500	FNAL-745
ν_μ nucleus	<600	FNAL-770
ν_μ nucleus	10.0–600	FNAL-632
$\overline{\nu}_\mu$ e^-	5.00–100	CERN-WA-079
$\overline{\nu}_\mu$ nucleon	5.00–30.0	SERPUKHOV-136
$\overline{\nu}_\mu$ nucleus	<500	FNAL-733
$\overline{\nu}_\mu$ nucleus	<600	FNAL-770
$\overline{\nu}_\mu$ nucleus	10.0–600	FNAL-632
ν_τ nucleon	25.0	CERN-WA-095
ν_τ nucleon	?	CERN-WA-096
ν_τ nucleon	?	FNAL-803
e^+ crystal	$<1\times10^{12}$	CERN-NA-043
e^+ crystal	50.0–300	CERN-NA-043-2
e^- γ	47.0	SLAC-E-144
e^- p	0.8–4.00	CEBAF-93-027
e^- p	1.20–4.00	CEBAF-91-023
e^- p	1.20–4.00	CEBAF-93-036
e^- p	1.50–10.0	SLAC-NE-11
e^- p	1.60	CEBAF-89-037
e^- p	1.60	CEBAF-89-042
e^- p	1.60	CEBAF-91-024
e^- p	1.60	CEBAF-93-006
e^- p	2.00	CEBAF-89-038
e^- p	2.40	CEBAF-89-037
e^- p	2.40	CEBAF-89-042
e^- p	2.40	CEBAF-91-024
e^- p	2.40	CEBAF-93-006
e^- p	2.40	CEBAF-93-030
e^- p	3.00–10.0	SLAC-E-140X
e^- p	3.20	CEBAF-93-030
e^- p	4.00	CEBAF-89-037
e^- p	4.00	CEBAF-89-042
e^- p	4.00	CEBAF-91-024
e^- p	4.00	CEBAF-93-006
e^- p	4.00	CEBAF-89-038
e^- p	4.00	CEBAF-93-030
e^- p	$<1\times10^{12}$	CEBAF-91-002
e^- p		SLAC-E-143
e^- p		SLAC-E-143
e^- p		SLAC-E-143
e^- p		SLAC-E-155
e^- p		CEBAF-93-018
e^- p		CEBAF-93-021
e^- p		DESY-HERA-H1
e^- p		DESY-HERA-ZEUS
e^- n	1.60	CEBAF-93-006
e^- n	2.40	CEBAF-93-006
e^- n	4.00	CEBAF-93-006
e^- n	48.5	SLAC-E-155
e^- nucleon	0.5–3.00	CEBAF-91-003
e^- nucleon	1.60	CEBAF-93-012
e^- nucleon	1.90–5.10	SLAC-NE-18
e^- nucleon	2.40	CEBAF-93-012
e^- nucleon	4.00	CEBAF-93-012

BEAM/TARGET/MOMENTUM INDEX

Beam-target	Lab momentum (GeV/c)	Experiment
e^- nucleon	35.0	DESY-HERA-HERMES
e^- deut	1.50–10.0	SLAC-NE-11
e^- deut	1.60	CEBAF-89-037
e^- deut	1.60	CEBAF-89-042
e^- deut	1.60–2.40	CEBAF-93-038
e^- deut	1.60–4.00	CEBAF-93-009
e^- deut	2.40	CEBAF-89-037
e^- deut	2.40	CEBAF-89-042
e^- deut	3.00–10.0	SLAC-E-140X
e^- deut	4.00	CEBAF-89-037
e^- deut	4.00	CEBAF-89-042
e^- deut	4.00	CEBAF-93-026
e^- deut	9.70	SLAC-E-143
e^- deut	16.2	SLAC-E-143
e^- deut	29.1	SLAC-E-143
e^- deut	?	PSI-Z-89-02
e^- ^{3}He	22.7	SLAC-E-142
e^- ^{3}He	48.6	SLAC-E-154
e^- Be	3.00–10.0	SLAC-E-140X
e^- Al	1.50–10.0	SLAC-NE-11
e^- Si		INS-ES-122
e^- Si		INS-ES-128
e^- nucleus	1.00–4.00	CEBAF-89-008
e^- nucleus	3.00	CEBAF-91-016
e^- nucleus	30.0	SERPUKHOV-170
e^- nucleus	350	FNAL-774
e^- crystal	0.2–1.10	INS-ES-133
e^- crystal	0.4	INS-ES-136
e^- crystal	0.6	INS-ES-136
e^- crystal	0.9	INS-ES-136
e^- crystal	1.20	INS-ES-119
e^- crystal	$<1\times10^{12}$	CERN-NA-043
e^- crystal	50.0–300	CERN-NA-043-2
$e^\pm$ C		SLAC-E-146
$e^\pm$ C		SLAC-E-146
$e^\pm$ Fe	8.00	SLAC-E-146
$e^\pm$ Fe	25.0	SLAC-E-146
$e^\pm$ Wt	8.00	SLAC-E-146
$e^\pm$ Wt	25.0	SLAC-E-146
$e^\pm$ Au		SLAC-E-146
$e^\pm$ Au		SLAC-E-146
$e^\pm$ Pb	8.00	SLAC-E-146
$e^\pm$ Pb	25.0	SLAC-E-146
$e^\pm$ U	8.00	SLAC-E-146
$e^\pm$ U	25.0	SLAC-E-146
$e^\pm$ crystal	20.0–200	CERN-NA-042

Beam-target	C.m. energy (GeV)	Experiment
e^+ e^-	<1.40	NOVOSIBIRSK-SND
e^+ e^-	<70.0	KEK-TE-001
e^+ e^-	<70.0	KEK-TE-002
e^+ e^-	<70.0	KEK-TE-003
e^+ e^-	<100	CERN-LEP-L3
e^+ e^-	<100	SLAC-SLC-SLD
e^+ e^-	<100	SLAC-SLC-6
e^+ e^-	<120	CERN-LEP-ALEPH
e^+ e^-	<190	CERN-LEP-OPAL
e^+ e^-	<200	CERN-LEP-DELPHI
e^+ e^-	0.4–1.40	NOVOSIBIRSK-CMD-2
e^+ e^-	3.10	SLAC-SP-032
e^+ e^-	3.60	BEPC-BES
e^+ e^-	3.69	SLAC-SP-032
e^+ e^-	3.77	SLAC-SP-032
e^+ e^-	4.14	SLAC-SP-032
e^+ e^-	9.00–12.0	CESR-CLEO
e^+ e^-	9.30–10.6	DESY-DORIS-ARGUS
e^+ e^-	9.40–11.6	CESR-CUSB-II
e^+ e^-	29.0	SLAC-PEP-04/09
e^+ e^-	50.0–60.8	KEK-TE-004
e^+ e^-	90.0	CERN-LEP-05

Beam-target	Lab momentum (GeV/c)	Experiment
μ^+ e^-	0.005	LAMPF-869
μ^+ e^-	0.02	PSI-R-89-06
μ^+ e^-	0.02–0.03	TRIUMF-304
μ^+ C	0.0006–0.003	PSI-R-91-08
μ^- p	5.51×10^{-5}	TRIUMF-452
μ^- ^{3}He	0.06	TRIUMF-592
μ^- ^{3}He	?	LAMPF-1231
μ^- C	0.0006–0.003	PSI-R-91-08
μ^- ^{23}Na	5.51×10^{-5}	TRIUMF-612
μ^- ^{27}Al	5.51×10^{-5}	TRIUMF-612
μ^- ^{28}Si	5.51×10^{-5}	TRIUMF-570
μ^- ^{35}Cl	5.51×10^{-5}	TRIUMF-612
μ^- nucleus		PSI-R-87-03
muon e^-	<750	FNAL-665
muon p	<750	FNAL-665
muon p	90.0	CERN-NA-037
muon p	100–200	CERN-NA-047
muon p	120	CERN-NA-037
muon p	280	CERN-NA-037
muon deut	<750	FNAL-665
muon deut	90.0	CERN-NA-037
muon deut	100–200	CERN-NA-047
muon deut	120	CERN-NA-037
muon deut	280	CERN-NA-037
muon nucleus	<750	FNAL-665
muon nucleus	50.1	FNAL-843
muon nucleus	90.0	CERN-NA-037
muon nucleus	100	FNAL-843
muon nucleus	120	CERN-NA-037
muon nucleus	200	CERN-NA-037
muon nucleus	280	CERN-NA-037
muon nucleus	300	FNAL-782
muon nucleus	420	FNAL-802
muon nucleus	490	FNAL-843
π^+ p	0.10–0.2	PSI-R-85-13-3
π^+ p	0.1–0.6	LAMPF-1190
π^+ p	0.1	LAMPF-1256
π^+ p	0.1	TRIUMF-530
π^+ p	0.1	TRIUMF-530
π^+ p	0.2	TRIUMF-530
π^+ p	0.2	LAMPF-1256
π^+ p	0.2	TRIUMF-530
π^+ p	0.2–0.2	TRIUMF-471
π^+ p	0.2	TRIUMF-530
π^+ p	0.2	TRIUMF-530
π^+ p	0.2–0.3	TRIUMF-598
π^+ p	0.2	TRIUMF-530
π^+ p	0.2–0.4	TRIUMF-645
π^+ p	0.3–0.4	LAMPF-1179
π^+ p	0.3	TRIUMF-561
π^+ p	0.3	TRIUMF-561
π^+ p	0.3	TRIUMF-561
π^+ p	0.3	TRIUMF-561
π^+ p	0.3–0.5	TRIUMF-624
π^+ p	0.5–0.7	LAMPF-849
π^+ p	1.00–2.00	ITEP-914
π^+ p	6.00	BNL-838
π^+ p	60.0–70.0	SERPUKHOV-161
π^+ p	?	TRIUMF-560
π^+ n	2.00	ITEP-875
π^+ nucleon	515	FNAL-706
π^+ deut	1×10^{-5}–0.8	BNL-890
π^+ deut	0.03	LAMPF-1085
π^+ deut	0.04	LAMPF-1085
π^+ deut	0.05	LAMPF-1085

BEAM/TARGET/MOMENTUM INDEX

Beam-target	Lab momentum (GeV/c)	Experiment
π^+ deut	0.07	LAMPF-1085
π^+ deut	0.08	LAMPF-1085
π^+ deut	0.09	TRIUMF-506
π^+ deut	0.10	TRIUMF-399
π^+ deut	0.1	TRIUMF-506
π^+ deut	0.1	TRIUMF-502
π^+ deut	0.1	TRIUMF-399
π^+ deut	0.1	TRIUMF-506
π^+ deut	0.1	TRIUMF-399
π^+ deut	0.3	TRIUMF-360
π^+ deut	0.3–0.4	LAMPF-1096
π^+ deut	0.4	TRIUMF-508
π^+ trit	0.1–0.3	PSI-R-85-11
π^+ He	0.1–0.3	PSI-R-85-11
π^+ He	0.4	TRIUMF-556
π^+ He	1.00	KEK-217
π^+ ^{3}He	0.2	TRIUMF-557
π^+ ^{3}He	0.2–0.4	LAMPF-1267
π^+ ^{3}He	0.2	TRIUMF-445
π^+ ^{3}He	0.3	TRIUMF-445
π^+ ^{3}He	0.4	TRIUMF-445
π^+ ^{7}Li	300	FNAL-705
π^+ ^{12}C	1.00	KEK-217
π^+ ^{12}C	1.05	KEK-160
π^+ Fe	1.40	ITEP-853
π^+ Ti	1.40	ITEP-853
π^+ nucleus	0.4	TRIUMF-653
π^+ nucleus	0.5–1.50	KEK-157
π^+ nucleus	1.00–1.20	KEK-150
π^- p		PSI-R-86-05
π^- p	0.05–0.08	TRIUMF-643
π^- p	0.09	LAMPF-1179
π^- p	0.10–0.2	PSI-R-85-13-3
π^- p	0.1	LAMPF-1256
π^- p	0.1–0.4	LAMPF-1178
π^- p	0.2	LAMPF-1256
π^- p	0.2–0.6	LAMPF-1190
π^- p	0.2–0.2	TRIUMF-471
π^- p	0.2–0.4	TRIUMF-537
π^- p	0.2–0.3	TRIUMF-598
π^- p	0.2–0.4	TRIUMF-645
π^- p	0.3	TRIUMF-561
π^- p	0.3	TRIUMF-561
π^- p	0.3	TRIUMF-561
π^- p	0.3	LAMPF-1310
π^- p	0.3–0.5	BNL-857
π^- p	0.3	LAMPF-1310
π^- p	0.3	TRIUMF-561
π^- p	0.3–0.5	TRIUMF-624
π^- p	0.3–0.4	PSI-R-86-02
π^- p	0.4	LAMPF-1310
π^- p	0.4	LAMPF-1310
π^- p	0.5–0.7	LAMPF-849
π^- p	0.5–0.8	PNPI-SC-147
π^- p	0.6–0.7	PNPI-SC-124
π^- p	0.7–0.7	PNPI-SC-147
π^- p	0.9–2.00	ITEP-864
π^- p	1.00–2.00	ITEP-914
π^- p	4.50	ITEP-828
π^- p	6.00	BNL-838
π^- p	6.30	KEK-179
π^- p	8.00	BNL-881
π^- p	12.0	BNL-818
π^- p	18.0	BNL-852
π^- p	22.0	BNL-747
π^- p	32.0	SERPUKHOV-172
π^- p	37.0	SERPUKHOV-164
π^- p	40.0	SERPUKHOV-112
π^- p	40.0	SERPUKHOV-147
π^- p	40.0	SERPUKHOV-149
π^- p	40.0	SERPUKHOV-155
π^- p	40.0	SERPUKHOV-173
π^- p	40.0–50.0	SERPUKHOV-148
π^- p	60.0–70.0	SERPUKHOV-161
π^- p	300	CERN-NA-012-2
π^- p	?	LAMPF-1268
π^- D	?	TRIUMF-661
π^- deut		PSI-R-86-05
π^- deut	1×10^{-5}–0.8	BNL-890
π^- deut	0.10	TRIUMF-399
π^- deut	0.1	TRIUMF-502
π^- deut	0.1	TRIUMF-399
π^- deut	0.1	TRIUMF-399
π^- deut	0.3–0.4	LAMPF-1096
π^- deut	0.4	LAMPF-981
π^- deut	0.5–0.6	PNPI-SC-129
π^- deut	0.9–2.00	ITEP-863
π^- deut	0.9–3.00	ITEP-762
π^- deut	40.0	SERPUKHOV-149
π^- deut	?	LAMPF-1286
π^- trit	0.1–0.3	PSI-R-85-11
π^- n	300	CERN-NA-012-2
π^- nucleon	40.0	SERPUKHOV-163
π^- nucleon	500	FNAL-706
π^- nucleon	515	FNAL-706
π^- He	0.1–0.3	PSI-R-85-11
π^- ^{6}Li	4.00	KEK-187
π^- ^{7}Li	300	FNAL-705
π^- ^{24}Mg	2.00–3.60	ITEP-921
π^- Si	40.0	SERPUKHOV-157
π^- ^{31}Ph	2.00–3.60	ITEP-921
π^- ^{32}S	2.00–3.60	ITEP-921
π^- ^{40}Ca	2.00–3.60	ITEP-921
π^- Ti	1.40	ITEP-853
π^- Fe	1.40	ITEP-853
π^- Xe		ITEP-851
π^- Xe	0.4	ITEP-851
π^- Xe	1.00	ITEP-851
π^- nucleus	0.7–1.30	ITEP-901
π^- nucleus	5.00	ITEP-872
π^- nucleus	6.00–15.0	BNL-850
π^- nucleus	40.0	SERPUKHOV-112
π^- nucleus	40.0	SERPUKHOV-148
π^- nucleus	40.0	SERPUKHOV-155
π^- nucleus	40.0–50.0	SERPUKHOV-148
π^- nucleus	340	CERN-WA-082
π^- nucleus	350	CERN-WA-084
π^- nucleus	500	FNAL-791
π^- nucleus	500	FNAL-672A
π^- nucleus	600	FNAL-653
pion deut	0.2	TRIUMF-375
pion deut	0.3	TRIUMF-375
pion deut	0.3	TRIUMF-375
pion nucleus	40.0	FNAL-770
pion nucleus	70.0	FNAL-770
pion nucleus	100	FNAL-770
pion nucleus	250	FNAL-769
pion nucleus	$<1\times10^{12}$	FNAL-667
K^+ p	6.00	BNL-838
K^+ deut	0.4–0.8	BNL-835
K^+ Xe	<0.8	ITEP-871
K^+ Xe	0.6–0.8	ITEP-814
K^+ Xe	0.8	ITEP-802
K^+ nucleus	0.4–0.8	BNL-835
K^+ nucleus	0.6–0.7	BNL-874

BEAM/TARGET/MOMENTUM INDEX

Beam-target	Lab momentum (GeV/c)	Experiment
K^- p		BNL-811
K^- p	1.80	BNL-813
K^- p	1.80	BNL-885
K^- p	6.00	BNL-838
K^- p	8.00	BNL-881
K^- p	22.0	BNL-747
K^- p	32.0	SERPUKHOV-172
K^- p	40.0	SERPUKHOV-112
K^- p	40.0	SERPUKHOV-147
K^- p	40.0	SERPUKHOV-149
K^- p	40.0	SERPUKHOV-173
K^- p	40.0–50.0	SERPUKHOV-148
K^- deut		BNL-811
K^- deut	40.0	SERPUKHOV-149
K^- He	0.6	BNL-774
K^- He	0.8	BNL-788
K^- ^{3}He	0.7	BNL-829
K^- ^{3}He	0.9	BNL-820
K^- ^{3}He	1.80	BNL-836
K^- ^{6}Li	0.8	BNL-788
K^- ^{7}Li		KEK-326
K^- Be		KEK-326
K^- Be	?	KEK-287
K^- ^{12}C		KEK-218
K^- ^{12}C	1.80	BNL-885
K^- ^{12}C	?	KEK-287
K^- Si	40.0	SERPUKHOV-157
K^- Xe	<0.8	ITEP-871
K^- nucleus	0.6	BNL-887
K^- nucleus	0.8	BNL-781
K^- nucleus	1.65	KEK-176
K^- nucleus	1.65	KEK-224
K^- nucleus	40.0	SERPUKHOV-112
K^- nucleus	40.0	SERPUKHOV-148
K^- nucleus	40.0–50.0	SERPUKHOV-148
K^- nucleus	?	KEK-167B
kaon nucleus	40.0	FNAL-770
kaon nucleus	70.0	FNAL-770
kaon nucleus	100	FNAL-770
kaon nucleus	250	FNAL-769

pp COLLIDING BEAM EXPERIMENTS ARE MERGED IN WITH FIXED-TARGET EXPERIMENTS BY GIVING THE EQUIVALENT LAB MOMENTUM FOR SCATTERING ON A STATIONARY PROTON

p p	0.2	PSI-Z-84-02
p p	0.4–1.09	IUCF-CE-42
p p	0.6	SATURNE-290
p p	0.6	IUCF-CE-45
p p	0.6	IUCF-CE-08
p p	0.6	IUCF-CE-35
p p	0.6	IUCF-E-367
p p	0.7	TRIUMF-497/287
p p	0.8–0.8	IUCF-CE-01
p p	0.8–0.8	IUCF-CE-03
p p	0.8–0.8	IUCF-CE-23
p p	0.8–0.8	IUCF-CE-31
p p	0.8	TRIUMF-552
p p	0.8	TRIUMF-704
p p	0.8	SATURNE-290
p p	0.8	TRIUMF-552
p p	0.8	IUCF-CE-38
p p	0.8–0.9	IUCF-CE-44
p p	0.8–1.81	SATURNE-144
p p	0.8–1.70	SATURNE-209
p p	1.0–1.09	TRIUMF-633
p p	1.00–25.0	BNL-880
p p	1.04	TRIUMF-544
p p	1.06–1.17	SATURNE-129
p p	1.09–1.46	LAMPF-1072
p p	1.09–1.46	SATURNE-173
p p	1.09–4.34	KEK-174
p p	1.10	TRIUMF-496
p p	1.46	SATURNE-132
p p	1.60	ITEP-893
p p	1.81–3.52	SATURNE-225
p p	1.92–3.72	SATURNE-177
p p	1.98	SATURNE-174
p p	1.99	SATURNE-174
p p	1.99	SATURNE-174
p p	$<1\times10^{12}$	SATURNE-237
p p		SATURNE-174
p p		SATURNE-174
p p		SATURNE-174
p p		SATURNE-290
p p		SATURNE-174
p p		SATURNE-212
p p		SATURNE-174
p p		SATURNE-212
p p		SATURNE-212
p p		SATURNE-174
p p		SATURNE-244
p p		BNL-838
p p	6.00–20.0	BNL-850
p p	12.0	KEK-248
p p	13.0–26.0	BNL-782
p p	24.0	BNL-794
p p	28.0	BNL-794
p p	40.0	SERPUKHOV-175
p p	60.0–70.0	SERPUKHOV-161
p p	70.0	SERPUKHOV-149
p p	70.0	SERPUKHOV-155
p p	200	FNAL-581/704
p p	313	CERN-UA-006
p p	400–3000	SERPUKHOV-UNK-001
p p	450	CERN-NA-012-2
p p	450	CERN-NA-051
p p	450	CERN-WA-091
p p	?	SATURNE-121
p p	?	SATURNE-213
p n	<70.0	SERPUKHOV-119
p n	<70.0	SERPUKHOV-174
p n	0.4	PSI-Z-91-02
p n	0.9–1.08	TRIUMF-460
p n	1.60	ITEP-893
p n	1.81–3.52	SATURNE-225
p nucleon	70.0	SERPUKHOV-169
p nucleon	70.0	SERPUKHOV-136
p nucleon	500	FNAL-706
p nucleon	515	FNAL-706
p nucleon	800	FNAL-706
p nucleon	800	FNAL-789
p nucleon	800	FNAL-866
p deut	0.6	IUCF-CE-49
p deut	0.6	TRIUMF-482
p deut	0.6–0.7	IUCF-CE-21
p deut	0.7	TRIUMF-332
p deut	0.8	TRIUMF-482
p deut	0.8	TRIUMF-332
p deut	1.0	TRIUMF-482
p deut	1.0	TRIUMF-332
p deut	1.08	TRIUMF-332
p deut	1.28	LAMPF-1119
p deut	1.46	LAMPF-1119
p deut	1.57	SATURNE-258
p deut	$<1\times10^{9}$	SATURNE-198
p deut	1.58–3.52	SATURNE-186
p deut	1.59	SATURNE-174
p deut	1.59	SATURNE-174
p deut	$<1\times10^{12}$	SATURNE-237
p deut		SERPUKHOV-149
p deut		CERN-NA-051
p deut		FNAL-772
p deut		SATURNE-197
p deut		SATURNE-222
p trit	1.41	LAMPF-1135

BEAM/TARGET/MOMENTUM INDEX

Beam-target	Lab momentum (GeV/c)	Experiment
p trit	1.45	LAMPF-1135
p trit	1.46	LAMPF-1135
p He		LAMPF-973
p He		LAMPF-973
p He		LAMPF-973
p He		LAMPF-973
p ^{3}He		IUCF-CE-25
p ^{3}He		TRIUMF-541
p ^{3}He		IUCF-CE-25
p ^{3}He		LAMPF-973
p ^{3}He		IUCF-CE-25
p ^{3}He		LAMPF-973
p ^{3}He		LAMPF-973
p ^{3}He		LAMPF-973
p ^{3}He		TRIUMF-566
p ^{3}He		TRIUMF-630
p ^{7}Li		FNAL-705
p Be	22.0	BNL-817
p Be	450	CERN-NA-034
p Be	450	CERN-NA-044
p Be	800	FNAL-756
p Be	800	FNAL-800
p C	70.0	SERPUKHOV-168
p C	70.0	SERPUKHOV-177
p ^{12}C	0.07	PSI-Z-90-07
p ^{12}C	1.99	SATURNE-174
p ^{12}C	2.20	SATURNE-174
p ^{12}C	2.31	SATURNE-174
p Mg		SERPUKHOV-168
p Mg		SERPUKHOV-177
p Al	7.50	ITEP-895
p Si	800	FNAL-771
p Su	200	CERN-WA-094
p Su	450	CERN-NA-044
p Cu	0.9–0.9	TRIUMF-298
p Cu	30.0	FNAL-776
p Cu	70.0	SERPUKHOV-168
p Cu	70.0	SERPUKHOV-177
p Cu	150	FNAL-776
p Cu	400	FNAL-776
p Cu	800	FNAL-776
p Wt	1000	FNAL-793
p ^{197}Au	800	FNAL-792
p Pb	7.50	ITEP-895
p Pb	70.0	SERPUKHOV-177
p Pb	160	CERN-WA-097
p Pb	450	CERN-NA-044
p ^{238}U	201	CERN-NA-038
p nucleus	0.8–1.0	SATURNE-155
p nucleus	1.46	SATURNE-192
p nucleus	1.46–1.92	SERPUKHOV-171
p nucleus	1.50	KEK-173
p nucleus	$<1\times10^{12}$	SATURNE-237
p nucleus		ITEP-894
p nucleus		SATURNE-192
p nucleus	3.50–5.00	KEK-257
p nucleus	4.54–10.1	ITEP-831
p nucleus	6.00–20.0	BNL-850
p nucleus	7.50	ITEP-894
p nucleus	9.96	ITEP-911
p nucleus	10.0	BNL-855
p nucleus	10.0	ITEP-873
p nucleus	10.9	ITEP-831
p nucleus	14.6	BNL-802
p nucleus	14.6	BNL-814
p nucleus	15.5	BNL-878
p nucleus	16.0	BNL-810
p nucleus	18.0	BNL-855
p nucleus	24.0	BNL-888
p nucleus	40.0	SERPUKHOV-175
p nucleus	70.0	SERPUKHOV-120
p nucleus	70.0	SERPUKHOV-155
p nucleus	200	CERN-NA-035
p nucleus	202	CERN-WA-080
p nucleus	250	FNAL-769
p nucleus	370	CERN-WA-082
p nucleus	400–3000	SERPUKHOV-UNK-001
p nucleus	450	CERN-NA-034-2
p nucleus	453	CERN-NA-045
p nucleus	500	FNAL-672A
p nucleus	800	FNAL-672A
p nucleus	800	FNAL-653
p nucleus	800	FNAL-711
p nucleus	800	FNAL-761
p nucleus	800	FNAL-772
$\bar{p}$ p		CERN-PS-170
$\bar{p}$ p		CERN-PS-175
$\bar{p}$ p		CERN-PS-195
$\bar{p}$ p	<1.80	CERN-PS-201
$\bar{p}$ p	<2.00	CERN-PS-197
$\bar{p}$ p	<2.00	CERN-PS-170
$\bar{p}$ p	0.3–0.7	CERN-PS-198
$\bar{p}$ p	0.5–1.30	CERN-PS-199
$\bar{p}$ p	0.6	CERN-PS-206
$\bar{p}$ p	0.6–1.90	CERN-PS-202
$\bar{p}$ p	1.20–2.00	CERN-PS-185
$\bar{p}$ p	1.43–1.45	CERN-PS-185-2
$\bar{p}$ p	3.00–7.00	FNAL-760
$\bar{p}$ p	3.00–8.80	FNAL-862
$\bar{p}$ p	6.00	BNL-838
$\bar{p}$ p	8.00	BNL-881
$\bar{p}$ p	40.0–50.0	SERPUKHOV-148
$\bar{p}$ p	200	FNAL-581/704
$\bar{p}$ p	313	CERN-UA-006

HERE, FOR THE REST OF $\bar{p}p$, WE SWITCH FROM LAB MOMENTUM TO C.M. ENERGY

Beam-target	C.m. energy (GeV)	Experiment
$\bar{p}$ p	300	FNAL-710
$\bar{p}$ p	300–2000	FNAL-713
$\bar{p}$ p	500–2000	FNAL-741
$\bar{p}$ p	540	CERN-UA-001
$\bar{p}$ p	546	FNAL-710
$\bar{p}$ p	630	CERN-UA-001
$\bar{p}$ p	630	CERN-UA-002
$\bar{p}$ p	630	CERN-UA-004-2
$\bar{p}$ p	630	CERN-UA-008
$\bar{p}$ p	1000	FNAL-710
$\bar{p}$ p	1800	FNAL-710
$\bar{p}$ p	1800	FNAL-811
$\bar{p}$ p	2000	FNAL-735
$\bar{p}$ p	2000	FNAL-740

Beam-target	Lab momentum (GeV/c)	Experiment
$\bar{p}$ n	<2.00	CERN-PS-197
$\bar{p}$ deut		CERN-PS-175
$\bar{p}$ deut	<1.80	CERN-PS-201
$\bar{p}$ deut	0.3–0.7	CERN-PS-198
$\bar{p}$ He		CERN-PS-175
$\bar{p}$ He	1×10^{-5}–0.0001	CERN-PS-194-3
$\bar{p}$ He	0.01	CERN-PS-194-2
$\bar{p}$ He	0.1	CERN-PS-205
$\bar{p}$ He	0.2	CERN-PS-194-2
$\bar{p}$ He	0.2	CERN-PS-205
$\bar{p}$ He	0.5	KEK-215
$\bar{p}$ ^{3}He		CERN-PS-175
$\bar{p}$ ^{7}Li	300	FNAL-705
$\bar{p}$ Be	0.7–2.50	ITEP-865

BEAM/TARGET/MOMENTUM INDEX

Beam-target	Lab momentum (GeV/c)	Experiment
$\bar{p}$ C	0.1	CERN-PS-204
$\bar{p}$ C	0.7–2.50	ITEP-865
$\bar{p}$ Al	0.7–2.50	ITEP-865
$\bar{p}$ Fe	0.7–2.50	ITEP-865
$\bar{p}$ Cu	0.7–2.50	ITEP-865
$\bar{p}$ Cd	0.7–2.50	ITEP-865
$\bar{p}$ Xe	1×10^{-5}–1.00	ITEP-913
$\bar{p}$ Pb	0.7–2.50	ITEP-865
$\bar{p}$ nucleus		CERN-PS-177
$\bar{p}$ nucleus		CERN-PS-203
$\bar{p}$ nucleus	<1.80	CERN-PS-201
$\bar{p}$ nucleus	0.0002–0.004	CERN-PS-194-3
$\bar{p}$ nucleus	0.2	CERN-PS-208
$\bar{p}$ nucleus	5.00	BNL-854
$\bar{p}$ nucleus	7.00	BNL-854
$\bar{p}$ nucleus	9.00	BNL-854
$\bar{p}$ nucleus	40.0	SERPUKHOV-148
$\bar{p}$ nucleus	40.0–50.0	SERPUKHOV-148
$\bar{p}$ crystal	0.03	CERN-PS-194-2
$\bar{p}$ crystal	0.2	CERN-PS-194-2
n p	0.3–1.0	LAMPF-1208
n p	0.3	PSI-Z-89-06
n p	0.3–2.85	KEK-235
n p	0.4	PSI-Z-89-07
n p	0.5–1.20	PSI-R-87-12
n p	0.6–1.20	PSI-R-86-14
n p	0.6–1.20	PSI-R-72-02
n p	0.6	IUCF-E-323
n p	0.6	TRIUMF-498
n p	0.6	IUCF-E-080
n p	0.6	IUCF-E-328
n p	0.7	TRIUMF-498
n p	0.8	TRIUMF-466
n p	0.8	TRIUMF-466
n p	0.8	TRIUMF-466
n p	0.8	TRIUMF-704
n p	0.8	TRIUMF-466
n p	0.8	TRIUMF-498
n p	0.8	TRIUMF-466
n p	0.8–1.46	LAMPF-960
n p	0.8–1.81	SATURNE-144
n p	0.9	TRIUMF-369
n p	1.02	TRIUMF-372
n p	1.09	LAMPF-1234
n p	1.09	LAMPF-1293
n p	1.18–1.85	SATURNE-140
n p	1.19	LAMPF-1234
n p	1.28	LAMPF-876
n p	1.28	LAMPF-1234
n p	1.28	LAMPF-1293
n p	1.37	LAMPF-1293
n p	1.38	LAMPF-1234
n p	1.45	LAMPF-1309
n p	1.46	LAMPF-1293
n p	1.46	LAMPF-876
n deut	0.6–1.20	PSI-R-72-02
n ^{81}Br	?	KEK-231
n ^{139}La	?	KEK-231
n nucleus	0.004–70.0	SERPUKHOV-159
n nucleus	4.00–9.00	ITEP-922
n nucleus	?	LAMPF-1188
$\bar{n}$ p	<0.3	CERN-PS-201
$\bar{n}$ nucleus	<0.3	CERN-PS-201
Λ p	30.0–60.0	SERPUKHOV-120
Λ deut	30.0–60.0	SERPUKHOV-120
Λ Cu	300–500	FNAL-800
Λ Cu	300–800	FNAL-756
Σ^+ p	0.2–0.6	KEK-251
Σ^+ p	30.0–60.0	SERPUKHOV-120
Σ^+ deut	30.0–60.0	SERPUKHOV-120
Σ^- p	30.0–60.0	SERPUKHOV-120
Σ^- deut	30.0–60.0	SERPUKHOV-120
Σ^- C	330	CERN-WA-089
Σ^- Cu	330	CERN-WA-089
Ξ^- p	30.0–60.0	SERPUKHOV-120
Ξ^- deut		BNL-813
Ξ^- deut	30.0–60.0	SERPUKHOV-120
Ξ^- ^{6}Li		BNL-885
Ξ^- C	270	CERN-WA-089
Ξ^- ^{12}C		BNL-885
Ξ^- Cu	270	CERN-WA-089
Ξ^0 p	30.0–60.0	SERPUKHOV-120
Ξ^0 deut	30.0–60.0	SERPUKHOV-120
Ξ^0 Cu	300–500	FNAL-800
Ξ^0 Cu	300–800	FNAL-756
Ω^- p	30.0–60.0	SERPUKHOV-120
Ω^- deut	30.0–60.0	SERPUKHOV-120
Ω^- C	270	CERN-WA-089
Ω^- Cu	270	CERN-WA-089
hadron p	200–2000	FNAL-690
monopole n	?	UNDERGROUND-IMB
monopole p	?	UNDERGROUND-IMB
deut p	0.9	SATURNE-166
deut p	0.9–1.29	SATURNE-235
deut p	1.10–3.73	SATURNE-249
deut p	1.20	SATURNE-166
deut p	1.29	IUCF-CE-47
deut p	1.29	SATURNE-246
deut p	3.39	SATURNE-145
deut p	?	SATURNE-190
deut deut	2.37–3.56	SATURNE-186
deut deut	?	SATURNE-280
deut C		SATURNE-253
deut nucleus	3.50–5.00	KEK-257
deut nucleus	3.51	SATURNE-202
deut nucleus	3.72	SATURNE-134
deut nucleus	201	CERN-NA-035
He p	3.00	ITEP-892
He p	5.00	ITEP-892
He p	7.00	SATURNE-220
He deut	4.20	SATURNE-251
He ^{12}C	4.20	SATURNE-251
^{12}C nucleus		BNL-826
^{12}C p		TRIUMF-478
^{16}O Au	232	BNL-844
^{16}O ^{238}U	3202	CERN-NA-038
^{16}O nucleus	222–3217	CERN-EMU-001
^{16}O nucleus	232	BNL-802
^{16}O nucleus	232	BNL-814
^{16}O nucleus	246	BNL-806
^{16}O nucleus	254	BNL-808
^{16}O nucleus	254	BNL-810
^{16}O nucleus	254	BNL-815
^{16}O nucleus	254	BNL-825
^{16}O nucleus	254	CERN-EMU-005
^{16}O nucleus	815	CERN-EMU-005
^{16}O nucleus	815	CERN-WA-086
^{16}O nucleus	975	CERN-EMU-003
^{16}O nucleus	975	CERN-EMU-007
^{16}O nucleus	975	CERN-EMU-011
^{16}O nucleus	975	CERN-NA-035
^{16}O nucleus	975	CERN-WA-080
^{16}O nucleus	3202	CERN-NA-034-2
^{16}O nucleus	3217	CERN-EMU-005
^{16}O nucleus	3217	CERN-WA-086

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Beam-target	Lab momentum (GeV/c)	Experiment
^{16}O nucleus	3217	CERN-EMU-003
^{16}O nucleus	3217	CERN-EMU-007
^{16}O nucleus	3217	CERN-EMU-011
^{16}O nucleus	3217	CERN-NA-035
^{16}O nucleus	3217	CERN-WA-080
Ne Br	80.6	ITEP-852
Ne Ag	80.6	ITEP-852
Mg Ar	97.1	ITEP-852
Mg Br	97.1	ITEP-852
Si Cu		BNL-793
Si Pb		BNL-793
^{28}Si Pt	434	BNL-886
^{28}Si Pb	434	BNL-882
^{28}Si nucleus	406	BNL-802
^{28}Si nucleus	406	BNL-814
^{28}Si nucleus	431	BNL-806
^{28}Si nucleus	431	BNL-847
^{28}Si nucleus	431	BNL-878
^{28}Si nucleus	431	CERN-EMU-011
^{28}Si nucleus	445	BNL-810
^{28}Si nucleus	445	BNL-815
^{28}Si nucleus	445	BNL-825
^{28}Si nucleus	445	BNL-858
^{28}Si nucleus	?	BNL-859
Su Su	6445	CERN-NA-044
Su Su	6445	CERN-WA-094
Su Ag	6445	CERN-NA-044
Su Wt	6415	CERN-NA-034-3
Su Pb	6445	CERN-NA-044
Su nucleus	6445	CERN-WA-093
^{32}S Wt	6433	CERN-WA-085
^{32}S ^{238}U	6403	CERN-NA-038
^{32}S nucleus	509	BNL-808
^{32}S nucleus	509	BNL-826
^{32}S nucleus	1630	CERN-WA-086
^{32}S nucleus	1951	CERN-EMU-003
^{32}S nucleus	6403	CERN-NA-034-2
^{32}S nucleus	6403	CERN-NA-036
^{32}S nucleus	6403	CERN-NA-045
^{32}S nucleus	6433	CERN-WA-086
^{32}S nucleus	6433	CERN-EMU-003
^{32}S nucleus	6433	CERN-EMU-001
^{32}S nucleus	6433	CERN-EMU-007
^{32}S nucleus	6433	CERN-EMU-009
^{32}S nucleus	6433	CERN-EMU-010
^{32}S nucleus	6433	CERN-EMU-011
^{32}S nucleus	6433	CERN-NA-035
^{32}S nucleus	6433	CERN-WA-080
^{32}S nucleus	6433	CERN-WA-090
^{197}Au Pt		BNL-886
^{197}Au Pb		BNL-882
^{197}Au nucleus	2147	BNL-877
^{197}Au nucleus	2147	BNL-891
^{197}Au nucleus	$<1.971\times10^{14}$	BNL-863
^{197}Au nucleus		BNL-868
^{197}Au nucleus		BNL-875
^{197}Au nucleus		CERN-EMU-011
^{197}Au nucleus		BNL-866
^{197}Au nucleus		BNL-864
^{197}Au nucleus		BNL-896
^{197}Au nucleus		BNL-878
^{197}Au nucleus		CERN-EMU-011
Pb ^{59}Co	3.336×10^4	CERN-NA-053
Pb ^{197}Au	3.336×10^4	CERN-NA-053
Pb Pb	3.317×10^4	CERN-NA-052
Pb Pb	3.317×10^4	CERN-WA-098
Pb Pb	3.336×10^4	CERN-EMU-015
Pb Pb	3.336×10^4	CERN-NA-044
Pb Pb	3.336×10^4	CERN-WA-097
Pb nucleus	3.317×10^4	CERN-WA-101
Pb nucleus	3.336×10^4	CERN-NA-050
Pb nucleus	?	CERN-NA-049
^{207}Pb nucleus	1.262×10^4	CERN-EMU-011
^{207}Pb nucleus	1.262×10^4–3.333×10^4	CERN-EMU-012
^{207}Pb nucleus	3.747×10^4	CERN-EMU-013
^{207}Pb nucleus	4.161×10^4	CERN-EMU-011
^{208}Pb nucleus	2.1×10^4	CERN-EMU-017
^{208}Pb nucleus	3.349×10^4	CERN-EMU-018

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ABBREVIATIONS USED IN THE SUMMARIES

JOURNALS

Following are abbreviations for journals listed in the summaries:

AEU	Atomnaya Energiya (In Russian)
APL	Applied Physics Letters
APP	Acta Physica Polonica
AOPT	Applied Optics
ASPP	Astroparticle Physics
ASTJ	Astrophysical Journal
CNPP	Comments on Nuclear and Particle Physics
CPC	Computer Physics Communications
CZJP	Czechoslovakian Journal of Physics
DANS	Doklady Akademii Nauk SSSR (in Russian)
ECHAYA	Fizika Elementarnykh Chastits i Atomnogo Yadra (in Russian)
EPL	Europhysics Letters
FORT	Fortschritte der Physik
HEPNP	High Energy Physics and Nuclear Physics (in Chinese)
HFI	Hyperfine Interactions
HPA	Helvetica Physica Acta
IEEE MTT	Institute of Electrical and Electronics Engineers Transactions on Microwave Theory and Techniques
IEEE TNS	Institute of Electrical and Electronics Engineers Transactions on Nuclear Science
IJMP	International Journal of Modern Physics
JDEP	Journale de Physique
JETPL	Journal of Experimental and Theoretical Physics Letters (English translation of ZETFP)
JJAP	Japanese Journal of Applied Physics
JDEP	Journale de Physique
JLTP	Journal of Low Temperature Physics
JPHY	Journal of Physics
JPSJ	Journal of the Physical Society of Japan
LNC	Lettere al Nuovo Cimento
MCF	Muon Catalyzed Fusion
MPL	Modern Physics Letters
NC	Nuovo Cimento
NIM	Nuclear Instruments and Methods
NP	Nuclear Physics
PAN	Physics of Atomic Nuclei (English translation of YF)
PL	Physics Letters
PPNP	Progress in Particle and Nuclear Physics
PR	Physical Review
PRL	Physical Review Letters
PRPL	Physics Reports (Physics Letters C)
PS	Physica Scripta
PTE	Pribory i Tekhnika Eksperimenta (in Russian)
PTP	Progress of Theoretical Physics
PW	Particle World
RCHA	Radiochimica Acta
RMP	Reviews of Modern Physics
RPP	Reports on Progress in Physics
RSI	Review of Scientific Instruments
SHEP	Surveys in High Energy Physics
SJNP	Soviet Journal of Nuclear Physics (English translation of YF)
YF	Yadernaya Fizika (translated as SJNP before 1993, and as PAN thereafter)
ZETF	Zhurnal Eksperimental'noi i Teoreticheskoi Fiziki (translated as JETP)
ZETFP	Pis'ma v Zhurnal Eksperimental'noi i Teoreticheskoi Fiziki (translated as JETPL)
ZPHY	Zeitschrift für Physik

KINEMATIC VARIABLES

Following are abbreviations used with reactions to indicate the momenta or energies at which they are studied:

PLAB	beam momentum in the lab frame
TLAB	beam kinetic energy in the lab frame
ELAB	beam total energy in the lab frame
PLAB/N	beam momentum per nucleon in the lab frame
TLAB/N	beam kinetic energy per nucleon in the lab frame
ELAB/N	beam total energy per nucleon in the lab frame
ECM	total energy in the c.m. frame

ACCELERATORS

BEPC	Beijing e^+e^- collider (3.6 GeV Ecm)
BNL	Brookhaven AGS proton synchrotron (31 GeV/c Plab)
BNL-ION	Brookhaven heavy ion accelerator
BNL-RHIC	Brookhaven relativistic heavy ion collider (100 GeV/n per beam)
CEBAF	CEBAF linear accelerator with continuous e^- beam (4.0 GeV Ecm)
CERN-LEAR	CERN Low-Energy Antiproton Ring
CERN-LEP	CERN Large Electron-Positron collider (100 GeV Ecm)
CERN-PBAR/P	CERN $\overline{p}p$ collider (900 GeV Ecm)
CERN-SC	CERN cyclotron (600 MeV/c Plab)
CERN-SPS	CERN Super Proton Synchroton (450 GeV/c Plab)
CESR	Cornell Electron-positron Storage Ring (16 GeV Ecm)
DESY-DORIS	DESY DORIS electron-positron double ring (11.6 GeV Ecm)
DESY-DORIS-III	DESY DORIS 1991 upgrade
DESY-HERA	DESY HERA electron (26 GeV) – proton (820 GeV) collider
FNAL-COLLIDER	FNAL $\overline{p}p$ collider (2000 GeV Ecm)
FNAL-TEV	FNAL fix target Tevatron (1000 GeV)
ITEP	ITEP Moscow proton synchrotron (7 GeV/c Plab)
IUCF-COOLER	Proton storage ring with phase-space cooling at Indiana University
IUCF-CYCLOTRON	Indiana University cyclotron
JINR	JINR (Dubna) proton synchrotron (10 GeV/c Plab)
KEK-PS	KEK proton synchrotron (12 GeV/c Plab)
KEK-TRISTAN	KEK electron-positron storage ring (60 GeV Ecm)
LAMPF	Los Alamos Meson/Proton Factory (1460 MeV/c Plab)
NONE	no accelerator used
NOVO-VEPP-2M	Novosibirsk VEPP-2M electron-positron storage ring (1.4 GeV Ecm)
PSI	Paul Scherrer Institute, formerly SIN (590 MeV Tlab)
SATURNE-II	Saclay Saturne-II p, d, and He synchrotron
SERPUKHOV	Serpukhov proton synchrotron (76 GeV/c Plab)
SERPUKHOV-UNK	Serpukhov multi-TeV proton machine
SLAC	Stanford electron linear accelerator (40 GeV/c Plab)
SLAC-PEP	SLAC Positron-Electron Project (36 GeV Ecm)
SLAC-SLC	SLAC Linear e^+e^- Collider (100 GeV Ecm)
SLAC-SPEAR	SLAC SPEAR electron-positron ring (8.4 GeV Ecm)
TOKYO	Inst. for Nucl. Studies (Tokyo) electron synchrotron (1.3 GeV/c Plab)
TRIUMF	Canadian TRIangle University Meson Facility (520 MeV Tlab)

For bubble chambers, we use a construction such as:

DBC-2M, or **HBC-15FT-HYB**, or **HLBC-BEBC-TST**.

The first element, one of

HBC, **DBC**, **HEBC**, or **HLBC**,

tells whether the chamber fill is hydrogen, deuterium, helium, or heavy liquid. The second element gives the size or name of the chamber. Where appropriate, a third element, one of

HYB, **RAP**, or **TST**,

indicates that the chamber is part of a hybrid system, or that it is rapid cycling, or that it contains a track-sensitive target.

In searching the SLAC/SPIRES database from which this report is taken, use the following abbreviations for general kinds of detectors (in this report, the words are spelled out):

CALO	calorimeter
CNTR	counter(s)
COMB	combination of various elements
DAS	double-arm spectrometer
DRIFT	drift chamber
EMUL	emulsion
IONIZATION	detector looking for ionization
MICROSTRIP	microstrip detector
MWPC	multiwire proportional chamber
OSPK	optical spark chamber
OTHER	other types of detectors
PHOTON	photon spectrometer such as NaI or Ge detectors
PLASTIC	Lexan, etc., used like emulsion
RICH	ring-imaging Čerenkov detector
SAS	single-arm spectrometer
SCINT	scintillator
SPEC	spectrometer system
STRC	streamer chamber
TPC	time projection chamber
TRAD	transition radiation detector
WAS	wide-angle spectrometer
WIRE	wire chamber

Acronyms for specific detectors:

ALEPH	CERN-LEP detector
AMY	KEK-TRISTAN high-resolution lepton detector
ARGUS	DESY-DORIS-II detector
BCD	FNAL Bottom Collider Detector
BELLE	KEK-B-FACTORY proposed detector
BENKEI	KEK-PS detector
BES	BEPC detector
BRAHMS	BNL-RHIC proposed Broad Range Hadron Magnetic Spectrometer
CCM	FNAL, FNAL-TEV Chicago Cyclotron Magnet spectrometer
CDF	Collider Detector at Fermilab
CHAOS	TRIUMF detector
CHARM	CERN-PS, CERN-SPS CERN-Hamburg-Amsterdam-Rome-Moscow neutrino detector
CHARM-II	CERN-SPS upgrade of CHARM detector
CLAS	CEBAF Large Acceptance Spectrometer (under construction)
CLEO	CESR spectrometer system
CMD	Novosibirsk detector
CMD-2	Novosibirsk upgrade of CMD
CRYSTAL-BARREL	CERN-LEAR large-solid-angle detector
CUSB	CESR Columbia University–Stony Brook high-resolution calorimeter
CUSB-II	CESR upgrade of CUSB
DELPHI	CERN-LEP detector
DIOGENE	Saclay SATURNE-II pictorial drift chamber

DETECTORS

D0	FNAL-COLLIDER detector
EMC	CERN-SPS European Muon Collaboration detector
EMRIC	Saclay detector
EVA	BNL Exclusive Variable Apparatus
EXCHARM	Serpukhov detector, upgrade of BIS-2M
FANCY	KEK-PS, KEK-TRISTAN Forward ANd CYlindrical detector system
FHS-1	ITEP Focusing Hadron Spectrometer
FHS-2	ITEP upgrade of FHS-1
FHS-3	ITEP upgrade of FHS-2
FOCUS	ITEP modified NHS spectrometer
FODS	Serpukhov double-arm spectrometer
FODS-2	Serpukhov upgrade of FODS
GAMS-2000	Serpukhov hodoscope gamma spectrometer
GAMS-4000	CERN-SPS 64×64 cell Pb-glass array
GAMS-4PI	Serpukhov gamma spectrometer
GGNT	Baksan Gallium–Germanium Neutrino Telescope
HELIOS	CERN-SPS detector
HYPERON-II	Serpukhov single arm magnetic spectrometer
HYPERSPEC	BNL hypernuclear spectrometer
H1	DESY-HERA detector
ISTRA-M	Serpukhov detector
JANUS	LAMPF proton polarimeter
JETSET	CERN-LEAR compact general purpose detector
KASKAD	Serpukhov cascade magnetic spectrometer
KURAMA	KEK wide angle spectrometer
LAB-E	FNAL, FNAL-TEV target-calorimeter muon-spectrometer detector for neutrino physics
LAHRS	LAMPF Los Alamos High-Resolution (proton) Spectrometer
LAMBDAMETER	ITEP detector
LSND	LAMPF Liquid Scintillator Neutrino Detector
L3	CERN-LEP detector
MAGE	ITEP MAgnet–GErmanium spectrometer
MARK-II	SLAC-SPEAR, SLAC-PEP, SLAC-SLC detector
MARK-III	SLAC-SPEAR detector
MEGA	LAMPF array of electron and photon spectrometers
MINIMAX	FNAL collider detector
MIS	Serpukhov multiparticle spectrometer
MIS-2	Serpukhov upgrade of MIS
MPS	BNL MultiParticle Spectrometer
MPS-II	BNL upgrade of MPS
MTS	ITEP detector
NEPTUN	Serpukhov-UNK jet target detector
NHS	ITEP Non-magnetic Hadron Spectrometer
OMEGA	CERN, CERN-SPS spectrometer system
OMEGAPRIME	CERN-SPS spectrometer system
OPAL	CERN-LEP detector
PHENIX	BNL-RHIC photon, electron, and hadron detector, under construction
PHOBOS	BNL-RHIC two-arm multiparticle spectrometer, under construction
PINOT	Saclay high resolution pi0 and eta detector
PLASTIC-BALL	CERN-SPS detector
POLDER	Saclay polarimeter
POMME	Saclay medium energy deuteron polarimeter
PROZA	Serpukhov polarized proton target with frozen polarization, gamma spectrometer, neutron detector
PROZA-M	Serpukhov polarized target detector
QUARTZ	Serpukhov crystal-diffraction spectrometer
SHIP	KEK-TRISTAN detector for Search for Highly Ionizing Particles
SIGMA	Serpukhov CERN-IHEP magnetic spectrometer
SIGMA-AYAKS	Serpukhov upgrade of SIGMA
SINDRUM	PSI large-solid-angle magnetic detector
SINDRUM-II	PSI upgraded large-angle solenoid detector
SLD	SLAC-SLC detector
SND	Novosibirsk Spherical Neutral Detector
SPES-0	Saclay modular lead-glass Čerenkov detector
SPES-I	Saclay high-resolution spectrometer
SPES-II	CERN, CERN-LEAR high-resolution spectrometer

SPES-III	Saclay high-resolution spectrometer
SPES-IV	Saclay high-resolution spectrometer
SPHINX	Serpukhov detector, also known as SFINKS
STAR	BNL-RHIC solenoidal detector, under construction
SUPERBENKEI	KEK window-frame-type superconducting magnetic spectrometer
TAGX	TOKYO large-aperture spectrometer system
TOKIWA	KEK-PS spectrometer
TOPAZ	KEK-TRISTAN solenoidal spectrometer with TPC
TPS	FNAL Tagged Photon Spectrometer
2-GAMMA	SLAC-PEP system of forward detectors for 2-gamma process
UA1	CERN-PBAR/P detector
UA2	CERN-PBAR/P detector
VENUS	KEK-TRISTAN Versatile Economical and Novel Universal Spectrometer
VES	Serpukhov magnetic VErtex Spectrometer
ZEUS	DESY-HERA detector

SUMMARIES OF BEIJING AND BROOKHAVEN EXPERIMENTS

BEPC Experiments

BEPC-BES

(Began data-taking 1991)

MEASUREMENT OF THE τ LEPTON MASS WITH THE BEIJING SPECTROMETER (BES)

BEIJING, IHEP – J Z Bai, S M Chen, S J Chen, Y Q Cheng, Z D Cheng, H C Cui, X Z Cui, H L Ding, Z Z Du, C Fang, M L Gao, S Q Gao, W X Gao, Y N Gao, J H Gu, S D Gu, W X Gu, Y N Guo, Y Y Guo, Y Han, J He, G Y Hu, H B Hu, T Hu, D Q Huang, Y Z Huang, C H Jiang, Z J Jiang, Y F Lai, P F Lang, F Li, J Li (✓ Spokesperson), P Q Li, Q M Li, R B Li, W D Li, W Li, W G Li, Y S Li, S Z Lin, H M Liu, Q Liu, R G Liu, Y Liu, J G Lu, D H Ma, E C Ma, J M Ma, H S Mao, Z P Mao, X C Meng, H L Ni, L J Pan, N D Qi, Y K Que, G Rong, Y Y Shao, D L Shen, H Y Sheng, H Z Shi, X F Song, H S Sun, G L Tong, L Z Wang, M Wang, P L Wang, P Wang, T J Wang, Y Y Wang, X D Wu, D M Xi, X M Xia, P P Xie, X X Xie, R S Xu, Z Q Xu, S T Xue, J Yan, W G Yan, C Y Yang, C M Yang, H B Yao, M H Ye, S Z Ye, Z Q Yu, B Y Zhang, C C Zhang, D H Zhang, H Y Zhang, H L Zhang, J W Zhang, L S Zhang, S Q Zhang, Y Zhang, D X Zhao, M Zhao, P D Zhao, W R Zhao, J P Zheng, L S Zheng, Z P Zheng, G P Zhou, H S Zhou, L Zhou, L Zhou, X F Zhou, Y H Zhou, Q M Zhu, Y S Zhu, Y C Zhu
BOSTON U – J A Coller, A S Johnson, J Shank, J S Whitaker
CAL TECH – M Hatanaka, D Hitlin, L A Jones, M H Kelsey, J H Panetta, F Porter, E N Prabhakar, X Shi
COLORADO STATE U – J Chen, Q P Jia, W Toki (✓ Spokesperson), R J Wilson
HAWAII U – A Breakstone, F Harris, S Olsen, D Paluselli, E Torrence, R K Yamamoto
MIT, LNS – O Bardon, R Cowan, M Fero, J Quigley, E Torrence, R K Yamamoto
SLAC – R A Becker-Szendy, W M Dunwoodie, H Marsiske, E Soderstrom, J Synodinos, W J Wisniewski
TEXAS U, DALLAS – I Blum, J S Campbell, P Gratton, J M Izen, X Lou, B Lowery, J Standifird
UC, IRVINE – A J Lankford, M Mandelkern, M Schernau, B Schmid, J Schultz, A Smith, D P Stoker, G Zioulas
WASHINGTON U, SEATTLE – T Burnett, K Young

Accelerator BEPC *Detector* BES

Reactions

$e^+ e^- \rightarrow \tau^+ \tau^-$	3.6 GeV (E_{cm})

Particles studied τ

Brief description Uses non-collinear 2-prong $e\mu$ events with both e and μ identified. Measures the threshold behavior of the cross section by scanning a very narrow range of energies, $3.544 < E_{cm} < 3.569$ GeV. The BES detector consists of a Muon Counter, TOF Counters, a Barrel Shower Counter and the main Drift Chamber.

Journal papers NIM A308 (1991) 616, and PRL 69 (1992) 3021.

E-mail contact lij@bepc2.ihep.ac.cn, toki@lamar.colostate.edu

WWW Home-page
http://slacvx.slac.stanford.edu/BESWWW/000000/bes.html

BNL Experiments

BNL-747

(Proposed Aug 1979, Approved Oct 1980, Feb 1984, Began data-taking Jun 1982, Completed data-taking 1988)

A HIGH STATISTICS STUDY OF ϕ AND $\phi\phi$ PRODUCTION FROM $\pi^- p$ AND $K^- p$ INTERACTIONS AT 22 GeV/c — A SEARCH FOR GLUEBALLS

BROOKHAVEN – A Etkin, K J Foley, R W Hackenburg, R S Longacre, W A Love, T W Morris, E D Platner, A C Saulys
BROOKHAVEN & CITY COLL, NY – S J Lindenbaum (Spokesperson)
CITY COLL, NY – C S Chan, M A Kramer

Accelerator BNL *Detector* MPS-II

Reactions

$\pi^- p \rightarrow \phi \phi n$	22 GeV/c
$\pi^- p \rightarrow \phi K^+ K^- n$	"
$K^- p \rightarrow \phi Y^0$	"
$K^- p \rightarrow \phi \phi Y^0$	"
$K^- p \rightarrow \phi K^+ K^- Y^0$	"

Particles studied glueball

Brief description Of particular interest is the role of glueballs in the breaking of the OZI rule in $\pi^- p \rightarrow \phi\phi n$. Three new $I^G J^{PC} = 0^+ 2^{++}$ meson states, the $f_2(2010)$, $f_2(2300)$, and $f_2(2340)$, fit the glueball resonance hypothesis and no other one proposed. A second-phase experiment is planned to search for exotic-J^{PC} glueballs in $\pi^- p \rightarrow \phi\phi n$ and other reactions.

Journal papers PRL 49 (1982) 1620, SHEP 4 (1983) 69, PL B131 (1983) 221, CNPP 13 (1984) 285, PL B149 (1984) 407, PL B165 (1985) 202, PL B165 (1985) 217, and PL B201 (1988) 568.

E-mail contact lindenbaum@bnldag.bnl.gov

BNL-774

(Proposed Aug 1981, Apr 1982, Approved May 1982, Began data-taking Apr 1985, Completed data-taking 1991)

SEARCH FOR Σ HYPERNUCLEAR LEVELS IN ^{4}He

HOUSTON U – E V Hungerford (Spokesperson), B W Mayes, H Piekarz, L S Pinsky
BROOKHAVEN – S Bart, R Chrien, P Pile
NEW MEXICO U – B Bassalleck
VASSAR COLL – R Stearns

Accelerator BNL *Detector* Spectrometer

Reactions

K^- He $\rightarrow \pi^+$ hypernuc	600 MeV/c

Particles studied hypernuc

Brief description A continuation of BNL-752. Ran for 650 hours.

Journal papers PR C35 (1987) 1589.

Related experiments BNL-752

E-mail contact hunger@uh.edu

SUMMARIES OF BEIJING AND BROOKHAVEN EXPERIMENTS

BNL-777

(Proposed Jan 1982, Approved May 1982, Began data-taking Feb 1985, Completed data-taking May 1988)

SEARCH FOR THE RARE DECAY MODE $K^+ \to \pi^+\mu^+e^-$

BROOKHAVEN – H A Gordon, D M Lazarus, P Rehak
YALE U – C Alliegro, C Campagnari, P S Cooper, N Hadley, A Lee, M E Zeller (Spokesperson)
WASHINGTON U, SEATTLE – V Chaloupka, E Jagel, H J Lubatti
PSI, VILLIGEN – J Egger, W D Herold, H Kaspar

Accelerator BNL *Detector* Spectrometer

Reactions

$K^+ \to \pi^+ \mu^+ e^-$	5.8 GeV/c
$K^+ \to \pi^+ e^+ e^-$	"

Particles studied K^+

Journal papers PRL 59 (1987) 2832, PRL 61 (1988) 2062, and PRL 64 (1990) 165.

Related experiments BNL-865

E-mail contact zeller@yalph1.physics.yale.edu, zeller@yalehep.bitnet

BNL-780

(Proposed Sep 1982, Approved Feb 1983, Began data-taking May 1985, Completed data-taking 1988)

A SEARCH FOR THE FLAVOR CHANGING NEUTRAL CURRENTS $K_L \to \mu e$ AND $K_L \to e^+e^-$

BROOKHAVEN – E Jastrzembski, R C Larsen, L B Leipuner, W M Morse (√ Spokesperson)
YALE U – R K Adair, H B Greenlee, H Kasha, E B Mannelli, M Mannelli, K E Ohl, S F Schaffner, M P Schmidt (√ Spokesperson), C B Schwarz

Accelerator BNL *Detector* Spectrometer

Reactions

$K_L \to \mu^+ e^-$	4–12 GeV/c
$K_L \to \mu^- e^+$	"
$K_L \to e^+ e^-$	"
$K_L \to \mu^+ \mu^-$	"
$K_L \to \pi^0 e^+ e^-$	"

Particles studied K_L

Brief description A sensitivity to branching fractions of 10^{-9} was achieved.

Journal papers PRL 60 (1988) 893, PRL 61 (1988) 2300, and PR D39 (1989) 990. No other papers expected.

Related experiments BNL-791, CERN-NA-031, FNAL-731

E-mail contact morse@bnlcl1.bnl.gov, schmidt@yalph2.physics.yale.edu

BNL-781

(Proposed Sep 1982, Approved Feb 1983, Began data-taking Jan 1984, Completed data-taking 1992)

SPIN DEPENDENCE OF THE Λ – NUCLEUS INTERACTION DETERMINED BY OBSERVATION OF HYPERNUCLEAR γ RAYS

BROOKHAVEN – D Alburger, S Bart, R E Chrien, M May (√ Spokesperson), P H Pile, R Sawafta
MIT – M Deutsch (√ Spokesperson), V Lia
INDIANA U – S Bowyer, W Franklin, J Lisantti, S Wells, S Wissink
HOUSTON U – B Barakat
OHIO U – H Clark, K Hicks, R Michael
TRIUMF – L Lee
COLORADO U – C Kormanyos, J Wise
VASSAR COLL – R L Stearns
NEW YORK U – B Budick

Accelerator BNL *Detector* Spectrometer, Photon spectrometer

Reactions

K^- nucleus $\to \pi^-$ hypernuc γ(s)	800 MeV/c

Particles studied hypernuc

Brief description Searches for radiative transitions in the hypernuclei $^{10}_{\Lambda}$B and $^{13}_{\Lambda}$C.

Journal papers PR C41 (1990) 1062.

Related experiments BNL-760

E-mail contact may@bnldag.bnl.gov, deutsch@mitlns.mit.edu

BNL-782

(Proposed Sep 1982, Approved Feb 1983, Began data-taking Jul 1984, In progress)

SPIN–SPIN EFFECTS IN MEDIUM AND HIGH MOMENTUM TRANSFER ELASTIC *pp* SCATTERING

MICHIGAN U – I C Chang, D G Crabb, E C Gero, F C Hansen, N Heydari, W A Kaufman, A D Krisch (Spokesperson), A M T Lin, R R Raylman, B S Van Guilder, B Vuaridel
KING FAHD U – F Z Khiari
MIAMI U – A Perlmutter
BROOKHAVEN – K A Brown, P R Cameron, Y Y Lee, L G Ratner, T Roser
MARYLAND U & MICHIGAN U – D C Peaslee
MIT – G R Court
TEXAS A AND M – G Glass, L C Northcliffe
TRIUMF – M C Vetterli

Accelerator BNL *Detector* Counter

Reactions Polarized beam and target

$p\,p \to p\,p$	13–26 GeV/c

Brief description Continues to higher energies prior studies at Argonne of spin–spin effects.

Journal papers PR D31 (1985) 3017, PRL 57 (1986) 507, PRL 60 (1988) 2351, and PR D39 (1989) 45.

E-mail contact krisch@umiphys.bitnet

BNL-787

(Proposed Sep 1983, Approved Oct 1983, Began data-taking Jun 1988, In progress)

A STUDY OF THE DECAY $K^+ \to \pi^+\nu\bar{\nu}$

BROOKHAVEN – S Adler, M S Atiya, I H Chiang, M Diwan, J S Frank, J S Haggerty, S H Kettell, T F Kycia, K K Li, L S Littenberg (√ Spokesperson), A J Stevens, R C Strand, C Witzig
TOKYO U, INS – T Komatsubara, H Okuno, S Sugimoto, K Ukai
KEK – T Inagaki, S Kabe, M Kobayashi, Y Kuno, T Sato, T Shinkawa, Y Yoshimura
PRINCETON U – M Ardebili, M Convery, M M Ito, D R Marlow, R McPherson, P D Meyers, M A Selen, F C Shoemaker, A J S Smith (√ Spokesperson), B Stone
TRIUMF – M Aoki, E W Blackmore, D A Bryman (√ Spokesperson), P Kitching, A Konaka, J A Macdonald, J Mildenberger, T Nakano, T Numao, J M Poutissou, R Poutissou, G Redlinger, J Roy, M Rozon, R Soluk, A S Turcot

Accelerator BNL *Detector* Spectrometer

Reactions

$K^+ \to \pi^+ \nu\,\bar{\nu}$	0 MeV/c
$K^+ \to \pi^+ \mu^+ \mu^-$	"
$K^+ \to \mu^+ \mu^+ \mu^- \nu$	"
$K^+ \to \mu^+ \nu\,\gamma$	"
$K^+ \to \pi^+$ higgs	"
$K^+ \to \pi^+ \gamma\,\gamma$	"
$K^+ \to \pi^+$ X	"

$\pi^0 \rightarrow \nu\,\bar{\nu}$	205 MeV/c
$\pi^0 \rightarrow \gamma$ X	"
$\pi^0 \rightarrow \gamma\,\nu\,\bar{\nu}$	"

Particles studied K^+, higgs, nuino, π^0

Brief description A sensitivity down to a level of about 1×10^{-10} is expected for $K^+ \rightarrow \pi^+\nu\bar{\nu}$. A measurement at this level would determine $|V_{td}|$ if m_t were known. An observation significantly above this level would indicate a fourth generation of quarks and leptons, the presence of nuinos, or other new phenomena. A simultaneous measurement of $K^+ \rightarrow \pi^+X$ to a sensitivity of about 5×10^{-11} is also expected. This probes the existence of axions, familons, hyperphotons, or other new particles. Other processes probe the existence of higgs, majorons, massive neutrinos, and other hypothetical particles. The first run was completed in June 91. Approved for 3000 additional hours with an upgraded beam and detector. Scheduled to begin the next data taking May 94.

Journal papers NIM A279 (1989) 180, PRL 63 (1989) 2177, PRL 64 (1990) 21, PRL 65 (1990) 1188, NP (PROC SUPPL) B13 (1990) 568, PRL 66 (1991) 2189, NIM A321 (1992) 129, PRL 69 (1992) 733, PRL 70 (1993) 2521 [erratum: PRL 71 (1993) 305], PR D48 (1993) 1, and PR D48 (1993) 1225.

Related experiments N/A

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WWW Home-page http://www.phy.bnl.gov/e787/e787.html

BNL-788

(Proposed Sep 1983, Approved Oct 1983, Began data-taking May 1985, Completed data-taking May 1990)

THE FOUR-FERMION WEAK INTERACTION AND THE DECAY OF $^{4}_{\Lambda}$He AND $^{5}_{\Lambda}$He

CARNEGIE MELLON U – M Athanas, A Berdoz, G B Franklin (√ Spokesperson), R Magahiz, C Maher, B Quinn, R A Schumacher, I R Sukaton, V Zeps
ALBERTA U – F M Rozon
BROOKHAVEN – S Bart, R Chrien, K Johnson, P Pile, R Sawafta, R Sutter
HOUSTON U – E V Hungerford, T Kishimoto, L G Tang
INDIANA U – J J Szymanski
LOS ALAMOS – P D Barnes (√ Spokesperson)
NEW MEXICO U – B Bassalleck
VASSAR COLL – R L Stearns
YALE U – G Diebold

Accelerator BNL *Detector* Spectrometer

Reactions

K^- He $\rightarrow \pi^-$ hypernuc	750 MeV/c
$K^-\,{}^6$Li $\rightarrow \pi^-$ hypernuc	"

Particles studied hypernuc

Brief description Studies interactions $\Gamma(\Lambda n \rightarrow nn)$ and $\Gamma(\Lambda p \rightarrow np)$, and tests the $\Delta I = 1/2$ rule through measurements of hypernuclear decay rates $\Gamma(\Lambda \rightarrow p\pi^-)$ and $\Gamma(\Lambda \rightarrow n\pi^0)$. The hypernuclear state is isolated by momentum analysis of the (K^-, π^-) target reaction. Out-of-beam large volume scintillation detectors and tracking chambers are used to identify the hypernuclear decay products by time-of-flight, dE/dx, and range.

Journal papers PR C43 (1991) 849.

E-mail contact franklin@ernest.phys.cmu.edu, pdbarnes@lanl.gov

BNL-791

(Proposed 1984, Approved Jun 1984, Began data-taking Apr 1985, Completed data-taking 1990)

STUDY OF VERY RARE K_L DECAYS

UC, IRVINE – A Heinson, J Horvath, P Knibbe, C Mathiazhagan, W R Molzon (√ Spokesperson), J E Urheim
UCLA – K Arisaka, R D Cousins (√ Spokesperson), T Kaarsberg, J Konigsberg, J Kubic, P Melese, P Rubin, W E Slater, D Wagner
LOS ALAMOS – G W Hart, W W Kinneson, D M Lee, R J McKee, Jr , E C Milner, G H Sanders, H J Ziock
STANFORD U – S Axelrod, K A Biery, M Diwan, G M Irwin, K Lang, J Marguiles, D A Ouimette, A Schwartz, Q H Trang, S G Wojcicki
TEMPLE U – L B Auerbach, J Belz, P Buchholz, C Guss, V L Highland, S Kettell, W K McFarlane, M Sivertz
TEXAS U – G W Hoffmann, P J Riley, J L Ritchie, A Yamashita
WILLIAM AND MARY COLL – M D Chapman, E Eckhouse, J F Ginkel, P Guss, A D Hancock, D Joyce, J R Kane, C J Kenney, Y Kuang, W F Vulcan, R E Welsh, R J Whyley, R G Winter

Accelerator BNL *Detector* Spectrometer

Reactions

$K_L \rightarrow$ muon $e^{\pm}$	—
$K_L \rightarrow \mu^+\,\mu^-$	—
$K_L \rightarrow e^+\,e^-$	—
$K_L \rightarrow e^+\,e^-\,e^+\,e^-$	—
$K_L \rightarrow e^+\,e^-\,\gamma$	—

Particles studied K_L

Brief description The first priority is a search for $K_L \rightarrow \mu e$ with a branching-ratio sensitivity of 10^{-12}. Ran for 5000 hours. See also BNL-871.

Journal papers NIM A256 (1987) 329, PR D38 (1988) 2914, NIM A277 (1989) 517, PRL 63 (1989) 2181, PRL 63 (1989) 2185, PR D44 (1991) 1, PRL 70 (1993) 1049, and PRL 71 (1993) 3910.

Related experiments BNL-871

E-mail contact wmolzon@uci.edu, cousins@uclahep.physics.ucla.edu, cousins@bnldag.bnl.gov

BNL-793

(Proposed Aug 1984, Approved Oct 1984, Began data-taking 1987, Completed data-taking 1989)

SEARCH FOR FRACTIONALLY CHARGED NUCLEI IN 15 A GeV Si Pb AND Si Cu COLLISIONS

UC, BERKELEY – Y D He, P B Price (√ Spokesperson)

Accelerator BNL-ION *Detector* Plastic

Reactions

Si Pb $\rightarrow$	15 GeV (E_{lab}/N)
Si Cu $\rightarrow$	"

Particles studied quark, exotic

Brief description Looks for quarks bound to nuclear fragments, anomalons, and other exotic composites. Studies secondary interactions of projectile fragments. Ran in 1987 and in Summer 1989.

Journal papers PL B252 (1990) 331, PR C43 (1991) 835, and PR C44 (1991) 1672.

E-mail contact pbprice@lbl.gov, yudong@physics.berkeley.edu

BNL-794

(Proposed Aug 1984, Approved Oct 1984, Began data-taking Mar 1985, Completed data-taking 1990)

ONE–SPIN EFFECTS IN $pp \rightarrow pp$ AT HIGH $p_\perp^2$

MICHIGAN U – P R Cameron, G R Court, D G Crabb, G de Muth, I Gialas, W A Kaufman, F Z Khiari, A D Krisch (Spokesperson), A M T Lin, R A Phelps, R R Raylman, R S Raymond, T Roser, J A Stewart, K M Terwilliger, B Vuaridel
BROOKHAVEN – K A Brown, G T Danby, L G Ratner

MARYLAND U & MICHIGAN U – D C Peaslee
NOTRE DAME U – J R O'Fallon
RICE U – J B Roberts
TEXAS A AND M – T S Bhatia, G Glass, L C Northcliffe
ZURICH, ETH – M Simonius

Accelerator BNL *Detector* Double-arm spectrometer

Reactions Polarized target

$p\,p \rightarrow p\,p$	24, 28 GeV/c

Brief description Measures elastic differential cross sections in different initial spin states in the large $p_\perp^2$ region from 6.6 to 8 $(\mathrm{GeV}/c)^2$. Continues studies of BNL-748. Ran for 1400 hours. For a similar experiment at much higher energies, see SERPUKHOV-UNK-001.

Journal papers PRL 51 (1983) 2359, PR D32 (1985) 3070, PRL 64 (1990) 2627, and PRL 65 (1990) 3241.

Related experiments BNL-748, SERPUKHOV-UNK-001

E-mail contact krisch@umiphys.bitnet

BNL-802

(Proposed Sep 1984, Approved Oct 1984, Began data-taking 1987, Completed data-taking 1989)

STUDIES OF PARTICLE PRODUCTION AT EXTREME BARYON DENSITIES IN NUCLEAR COLLISIONS AT THE AGS

E-802 COLLABORATION
ARGONNE – S Kaufman
BROOKHAVEN – D Alburger, D Beavis, P D Bond, C Chasman (√ Spokesperson), Z Chen, Y Y Chu, J B Cumming, R Debbe, S Gushue, O Hansen, S Hayashi, M J LeVine, Y Miake, B E Moskowitz, J Olness, L P Remsberg, M Tanaka, M J Tannenbaum, J H van Dijk, F Videbaek, P Vincent, H Wegner
BUENOS AIRES U – M Mariscotti
COLUMBIA U – I Juricic, K Kurita, S Nagamiya (√ Spokesperson), P W Stankus, Y Wu, W A Zajc
HIROSHIMA U – T Sugitate
KYUSHU U – Y Ikeda, K Kimura
LIVERMORE – J Engelage
MIT – M Bloomer, B A Cole, J B Costales, L Grodzins, H Huang, R J Ledoux, R J Morse, C Parsons, M Sarabura, S G Steadman, G S F Stephans, V Vutsadakis, D S Woodruff
UC, BERKELEY – H Crawford
UC, RIVERSIDE – T Abbott, S Y Fung, M Vient
TOKYO U – R S Hayano, H Sakurai
TOKYO U, INS – Y Akiba, H Hamagaki, S Homma

Accelerator BNL-ION *Detector* Single-arm spectrometer

Reactions

^{28}Si nucleus → charged X	14.5 GeV/c (P_{lab}/N)
^{16}O nucleus → charged X	"
p nucleus → charged X	"

Particles studied p, $\bar{p}$, π^+, π^-, K^+, K^-

Brief description Aims to measure particle production cross sections as a function of $p_\perp$ and y, under well defined centrality trigger conditions. Targets are Al, Cu, and Au. Ran for 2300 hours.

Journal papers NIM A254 (1987) 88, RSI 58 (1987) 143, RSI 58 (1987) 1761, PL B197 (1987) 285, ZPHY C38 (1988) 35, ZPHY C38 (1988) 135, NIM A281 (1989) 367, NIM A283 (1989) 772, NP A498 (1989) 67c, NP A498 (1989) 415c, PRL 64 (1990) 847, PL B271 (1991) 447, PRL 66 (1991) 1567, NP A525 (1991) 231c, NP A525 (1991) 455c, NP A525 (1991) 531c, NP A525 (1991) 681c, NP A527 (1991) 595c, PR C44 (1991) 1611, PL B291 (1992) 341, PRL 69 (1992) 1030, NP A544 (1992) 237c, NP A544 (1992) 445c, PR C45 (1992) 2933, PR D45 (1992) 3906, PRL 70 (1993) 1057, PRL 70 (1993) 1393, NP A553 (1993) 799c, NP A553 (1993) 813c, PR C47 (1993) 1351, NP A566 (1994) 27c, and NP A566 (1994) 423c.

Related experiments BNL-859, BNL-866

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BNL-805

(Proposed Dec 1984, Approved Mar 1985, Began data-taking Aug 1986, Completed data-taking Jun 1989)

A SEARCH FOR GALACTIC AXIONS

ROCHESTER-BROOKHAVEN-FERMILAB COLLABORATION
ROCHESTER U – S DePanfilis, A C Melissinos (√ Spokesperson), B Moskowitz, J Rogers, Y Semertzidis, W Wuensch
BROOKHAVEN – H Halama, A Prodell
FERMILAB – W B Fowler, F Nezrick

Accelerator NONE *Detector* Other

Particles studied axion

Brief description A search for a light-mass galactic axion through its electromagnetic conversion to a photon in the presence of a strong static field. Uses a high-field large aperture solenoid and a microwave detection apparatus. Data from 1 to 6 GHz are complete.

Journal papers PRL 59 (1987) 839, APL 52 (1988) 2266, IEEE MTT 36 (1988) 607, NIM A264 (1988) 98, NIM A264 (1988) 445, and PR D40 (1989) 3153.

Related experiments BNL-840

E-mail contact meliss@uorhep.bitnet

BNL-806

(Proposed Dec 1984, Approved Mar 1985, Began data-taking Nov 1986, Completed data-taking Jun 1988)

NUCLEAR FRAGMENTATION IN HEAVY ION COLLISIONS AT 15 GeV/amu

SIEGEN U – C Brechtmann, W Heinrich (√ Spokesperson), S E Hirzebruch

Accelerator BNL-ION *Detector* Plastic

Reactions

^{28}Si nucleus	14.5 GeV (T_{lab}/N)
^{16}O nucleus	"

Particles studied nuclearfragment(s)

Brief description Measures the cross sections for production of beam fragments with charges greater than five. Studies nuclear fragmentation and Coulomb dissociation for various targets. Searches for projectile fragments with fractional charge. Targets are CH_2, CR39, C, Al, Cu, Ag, and Pb.

Journal papers PL B200 (1988) 583, PR C39 (1989) 2222, MPL A4 (1989) 1879, and PR C46 (1992) 1487.

Related experiments CERN-WA-087

E-mail contact heinrich@hrz.uni-siegen.d400.de

BNL-808

(Proposed Feb 1985, Approved Mar 1985, Completed data-taking 1988)

INTERACTIONS OF 14.1 GeV/amu NUCLEI FOR ^{16}O TO ^{197}Au IN LIGHT AND HEAVY TARGETS

KLM COLLABORATION
CRACOW – R Holynski, A Jurak, A Olszewski, B Wilczynska, H Wilczynski, W Wolter
LOUISIANA STATE U – L Barbier, W V Jones, E Pruet, J P Wefel, B Wosiek
MINNESOTA U – P S Freier, C J Waddington (√ Spokesperson)

Accelerator BNL-ION *Detector* Emulsion

Reactions

^{16}O nucleus	15 GeV (T_{lab}/N)
^{32}S nucleus	"

Brief description A search for evidence for a quark–gluon plasma. Uses emulsion chambers.

Journal papers PRL 60 (1988) 405, PRL 62 (1989) 733, NP A498 (1989) 535c, PR C39 (1989) 1385, PR C40 (1989) 2449, and PR C41 (1990) 1292.

E-mail contact waddington@uhn.spa.umn.edu

BNL-810

(Proposed Jan 1985, Approved Mar 1985, Began data-taking Dec 1988, Completed data-taking 1992)

A SEARCH FOR QUARK MATTER (QGP) AND OTHER NEW PHENOMENA UTILIZING HEAVY ION COLLISIONS AT THE AGS

BROOKHAVEN – A Etkin, K J Foley, R W Hackenburg, R S Longacre, W A Love, T W Morris, E D Platner (Spokesperson), A C Saulys
BROOKHAVEN & CITY COLL, NY – S J Lindenbaum (Spokesperson)
CITY COLL, NY – C S Chan, M A Kramer
JOHNS HOPKINS U – T J Halman, L Madansky
RICE U – S Ahmad, B E Bonner, J A Buchanan, C N Chiou, J M Clement, G S Mutchler

Accelerator BNL-ION *Detector* MPS

Reactions

p nucleus	15 GeV (T_{lab}/N)
^{28}Si nucleus	"
^{16}O nucleus	"

Brief description Searches for anomalous behavior in rapidities, multiplicities, strangeness enhancements, transverse momenta, energy flows, *etc.* Targets are C, Si, Sn, Cu, W, Pb, and Au. The tracking and momentum analysis of most of the charged particles emitted in individual events permits a very sensitive search for anomalous phenomena such as a quark–gluon plasma. Approved for 1650 hours. Data were taken in December 88, June 89, June 90, and February 91.

Journal papers NP A498 (1989) 523c, IEEE TNS 36 (1989) 58, NIM A283 (1989) 557, PL B248 (1990) 254, NP (PROC SUPPL) B16 (1990) 405, NP A525 (1991) 601c, IEEE TNS 39 (1992) 615, IEEE TNS 39 (1992) 696, NIM A323 (1992) 224, NP A544 (1992) 335c, PL B281 (1992) 29, PL B292 (1992) 10, and PL B297 (1992) 44.

Related experiments BNL-891

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BNL-811

(Proposed Jan 1985, Approved Mar 1985, Jun 1986, Completed data-taking Apr 1989)

RADIATIVE KAON CAPTURE AND HYPERON WEAK RADIATIVE DECAY

BIRMINGHAM U – N Hessey, J Lowe
BOSTON U – E C Booth, K P Gall, C Heisey, E K McIntyre, J P Miller, B L Roberts (Spokesperson), D A Whitehouse
BRITISH COLUMBIA U – M D Hasinoff, D F Measday, A J Noble
BROOKHAVEN – M Sakitt
CASE WESTERN RESERVE U – W Fickinger, K Robinson
BUDAPEST, CRIP & TRIUMF – D Horvath
TRIUMF – M Salomon

Accelerator BNL *Detector* Counter

Reactions

$K^- p \to \Lambda \gamma$	0 MeV/c
$K^- p \to \Lambda \pi^0$	"
$K^- p \to \Sigma^0 \gamma$	"
$K^- p \to \Sigma^+ \pi^-$	"
K^- deut $\to \Lambda n \gamma$	"

Particles studied Λ, Σ^+

Brief description Studies weak radiative decays of the Λ and Σ^+ in the K^-p reactions and measures the Λ-n scattering length in K^-d capture. Ran for 3750 hours.

Journal papers NP A479 (1988) 75c, ZPHY C42 (1989) 175, NC 102A (1989) 145, PRL 63 (1989) 1352, NP (PROC SUPPL) B13 (1990) 449, PR C42 (1990) 475, and PRL 69 (1992) 410.

Related experiments CEBAF-89-024

E-mail contact roberts@buphyc.bu.edu

BNL-813

(Proposed Jan 1985, Approved Mar 1985, Began data-taking 1991, Completed data-taking Jul 1993)

SEARCH FOR A STRANGENESS −2 DIBARYON

CARNEGIE MELLON U – M J Athanas, A Berdoz, G B Franklin (√ Spokesperson), R A Magahiz, R McCrady, F E Merrill, C A Meyer, B Quinn, R A Schumacher, I R Sukaton, V J Zeps
ALBERTA U – F M Rozon
BIRMINGHAM U – J Lowe, J M Nelson, R Zybert
BROOKHAVEN – R Chrien, P Pile, R Sawafta, R Sutter
FREIBURG U – M Buerger, T Buerger, J D Franz, E Roessle, H Schmitt
INDIANA U – J J Szymanski
KYOTO U – T Iijima, K Imai, A Masaike, N Saito
KYOTO SANGYO U – K Okada, F Takeutchi
LOS ALAMOS – P D Barnes (√ Spokesperson)
MANITOBA U – J Birchall, C A Davis, L P Gan, M R Landry, L Lee, S A Page, D Ramsay, V Sum, W T H van Oers
NEW MEXICO U – B Bassalleck, H Fischer, A Rusek, R Stotzer, D Wolfe
TRIUMF – D R Gill
VASSAR COLL – R L Stearns
YALE U – G E Diebold

Accelerator BNL *Detector* Spectrometer, Counter

Reactions

$K^- p \to K^+ \Xi^-$	1.8 GeV/c
Ξ^- deut $\to$ dibaryon($S = -2$) n	0 GeV/c

Particles studied dibaryon($S = -2$)

Brief description Covers from about 100 MeV below to 20 MeV above the $\Lambda\Lambda$ mass in a triple-coincidence mode. See also BNL-836 for a search in the reaction K^- ^{3}He $\to K^+ N$ Dihyperon. Ran for 1000 hours.

Related experiments BNL-836

E-mail contact franklin@ernest.phys.cmu.edu, pdbarnes@lanl.gov

BNL-814

(Proposed Feb 1985, Approved Nov 1985, Began data-taking Dec 1988, Completed data-taking 1992)

STUDY OF EXTREME PERIPHERAL COLLISIONS AND OF THE TRANSITION FROM PERIPHERAL TO CENTRAL COLLISIONS IN REACTIONS INDUCED BY RELATIVISTIC HEAVY IONS

BROOKHAVEN – G David, D Lissauer, T Ludlam, S McCorkle, E O'Brien, H Takai, T Throwe, C Woody
DARMSTADT, GSI – N Herrmann
LOS ALAMOS – J Boissevain, D Fox, W E Sondheim, J Sullivan
MCGILL U – J Barrette, S Gilbert, R Lacasse, S K Mark, M Rosati, G Wang

NEW MEXICO U – D Wolfe
PITTSBURGH U – W Cleland, K Jayananda, D Kraus, U Sonnadara, S Voloshin, Z Zhang
SAO PAULO U – N C da Silva, O Dietzsch, E M Takagui
SUNY, STONY BROOK – P Braun-Munzinger (√ Spokesperson), J Dee, T K Hemmick, B Hong, W Llope, M Muthuswamy, M N Rao, J Stachel, N Xu, Y Zhang, C Zou
TEXAS A AND M – J Simon, K Wolf
WAYNE STATE U – R Bellwied, S Bennett, T M Cormier, J R Hall, Q Li, A Lukaszew, R Matheus, C Pruneau
YALE U – V Greene, B S Kumar, R Majka, J Mitchell, F Rotondo, J Sandweiss

Accelerator BNL-ION *Detector* Spectrometer, Calorimeter

Reactions

p nucleus	13.6 GeV (T_{lab}/N)
^{16}O nucleus	"
^{28}Si nucleus	"

Particles studied $\Delta(1232\,P_{33})^{++}$

Brief description Combines 4π calorimetry with a high-resolution forward spectrometer, allowing a completely exclusive study of the projectile fragmentation region and a detailed study of more central collisions. Topics include a search for strange matter, a study of rapidity distributions for baryons and mesons, measurements of transverse momentum distributions at low $p_\perp$, and reconstruction of the Δ^{++} resonance. Targets are Al, Cu, Sn, and Pb. Ran for 2700 hours.

Journal papers ZPHY C38 (1988) 45, NIM A284 (1989) 323, IEEE TNS 37 (1990) 82, IEEE TNS 37 (1990) 88, PL B252 (1990) 550, PRL 64 (1990) 1219, PR C41 (1990) 1512, PR C41 (1990) 2644, NP (PROC SUPPL) B24 (1991) 265, NP A538 (1992) 169c, NP A544 (1992) 137c, NP A544 (1992) 423c, NP A544 (1992) 599c, PR C45 (1992) 421, PR C45 (1992) 819, PR C45 (1992) 2427, PR C46 (1992) 312, PRL 70 (1993) 1763, PRL 70 (1993) 2996, NP A553 (1993) 785c, ZPHY C59 (1993) 2996, NP A566 (1994) 183c, NP A566 (1994) 411c, NP A566 (1994) 435c, NP A566 (1994) 585c, NP A566 (1994) 597c, and PR C49 (1994) 1669.

Related experiments BNL-877

E-mail contact braunmunz@nuclear.physics.sunysb.edu

BNL-815

(Proposed 1985, Approved Mar 1986, Completed data-taking 1988)

PARTICLE PRODUCTION AND NUCLEAR FRAGMENTATION IN COLLISIONS OF HEAVY IONS IN EMULSION AT AGS ENERGIES

ALMA ATA, PHYS INST – N P Andreeva, Z V Anson, V I Bubnov, Y I Chasnikov, G Z Eligbaeva, L E Eremenko, A S Gaitinov, G S Kalyachkina, E K Kanygina, V N Lepetan, C I Shakova
BEIJING, IHEP – G F Xu, P Y Zheng
PANJAB U – M M Aggarwal, R Arora, V S Bhatia, I S Mittra
HUNAN EDUCATION INST – Y X Li, L Liang, Z G Liu, Z Q Weng, Y L Xia
DUBNA – S A Krasnov, S Kulikova, T N Maksimkina, J J Musulmanbekov, G S Shabratova, K D Tolstov
RAJASTHAN U – K B Bhalla, S K Gupta, V Kumar, P Lal, S Lokanathan, S Mookerjee, H S Palsania, R Raniwala, S Raniwala
JAMMU U – S K Badyal, A Bhasin, V K Gupta, S Kachroo, S Kitroo, L Mangotra, N K Rao
KOSICE U – L Just, M Karabova, M Tothova, S Vokal, J Vrlakova
SHANXI NORMAL U – S B Lou, Y M Qin, D H Zhang
LUND U – S Garpman, B Jakobsson, J Nystrand, I Otterlund (Spokesperson), K Soderstrom, E Stenlund
MARBURG U – E Ganssauge, J T Rhee
LEBEDEV INST – M I Adamovich, Y A Alexandrov, M M Chernyavsky, S G Gerassimov, S P Kharlamov, V G Larionova, N V Maslennikova, G I Orlova, N G Peresadko, V M Rappoport, N A Salmanova, M I Tretyakova
WASHINGTON U, SEATTLE – T H Burnett, J Grote, J J Lord, D Skelding, R J Wilkes
KHLOPIN RADIUM INST – V G Bogdanov, V A Plyushchev, Z I Solovieva
TASHKENT, IFY – E S Basova, H Nasrullaeva, S Z Nasyrov, N V Petrov, D A Qarshiev, T P Trofimova, U I Tuleeva
TASHKENT, FTI – L P Chernova, K G Gulamov, F G Kadyrov, N S Lukicheva, V S Navotny, N Saidkhanov, L N Svechnikova, S I Zhokhova
HUA-ZHONG NORMAL U – X Cai, H Huang, L S Liu, W Y Qian, H Q Wang, D C Zhou
YEREVAN PHYS INST – F A Avetyan, N A Marutyan, L G Sarkisova, V R Sarkisyan

Accelerator BNL *Detector* Emulsion

Reactions

^{16}O nucleus	15 GeV (T_{lab}/N)
^{28}Si nucleus	"

Brief description Uses emulsion chambers and emulsion stacks. Studies pseudo-rapidity density distributions, density fluctuations, multiplicity and angular distributions, production cross sections, *etc.* See also CERN-EMU-001.

Journal papers PR C40 (1989) 66, PL B223 (1989) 262, PRL 62 (1989) 2801, HEPNP 13 (1989) 865, PL B230 (1989) 175, PL B242 (1990) 512, MPL A5 (1990) 169, PS T32 (1990) 168, NP A525 (1991) 551c, ZPHY C49 (1991) 395, MPL A6 (1991) 469, HEPNP 15 (1991) 131, PL B262 (1991) 369, PL B263 (1991) 539, and PRL 67 (1991) 1201.

Related experiments BNL-863, CERN-EMU-001

E-mail contact ingvar.otterlund@kosufy.lu.se

BNL-817

(Proposed Jun 1985, In progress)

POLARIZATION TRANSFER IN HYPERON PRODUCTION

RICE U – D L Adams, B E Bonner (√ Spokesperson), J A Buchanan, J M Clement, M D Corcoran, N Krishna, H E Miettinen, R M Moss, G S Mutchler, F Nessi-Tedaldi, M Nessi, J B Roberts (√ Spokesperson), P M Stevenson
BROOKHAVEN – A Birman, S U Chung, R C Fernow, H Kirk, S D Protopopescu, H Willutzki
JOHNS HOPKINS U – T J Hallman, L Madansky
HOUSTON U – B Mayes, L S Pinsky
LIVERMORE – S R Tonse
MASSACHUSETTS U, DARTMOUTH – Z Bar-Yam, J Dowd, W Kern, E W King

Accelerator BNL *Detector* MPS

Reactions Polarized beam

p Be $\rightarrow \Lambda$ X	22 GeV/c
p Be $\rightarrow \Sigma^0$ X	"

Brief description Approved for 1300 hours. In progress (May 94).

Journal papers PRL 58 (1987) 447, PR D38 (1988) 729, PRL 62 (1989) 1591, and PR D41 (1990) 13.

E-mail contact bonner@physics.rice.edu

BNL-818

(Proposed 1985, Approved Mar 1986, Began data-taking 1990, Completed data-taking 1990)

SEARCH FOR A J^{PC}-EXOTIC HYBRID MESON

BROOKHAVEN – A Birman, S U Chung (√ Spokesperson), R C Fernow, H Kirk, S D Protopopescu
INDIANA U – R Crittenden, A Dzierba, T Marshall, D Zieminska
MASSACHUSETTS U, DARTMOUTH – Z Bar-Yam, J Dowd, W Kern, E King
RICE U – B E Bonner, G C Phillips, J B Roberts

Accelerator BNL *Detector* MPS

Reactions

$\pi^- p \to f_1(1285)\, \pi^- p$ 12 GeV/c

Particles studied exotic-meson

Brief description Looks for a resonance in the $J^{PC} = 1^{-+}$ $f_1(1285)\pi^-$ system. Ran for 1000 hours.

E-mail contact suchung@bnlcl1.bnl.gov

BNL-820

(Proposed 1985, Approved Nov 1985, Began data-taking Dec 1988, Completed data-taking May 1989)

SEARCH FOR $S = -1$ DIBARYON RESONANCES IN THE MASS REGION 2050–2130 MeV/c USING THE REACTIONS ^{3}He$(K^-, \pi^+)nX$ AND ^{3}He$(K^-, \pi^+)pX^-$ AT 870 MeV/c

BROOKHAVEN – S Bart, R E Chrien, P H Pile, R J Sutter, N Tsoupas, T Ward
FLORIDA STATE U – H Piekarz (√ Spokesperson)
HOUSTON U – E V Hungerford, K Johnstone, B Mayes, L Pinsky, L Tang
OHIO STATE U – K Hicks
OSAKA U – T Kishimoto
TEXAS U – R Krauss
TOKYO U – T Fukuda
TRIUMF – D Gill
VASSAR COLL – R L Stearns

Accelerator BNL *Detector* Spectrometer

Reactions

$K^-\ ^3\text{He} \to \pi^+\ n$ dibaryon$(S = -1)$ 870 MeV/c
$K^-\ ^3\text{He} \to \pi^+\ p$ dibaryon$(S = -1)$ "

Particles studied dibaryon$(S = -1)$

Brief description A double-arm magnetic spectrometer was used to measure the missing mass spectrum from the studied reactions. The scattering angle was 20°, in order to enhance the p-wave resonance production. A two-layer scintillation hodoscope closely surrounding a liquid ^{3}He target and arranged into twelve azimuthal and polar angles was used to detect charged particles from the Λn and $\Sigma^- n$ final state resonance decays. It was also used to suppress the K^0_S and quasielastic $\Sigma^- p$ backgrounds. The neutral ($Q = 0$) and charged ($Q = -1$) two-baryon states were studied in the first and second reactions, respectively. Data analysis in progress (May 94).

E-mail contact hpiekarz@fnalv.fnal.gov

BNL-821

(Proposed Sep 1985, Sep 1986, Approved Nov 1986, In preparation)

A NEW PRECISION MEASUREMENT OF THE $g_\mu - 2$ VALUE AT THE LEVEL OF 0.35 PPM

BOSTON U – D H Brown, R M Carey, W Earle, E S Hazen, F Krienen, Z F Liu, J P Miller, J Ouyang, B L Roberts (√ Spokesperson), L R Sulak, G Varner, W A Worstell
BROOKHAVEN – H N Brown, G Bunce, J R Cullen, G T Danby, C R Gardner, H Hseuh, J W Jackson, R Larsen, Y Y Lee, W Meng, W M Morse (√ Spokesperson), C Pai, I Polk, J Powers, S Rankowitz, Y Semertzidis, R Shutt, L Snydstrup, A Stillman, K Woodle
CORNELL U – T Kinoshita, Y Orlov
FAIRFIELD U – D Winn
HEIDELBERG U, PHYS INST – J Gerhaeuser, K Jungmann, P von Walter, G zu Putlitz,
HEIDELBERG, MAX PLANCK INST – U Haeberlen
ILLINOIS U, URBANA – P T Debevec, W Deninger, D W Hertzog, T D Jones, K McCormick
LBL & BROOKHAVEN – M A Green
MINNESOTA U & NOVOSIBIRSK, IYF – L M Barkov, P Cushman, S Giron, D N Grigorev, B I Khazin, J Kindem, E A Kuraev, D Maxam, D Miller, Y M Shatunov, E Solodov, C Timmermans
TOKYO U – K Nagamine
KEK – K Endo, H Hirabayashi, S Ichii, S Kurokawa, Y Mizumachi, T Sato, A Yamamoto
WAKO, RIKEN – K Ishida
YALE U – S K Dhawan, A A Disco, F J M Farley, X A Fei, V W Hughes (√ Spokesperson), R Prigl, S I Redin

Accelerator BNL *Detector* Other

Reactions Polarized beam

muon $\to e^\pm\ \nu\ \bar{\nu}$ 3.09 GeV/c

Particles studied muon

Brief description Uses a 7-m-radius muon storage ring with a 1.45-tesla vertical field. Approved for 2100 hours. Expected to run in 1996/98.

E-mail contact roberts@buphyc.bu.edu, morse@bnlcl1.bnl.gov, hughes@yalehep.bitnet

BNL-825

(Proposed Oct 1985, Approved Nov 1985, Completed data-taking 1988)

RADIOCHEMICAL STUDIES OF ULTRARELATIVISTIC NUCLEAR COLLISIONS

OREGON STATE U – C Casey, W Loveland (Spokesperson), Z Xu
BROOKHAVEN – Y Y Chu, J B Cumming, P E Haustein, S Katcoff
PURDUE U – M Bronikowski, Y H Chung, N T Porile
STUDSVIK SCI RES LAB, NYKOPING – K Aleklett, L Sihver

Accelerator BNL *Detector* Photon spectrometer

Reactions

^{16}O nucleus 15 GeV (T_{lab}/N)
^{28}Si nucleus "

Particles studied nuclearfragment(s)

Brief description Targets are Cu, Ag, and Au. Induced radioactivities are determined by off-line γ spectroscopy. Investigates evidence for a limiting fragmentation.

Journal papers PR C37 (1988) 1311, PR C42 (1990) 1753, PR C44 (1991) 1661, and PR C46 (1992) 2042.

Related experiments BNL-844

BNL-826

(Proposed Dec 1985, Approved Mar 1986, Completed data-taking 1988)

EXCLUSIVE EXPERIMENT OF HIGH ENERGY NUCLEAR REACTIONS INDUCED BY ^{32}S IONS WITH 15 GeV/N AT THE BNL AGS

SAGA U, JAPAN – H Itoh (Spokesperson)
TOHOKU U – M Chida, T Hayashino, Y Yamato
NAGOYA U – K Nakazawa
OSAKA U – R Ihara, T Nakai
SAGAMI INST TECH – H Sugimoto, K Taira
GIFU U – S Tasaka
UTSUNOMIYA U – Y Sato
KANAGAWA U – N Tateyama

Accelerator BNL-ION *Detector* Emulsion

Reactions

^{32}S nucleus 15 GeV (T_{lab}/N)
^{12}C nucleus "

Brief description Uses emulsion chambers in a 2-tesla magnetic field. A search for evidence of a quark–gluon plasma, *etc.*

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SUMMARIES OF BEIJING AND BROOKHAVEN EXPERIMENTS

BNL-829

(Proposed Jan 1986, Approved 1986, Completed data-taking 1989)

SEARCH FOR $S = -1$ THREE BODY BOUND SYSTEM

HOUSTON U – E V Hungerford, T Kishimoto (Spokesperson), B Mayes, L Pinsky
BRANDEIS U – H Piekarz
BROOKHAVEN – S Bart, R E Chrien, P H Pile, R J Sutter, T E Ward
MIT – M Deutsch
OSAKA U – T Fukuda, T Shibata
TEXAS U – M Barlett, G W Hoffmann
VASSAR COLL – R L Stearns

Accelerator BNL *Detector* HYPERSPEC

Reactions

$K^-\ ^3\mathrm{He} \to \pi^-\ \mathrm{X}$	715 MeV/c

Particles studied hypernuc

Brief description A search for a Λpp bound state in $K^-\ ^3\mathrm{He} \to \pi^- X$.

E-mail contact kishimoto@bnldag.bnl.gov, kishimot@kekvax.kek.jp

BNL-835

(Proposed Apr 1986, Approved Jun 1986, Mar 1989, Began data-taking Mar 1988, Completed data-taking 1990)

KAON–NUCLEUS TOTAL CROSS SECTION MEASUREMENTS AND PARTIAL DECONFINEMENT IN NUCLEI

TEL AVIV U – J Aclander, J Alster, I Mardor, Y Mardor, S MayTal-Beck, M A Moinester, E Piasetzky (√ Spokesperson), R Weiss, I Yavin
BROOKHAVEN – S Bart, R E Chrien (√ Spokesperson), P H Pile, R J Sutter
HOUSTON U – M Barakat, K Johnston
TEXAS A AND M – J Hiebert, R Krauss
VASSAR COLL – R L Stearns

Accelerator BNL *Detector* Counter

Reactions

K^+ deut	450–800 MeV/c
K^+ nucleus	"

Particles studied K^+

Brief description Measures the ratio of kaon–nucleus to K^+d total cross sections to search for evidence for nucleon swelling in nuclei. Targets are light nuclei with $N = Z$ (^{6}Li, ^{12}C, ^{28}Si, and ^{40}Ca). The first run was completed in 1988, the last in 1990.

Journal papers PRL 65 (1990) 2110, PR C46 (1992) 655, PL B307 (1993) 293, and PR C49 (1994) 2569.

Related experiments BNL-874

E-mail contact eip@tauphy.tau.ac.il, chrien@bnl.gov

BNL-836

(Proposed May 1986, Approved Jun 1986, Began data-taking May 1994, In progress)

SEARCH FOR A STRANGENESS −2 DIBARYON USING A ^{3}He TARGET

CARNEGIE MELLON U – M J Athanas, A R Berdoz, G B Franklin (√ Spokesperson), R A Magahiz, R McCrady, F E Merrill, C A Meyer, B Quinn, R A Schumacher, I R Sukaton, V J Zeps
ALBERTA U – F M Rozon
BIRMINGHAM U – J Lowe, J M Nelson, R Zybert
BROOKHAVEN – R Chrien, P Pile, R Sawafta, R Sutter
FREIBURG U – M Buerger, T Buerger, J D Franz, E Roessle, H Schmitt
INDIANA U – J J Szymanski
KYOTO U – T Iijima, K Imai, A Masaike, N Saito
KYOTO SANGYO U – K Okada, F Takeutchi
LOS ALAMOS – P D Barnes (√ Spokesperson)
MANITOBA U – J Birchall, C A Davis, L P Gan, M Landry, L Lee, S A Page, W D Ramsay, V Sum, W T H van Oers
NEW MEXICO U – B Bassalleck, H Fischer, A Rusek, R Stotzer, D Wolfe
TRIUMF – D R Gill
VASSAR COLL – R L Stearns
YALE U – G E Diebold

Accelerator BNL *Detector* Spectrometer

Reactions

$K^-\ ^3\mathrm{He} \to K^+\ n$ dibaryon($S = -2$)	1.8 GeV/c

Particles studied dibaryon($S = -2$)

Brief description See also BNL-813 for a search in the reaction $\Xi^- d \to$ Dihyperon n. Approved for 700 hours. Running (May 94).

Related experiments BNL-813

E-mail contact franklin@ernest.phys.cmu.edu, pdbarnes@lanl.gov

BNL-838

(Proposed Oct 1986, Approved Nov 1986, Began data-taking 1988, Completed data-taking 1988)

90° EXCLUSIVES AT 6 GeV

BROOKHAVEN – R Appel, D S Barton, G Bunce (√ Spokesperson), A S Carroll, S Gushue, M Kmit, D I Lowenstein, Y I Makdisi
MINNESOTA U – H Courant, G Fang, K J Heller, K Johns, M L Marshak, M A Shupe, C White
MASSACHUSETTS U, DARTMOUTH – X Ma, J J Russell (√ Spokesperson)
PENN STATE U – S Heppelmann

Accelerator BNL *Detector* Double-arm spectrometer

Reactions

$\pi^- p \to \pi^- p$	6 GeV/c
$\pi^- p \to \rho^- p$	"
$\pi^- p \to \pi^+ \Delta(1232\,P_{33})^-$	"
$\pi^- p \to \pi^- \Delta(1232\,P_{33})^+$	"
$\pi^- p \to K^+ \Sigma^-$	"
$\pi^- p \to K^0 \Lambda$	"
$\pi^+ p \to \pi^+ p$	"
$\pi^+ p \to \rho^+ p$	"
$\pi^+ p \to \pi^+ \Delta(1232\,P_{33})^+$	"
$K^+ p \to K^+ p$	"
$K^+ p \to K^*(892)^+ p$	"
$K^+ p \to K^+ \Delta(1232\,P_{33})^+$	"
$K^- p \to K^- p$	"
$K^- p \to K^*(892)^- p$	"
$K^- p \to \pi^- \Sigma^+$	"
$K^- p \to \pi^+ \Sigma^-$	"
$K^- p \to \pi^0 \Lambda$	"
$p p \to p p$	"
$\bar{p} p \to \bar{p} p$	"
$\bar{p} p \to \pi^+ \pi^-$	"
$\bar{p} p \to K^+ K^-$	"

Brief description Studies importance of gluon exchange, quark interchange, and quark/antiquark annihilation in the scaling region for two-body exclusive scattering. Tests particularly the dominance of the quark interchange. Uses tagged beams and a hydrogen target.

Journal papers PR D49 (1994) 58.

Related experiments BNL-755

E-mail contact bunce@bnldag.bnl.gov, jrussell@umassd.edu

SUMMARIES OF BEIJING AND BROOKHAVEN EXPERIMENTS

BNL-839

(Proposed 1988, Completed data-taking 1989)

A SEARCH FOR MAGNETIC MONOPOLES

IBM WATSON RES CTR – S Bermon (Spokesperson), P Chaudhari, C C Chi, C C Tsuei
BROOKHAVEN – A G Prodell (Spokesperson)

Accelerator NONE *Detector* Other

Particles studied monopole

Brief description A study involving the design, construction, and operation of a prototype superconducting induction monopole detection system. The goal is to develop a large-area prototype detector which can be replicated to achieve monopole flux limits approaching the Parker limit.

BNL-840

(Proposed Jul 1987, Approved Oct 1987, Began data-taking Jul 1989, Completed data-taking Dec 1991)

SEARCH FOR THE COHERENT PRODUCTION OF LIGHT SCALAR AND PSEUDOSCALAR PARTICLES

ROCHESTER-BROOKHAVEN-FERMILAB-TRIESTE COLLABORATION
ROCHESTER U – R Cameron, G Cantatore, A C Melissinos (✓ Spokesperson), J T Rogers, G Ruoso, Y K Semertzidis
BROOKHAVEN – H Halama, D Lazarus, A G Prodell
FERMILAB – F A Nezrick
CERN & TRIESTE U – P Micossi, C Rizzo, E Zavattini

Accelerator NONE *Detector* Other

Particles studied axion

Brief description The detector used two CBA superconducting dipoles. Searched for light scalar or pseudoscalar particles that couple to the electromagnetic field. Looked for optical rotation of a polarized laser beam traversing in vacuum the 3.5 T magnetic field. The sensitivity of 10^{-10} rad corresponds to a limit on the coupling $g_{a\gamma\gamma}$ of 4×10^{-7} GeV^{-1}. Did not reach Delbruck scattering (real photons from virtual photons) below the e^+e^- threshold.

Journal papers PRL 64 (1990) 2988, JOSA B8 (1991) 520, PL A157 (1991) 125, PRL 69 (1992) 2333, ZPHY C56 (1992) 505, and PR D47 (1993) 3707.

Related experiments BNL-805

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BNL-841

(Proposed 1987, Approved Aug 1987, In preparation)

PHYSICS CALIBRATION OF THE SOUDAN-2 NUCLEON DECAY EXPERIMENT USING NEUTRINOS AT BROOKHAVEN

SOUDAN-2 COLLABORATION
ARGONNE – I Ambats, D Ayres, L Balka, L Barrett, J Biggs, J Dawson, T Fields, M C Goodman, N Hill, D Jankowski, F Lopez, E May, L E Price, J Schlereth, J Thron
MINNESOTA U – H Courant, U DasGupta, K Heller, K Johns, M Marshak, E Peterson, D Rosen, K Ruddick, M Shupe, S Werkema
OXFORD U – W W M Allison, G D Barr, C B Brooks, J H Cobb, L Kirby-Gallagher, D H Perkins, P Shield, N West
RUTHERFORD – J Alner, D Cockerill, C Garcia, R Giles, P J Litchfield, G F Pearce
TUFTS U – B Ewen, T Kafka, W Leeson, W A Mann (✓ Spokesperson), R Milburn, A Napier, W Oliver, J Schneps, N Sundaralingam

Accelerator BNL *Detector* Calorimeter

Reactions

ν_μ	<5 GeV/c

Brief description A test of modules for the SOUDAN-2 proton decay detector, to run parasitically during neutrino runs. For neutrino energies near the nucleon mass, the flux from the AGS wide-band horn-focussed beam has a shape similar to the spectrum of atmospheric neutrinos. The test measures the extent to which neutrino events can mimic decaying nucleons in the detector. Studies neutrino elastic, quasielastic, and pion production reactions at threshold energies. Approved for 350 hours.

Related experiments UNDERGROUND-SOUDAN-2

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BNL-844

(Proposed 1988, Approved Mar 1988, In preparation)

MEASUREMENT OF ANGULAR DISTRIBUTIONS FOR FRAGMENTS IN THE TARGET RAPIDITY REGION

BROOKHAVEN – Y Y Chu, J B Cumming (Spokesperson), P E Haustein, S Katcoff, R W Stoenner
OREGON STATE U – W Loveland

Accelerator BNL-ION *Detector* Other

Reactions

^{16}O Au → ^{37}Ar X	13.6 GeV (T_{lab}/N)
^{16}O Au → ^{127}Xe X	"

Brief description Investigates enhanced backward yields of fragments in the mass range A = 24–48 observed in BNL-825. Fragments are stopped in catcher foils and yields are determined off-line. Approved for 100 hours. Awaiting the availability of a high-intensity ^{16}O beam.

Related experiments BNL-825

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BNL-845

(Proposed Jan 1988, Approved Mar 1988, Began data-taking Jan 1989, Completed data-taking May 1989)

A SEARCH FOR THE RARE DECAY $K^0 \to \pi^0 e^+ e^-$

BROOKHAVEN – E Jastrzembski, R C Larsen, L B Leipuner, W M Morse (✓ Spokesperson)
YALE U – R K Adair, H B Greenlee, H Kasha, E B Mannelli, K E Ohl, M P Schmidt (✓ Spokesperson), M Vagins
VASSAR COLL – C B Schwarz

Accelerator BNL *Detector* Spectrometer

Reactions

$K_L \to \pi^0\ e^+\ e^-$	4–12 GeV (T_{lab})
$K_L \to e^+\ e^-\ \gamma$	"
$K_L \to e^+\ e^-\ \gamma\ \gamma$	"
$K_L \to e^+\ e^-\ e^+\ e^-$	"

Particles studied K_L

Brief description Normalized to $K_L^0 \to \pi^+\pi^-\pi^0$ with and without π^0 Dalitz decay. Sensitive to K_L^0 decays with an e^+e^- pair, branching ratio sensitivities on the order of 10^{-9}. Measures form factor and branching ratio for $K_L^0 \to e^+e^-\gamma$, studies $K_L^0 \to e^+e^-e^+e^-$ and $K_L^0 \to e^+e^-\gamma\gamma$, the latter mode possessing an important physics background to future searches for $K_L^0 \to \pi^0e^+e^-$. Ran for 1500 hours.

Journal papers PRL 64 (1990) 2755, PRL 65 (1990) 1407, PR D42 (1990) 3724, NP A527 (1991) 717, PR D45 (1992) 36, and PRL 71 (1993) 35. No further papers expected.

Related experiments FNAL-731, CERN-NA-031, KEK-162

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SUMMARIES OF BEIJING AND BROOKHAVEN EXPERIMENTS

BNL-847

(Proposed 1988, Approved Oct 1988, Began data-taking Jun 1989, Completed data-taking Jun 1989)

STUDY OF PARTICLE PRODUCTION IN HEAVY-ION COLLISIONS

SUNY, BUFFALO – P L Jain (✓ Spokesperson), K Sengupta, G Singh

Accelerator BNL-ION *Detector* Emulsion

Reactions

^{28}Si nucleus	14.5 GeV (T_{lab}/N)

Brief description Emphasis is on central collisions with the aim of finding evidence for a new, collective form of quark matter. Ran for 2 hours.

Journal papers PR C43 (1991) 2027, PR C43 (1991) 2417, PR C44 (1991) 854, ZPHY C52 (1991) 465, MPL A7 (1992) 93, PL B294 (1992) 27, ZPHY C53 (1992) 355, ZPHY A344 (1992) 73, PR C46 (1992) 721, NC 106A (1993) 967, NC A106 (1993) 793, JPHY G19 (1993) 1137, ZPHY A344 (1993) 291, ZPHY C58 (1993) 1, PR C47 (1993) 342, PR C47 (1993) 410, and PR C48 (1993) 517.

Related experiments BNL-875, CERN-EMU-008, CERN-EMU-011

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BNL-849

(Proposed Aug 1988, In preparation)

SEARCH FOR MUONIUM TO ANTIMUONIUM CONVERSION

A T AND T BELL LABS, MURRAY HILL – D R Harshman (Spokesperson), A P Mills, Jr (Spokesperson)

Accelerator BNL *Detector* Counter

Reactions

muonium → $\overline{\text{muonium}}$	—

Brief description A search for spontaneous conversion of muonium to antimuonium by looking for the spectator orbital positron remaining after the decay of the μ^-. Approved for 500 hours subject to test, with a request for a further 1550 hours deferred.

BNL-850

(Proposed 1988, Approved Oct 1988, Began data-taking Jun 1993, In progress)

EVA, A SOLENOIDAL DETECTOR FOR LARGE ANGLE EXCLUSIVE REACTIONS: PHASE I — DETERMINING COLOR TRANSPARENCY TO 22 GeV/c

BROOKHAVEN – D S Barton, G Bunce, A S Carroll (✓ Spokesperson), S Gushue, M Kmit, Y I Makdisi, M Tanaka
MINNESOTA U – N L Christensen, H Courant, M L Marshak, C White
MOUNT HOLYOKE COLL – H Nicholson, C S Sutton
PENN STATE U – S Durrant, S Heppelmann (✓ Spokesperson), S Kaye, E D Minor, Jr, J Y Wu
MASSACHUSETTS U, DARTMOUTH – S H Baker, F J Barbosa, D Martel, J J Russell
TEL AVIV U – J Aclander, J Alster, I D Mardor, Y F Mardor, I Navon, E Piasetzky

Accelerator BNL *Detector* EVA

Reactions

$p\,p \to p\,p$	6–20 GeV/c
p nucleus → $p\,p$ nucleus	"
π^- nucleus → $\pi^-\,p$ nucleus	6–15 GeV/c

Brief description The detector EVA (Exclusive Variable Apparatus) is built around the CLEO-I solenoid. This first experiment with EVA measures color transparency, defined as the ratio of pp elastic scattering for the target proton in a nucleus to elastic scattering on free protons. Continues studies of BNL-834. Approved for 2500 hours. Taking data (June 94).

Related experiments BNL-755, BNL-834, BNL-838

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BNL-851

(Proposed Sep 1988, Approved Oct 1988, Completed data-taking 1989)

A STUDY OF THE DECAY $K^+ \to \pi^+ e^+ e^-$

BROOKHAVEN – H A Gordon, D M Lazarus, P Rehak
PSI, VILLIGEN – J Egger, W D Herold, H Kaspar
WASHINGTON U, SEATTLE – V Chaloupka, H J Lubatti, A Shukla, T Zhao
YALE U – C Alliegro, A Deshpande, N J Hadley, A M Lee, M E Zeller (Spokesperson)

Accelerator BNL *Detector* Spectrometer

Reactions

$K^+ \to \pi^+\,e^+\,e^-$	—
$K^+ \to \pi^+$ neutral	—
neutral → $e^+\,e^-$	—
$\pi^0 \to e^+\,e^-$	—

Particles studied K^+, π^0

Brief description Measures the $K^+ \to \pi^+e^+e^-$ and $\pi^0 \to e^+e^-$ branching fractions and searches for an e^+e^- state in the mass range 1.02 to 350 MeV. Ran for 2000 hours.

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BNL-852

(Proposed Jan 1989, Approved Mar 1989, Began data-taking Jun 1993, In progress)

SEARCH FOR MESONS WITH UNUSUAL QUANTUM NUMBERS

BROOKHAVEN – S U Chung (✓ Spokesperson), K Olchanski, D Weygand, H J Willutzki
INDIANA U – B B Brabson, R R Crittenden, A R Dzierba (✓ Spokesperson), J L Gunter, R Lindenbusch, E B Scott, P T Smith, T Sulanke, S Teige, D Zieminska, Z Ziliak
LOUISVILLE U – C L Davis
MASSACHUSETTS U, DARTMOUTH – Z Bar-Yam, J Dowd, P Eugenio, W Kern
NOTRE DAME U – T Adams, J M Bishop, D R Cady, N M Cason, J M LoSecco, J Manak, W D Shephard, D L Stienike, S A Taegar, D R Thompson
MOSCOW STATE U – L I Belzer, V A Bodyagin, L Bravina, A I Demyanov, A M Gribushin, V L Korotkich, N A Kruglov, A I Ostrovidov, A S Proskuryakov, L I Sarycheva, N B Sinev
NORTHWESTERN U – T Pedlar, K K Seth, J Wise, D Zhao
RENSSELAER POLY – G Adams, J Napolitano, M Nozar, J Smith, B Wang, M Witkowski, A Wright
SERPUKHOV – S Denisov, V Kochetkov, A Soldatov

Accelerator BNL *Detector* MPS

Reactions

$\pi^-\,p \to n\,\eta\,\pi^0$	18 GeV/c
$\pi^-\,p \to p\,\eta\,\pi^-$	"
$\pi^-\,p \to n\,\eta\,\pi^0\,\pi^0$	"
$\pi^-\,p \to n\,\eta\,\pi^+\,\pi^-$	"
$\pi^-\,p \to n\,\eta\,\eta'$	"
$\pi^-\,p \to n\,\eta\,\eta\,\pi^0$	"
$\pi^-\,p \to n\,K^0\,\overline{K}^0\,\pi^0$	"
$\pi^-\,p \to n\,K^0\,\overline{K}^0\,\pi^0\,\pi^0$	"
$\pi^-\,p \to n\,K^0\,\overline{K}^0\,\pi^+\,\pi^-$	"

Particles studied exotic-meson, glueball, $f_0(1590)$

Brief description Looks in particular for further evidence of an "$M(1405)$", observed to decay into $\eta\pi^0$ in GAMS-spectrometer experiments at Serpukhov and CERN. Studies decay modes of mesons, with multi-photons and 0, 1, or 2 charged particles. The detector is built around MPS. The target is surrounded by a CsI veto. Other parts of the apparatus are a charged particle detector, a Čerenkov counter, and a 3000-element lead glass calorimeter. Approved for 2500 hours. Taking data (May 94).

Related experiments SERPUKHOV-163, CERN-NA-012-2

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WWW Home-page
http://lemond.phy.bnl.gov/~e852/home_e852.html

BNL-854

(Proposed Jan 1989, Approved Mar 1989, Began data-taking May 1991, Completed data-taking Jun 1991)

ANTIPROTON–NUCLEUS INTERACTIONS AT 5-10 GEV/c

RICE U – S Ahmad, B E Bonner (✓ Spokesperson), J A Buchanan, P Carter, J M Clement, A Empl, J Kruk, A Mattingly, G S Mutchler, S Toshkov
BROOKHAVEN – S E Eiseman, A Etkin, K J Foley, R W Hackenburg, R S Longacre, W A Love, T W Morris, E D Platner, A C Saulys
BROOKHAVEN & CITY COLL, NY – C S Chan, M A Kramer, S J Lindenbaum
JOHNS HOPKINS U – T J Hallman, L Madansky
MARYLAND U – D C Peaslee

Accelerator BNL *Detector* MPS

Reactions

$\bar{p}$ nucleus $\rightarrow \Lambda$ X	5, 7, 9 GeV/c
$\bar{p}$ nucleus $\rightarrow \bar{\Lambda}$ X	"
$\bar{p}$ nucleus $\rightarrow K_S$ X	"

Brief description Measures charged particle multiplicity distributions, production cross sections, and rapidity distributions of Λ's, $\bar{\Lambda}$'s, and K^0_S's for five targets (C, Al, Sn, Cu, Pb). The purpose of the measurement is to search for experimental signatures of the predicted formation of exotic quark–gluon states of hadronic matter in the energetic antiproton annihilation on various nuclei. A probe of the high-temperature, low-density region of the nuclear matter phase diagram in search of evidence for the quark–gluon plasma. Ran for 400 hours. Data analysis in progress (May 94).

Journal papers IEEE TNS 39 (1992) 615, and NP A558 (1993) 393c.

E-mail contact bonner@physics.rice.edu

BNL-855

(Proposed Jan 1989, Approved Mar 1989, Began data-taking Apr 1989, Completed data-taking Apr 1990)

LOW ENERGY PHOTON PRODUCTION IN PROTON NUCLEUS COLLISIONS AT THE AGS

BROOKHAVEN – D Lissauer, H Takai, C L Woody (✓ Spokesperson)
OAK RIDGE – J Gomez del Campo, A Ray, D Shapira (✓ Spokesperson)
PURDUE U – M Tincknell
CERN – C Erd, J Schukraft, W Willis
VANDERBILT U – R Clark

Accelerator BNL *Detector* Spectrometer

Reactions

p nucleus $\rightarrow \gamma$ X	10, 18 GeV/c

Particles studied γ

Brief description Uses the BNL-814 spectrometer and BaF_2 photon detectors. Studies low-energy photon production in correlation with event topology. A search for new sources of soft photons (in excess of nuclear decays and hadronic bremsstrahlung). Ran for 500 hours.

Journal papers NP A566 (1994) 451.

Related experiments CERN-NA-034, CERN-NA-034-2, CERN-NA-034-3

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BNL-857

(Proposed Jan 1989, Approved Mar 1989, Completed data-taking May 1989)

π^0 PAIR PRODUCTION NEAR THRESHOLD AND CHIRAL SYMMETRY BREAKING

BIRMINGHAM U – J Lowe (Spokesperson)
OXFORD U – N W Tanner
BOSTON U – J P Miller, B L Roberts (Spokesperson)
BRITISH COLUMBIA U – M D Hasinoff, A J Noble, M Sevior, C E Waltham
BROOKHAVEN – M Sakitt
CASE WESTERN RESERVE U – W J Fickinger, D K Robinson
BUDAPEST, CRIP & TRIUMF – D Horvath
NEW MEXICO U – B Bassalleck, J R Hall, K D Larson, D M Wolfe

Accelerator BNL *Detector* Counter

Reactions

$\pi^- p \rightarrow \pi^0 \pi^0 n$	300 – 500 MeV/c

Brief description Measurements made from the threshold, 265 MeV/c, up to 450 MeV/c, particularly in the region where the cross section varies rapidly, to provide the value of the chiral symmetry breaking parameter ξ. Also searches for the $\pi\pi$ resonance reported by the OMICRON collaboration in the neutral two-π^0 channel.

Journal papers PR C44 (1991) 956, and PRL 67 (1991) 2622.

Related experiments CERN-SC-094

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BNL-858

(Proposed May 1989, Approved Jun 1989, Began data-taking Jun 1990, Completed data-taking Jun 1990)

MEASUREMENT OF NEGATIVE PARTICLE YIELD AT 0° FOR 15 A GeV Si Au COLLISIONS

UC, BERKELEY, SPACE SCI DEPT – H J Crawford (✓ Spokesperson), J Engelage, L Greiner
BOSTON U – J Beatty, B Zhou
BROOKHAVEN – D Beavis, R Debbe
UCLA – J Carroll, G Igo
KEK – J Chiba, K Tanaka
WASEDA U – T Doke, T Kashiwagi, J Kikuchi
TOKYO U – M Aoki, R Hayano, Y Shimazu
JOHNS HOPKINS U – T Hallman
LOUISIANA STATE U – P Kirk, L Mao, Z Wang
LBL – I Flores, H H Heckman, P J Lindstrom
COLUMBIA U – S Nagamiya, P Stankus

Accelerator BNL *Detector* Counter

Reactions

^{28}Si nucleus $\rightarrow$ charged X	15 GeV (T_{lab}/N)

Particles studied π^-, K^-, $\bar{p}$, $\overline{deut}$

Brief description Studies the yield of antinuclei, π^-, and K^- at 0°. Targets are Al, Cu, and Au. 100 hours of data taking.

Journal papers NP A544 (1992) 603c, and PRL 69 (1992) 2345.

Related experiments BNL-802, BNL-814, CERN-NA-052

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SUMMARIES OF BEIJING AND BROOKHAVEN EXPERIMENTS

BNL-859

(Approved Jul 1989, Completed data-taking 1992)

STUDIES OF HIGH DENSITY BARYON MATTER FROM EXTENDED MEASUREMENTS OF PARTICLE MOMENTUM DISTRIBUTIONS AND FROM HIGH PRECISION TWO-PARTICLE CORRELATIONS

ARGONNE – S Kaufman
BROOKHAVEN – D Beavis, C Chasman, Z Chen, Y Y Chu, J B Cumming, R Debbe, M Gonin, S Gushue, O Hansen, S Hayashi, M J LeVine, B E Moskowitz, J Olness, L P Remsberg (√ Spokesperson), D Roehrich, M J Tannenbaum, J H van Dijk, F Videbaek, H Wegner
UC, BERKELEY, SPACE SCI DEPT – H J Crawford, J Engelage
UC, RIVERSIDE – P Beery, S Y Fung, J H Kang, R Seto
COLUMBIA U – C Y Chi, B A Cole, S Nagamiya, T K Nayak, P W Stankus, O E Vossnack, F Q Wang, Y Wang, Y D Wu, X Yang, W A Zajc (√ Spokesperson)
TOKYO U, INS – Y Akiba, H Hamagaki, S Homma
KYOTO U – H Kaneko
KYUSHU U – Y Tanaka
LIVERMORE – H C Britt, J B Costales, M N Namboodiri, T C Sangster, J Thomas, S Tonse
MIT – L Ahle, V Cianciola, W Kehoe, R J Ledoux (√ Spokesperson), D P Morrison, R J Morse, C G Parsons, P J Rothschild, R A Soltz, S G Steadman, G S F Stephans, T W Sung, V Vutsadakis, D Woodruff, D S Zachary
NEW YORK U – B Budick
TOKYO U – R S Hayano, H Sakurai
TSUKUBA U – K Kurita, Y Miake

Accelerator BNL *Detector* Calorimeter, Counter, Single-arm spectrometer

Reactions

^{28}Si nucleus → charged X	—

Particles studied π^-, π^+, K^+, K^-, p, $\bar{p}$, ϕ, Λ, $\bar{\Lambda}$, deut

Brief description Extends the inclusive cross section measurements of BNL-802 over a significantly larger kinematic range and performs high-precision two-particle measurements on particles produced in nucleus–nucleus collisions.

Journal papers NP A544 (1992) 237c, PRL 70 (1993) 1057, NP A566 (1994) 269c, NP A566 (1994) 379c, NP A566 (1994) 457c, and NP A566 (1994) 535c.

Related experiments BNL-802, BNL-866

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BNL-863

(Proposed May 1990, Began data-taking Sep 1993, Completed data-taking Sep 1993)

PARTICLE PRODUCTION AND NUCLEAR FRAGMENTATION IN COLLISIONS OF HEAVY IONS IN NUCLEAR TARGETS AT AGS ENERGIES

EMU01 COLLABORATION
ALMA ATA, PHYS INST – N P Andreeva, Z V Anzon, V I Bubnov, I Y Chasnikov, G Z Eligbaeva, L E Eremenko, A S Gaitinov, G S Kalyachkina, E K Kanygina, A M Seimbetev, C I Shakhova
BEIJING, IHEP – P Y Zheng
DUBNA – V Bradnova, A D Kovalenko, S A Krasnov, J Musulmanbekov, V V Rusakova
RAJASTHAN U – K Bhalla, J K Gupta, V Kumar, S Lokanathan, S Mookerjee, R Raniwala, S Raniwala
JAMMU U – J K Babyal, A Bhasin, S Kachroo, L K Mangotra, N Rao
HUNAN EDUCATION INST – Z Q Weng, Y L Xia
KHLOPIN RADIUM INST – V G Bogdanov, V A Plyushchev, Z I Solovieva
LEBEDEV INST – M I Adamovich, Y A Alexandrov, M M Chernyavsky, S G Gerassimov, S P Kharlamov, V G Larionova, N V Maslennikova, G I Orlova, N G Peresadko, N A Salmanova, M I Tretyakova
LUND U – S Garpman, B Jakobsson, J Nystrand, I Otterlund (√ Spokesperson), K Soderstrom, E Stenlund
MARBURG U – E Ganssauge, C Mueller
PANJAB U – M M Aggarwal, R Arora, V S Bhatia, S Dhamija, I S Mittra
KOSICE U – L Just, M Karabova, M Tothova, S Vokal, J Vrlakova
SHANXI NORMAL U – S B Luo, Y M Qin, D Zhang
SYDNEY U – R Amirikas, A M Bakich, L S Peak
TASHKENT, FTI – L P Chernova, K G Gulamov, N S Lukicheva, A Y Mashkov, V S Navotny, N Saidkhanov, S N Spilev, L N Svechnikova, S I Zhokova
TASHKENT, IFY – E S Basova, I K Bazarov, D A Carshiev, S H Nasyrov, N V Petrov, T P Trofimova, U I Tuleeva, B P Tursonov
WASHINGTON U, SEATTLE – T H Burnett, J G Grote, J Lord, D H Skelding, R J Wilkes (√ Spokesperson)
HUA-ZHONG NORMAL U – X Cai, Y D Li, L S Liu, W Y Qian, H Q Wang, C B Yang, D C Zhou
YEREVAN PHYS INST – F A Avetyan, N A Marutyan, L G Sarkisova, V R Sarkisyan

Accelerator BNL *Detector* Emulsion

Reactions

^{197}Au nucleus	> 10 GeV (T_{lab}/N)

Brief description Uses nuclear emulsion stacks and emulsion chambers with Au and Ag target foils and Pb calorimeters. Measures, on an event-by-event basis, pseudo-rapidity density distributions, density fluctuations, multiplicity and angular distributions, production cross sections, *etc.* Data analysis in progress (May 94).

Journal papers For papers see CERN-EMU-001 description.

Related experiments BNL-815, CERN-EMU-001, CERN-EMU-012

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BNL-864

(Proposed May 1990, Approved Nov 1990, In preparation)

PRODUCTION OF RARE COMPOSITE OBJECTS IN RELATIVISTIC HEAVY ION COLLISIONS

BROOKHAVEN – C B Dover, T G Throwe
IOWA STATE U – J C Hill, B Libby, F K Wohn
AMES LAB – H Skank, G Sleege
MASSACHUSETTS U, AMHERST – M S Z Rabin
MIT – H Padmanabhan, I A Pless, G E Van Buren
PENN STATE U – T A Armstrong, R A Lewis, J Passaneau, J D Reid, G A Smith, W S Toothacker
PURDUE U – A S Hirsch, H Z Huang, N Porile, A Rimai, R Scharenberg, M L Tincknell
VANDERBILT U – S V Greene
WAYNE STATE U – R Bellweid, S Bennett, T Cormier, J R Hall, B Kim, C Pruneau, J M Sheen
YALE U – K N Barish, M Bennett, S D Coe, G E Diebold, A J Gerber, J G Lajoie, R D Majka (√ Spokesperson), J L Nagle, K Pope, F S Rotondo, J Sandweiss (√ Spokesperson), B Shivakumar, A Slaughter, E J Wolin

Accelerator BNL *Detector* Calorimeter, Counter

Reactions

^{197}Au nucleus	11.71 GeV/c (P_{lab}/N)

Particles studied $\bar{p}$, dibaryon

Brief description Analyzes particles produced in small-impact parameter collisions in the central region of rapidity. Studies known objects, such as light nuclei and antinuclei, and those whose existence is uncertain, such as an H^0 dibaryon and quark matter. Scheduled to run in 1994.

Related experiments BNL-878, BNL-886, CERN-NA-052

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WWW Home-page
http://rhic2.physics.wayne.edu/e864/doc/e864.html

SUMMARIES OF BEIJING AND BROOKHAVEN EXPERIMENTS

BNL-865

(Proposed May 1990, Approved Jun 1990, In progress)

IMPROVED SEARCH FOR $K^+ \to \pi^+\mu^+e^-$

BASEL U – G Backenstoss, W Menzel, H Weyer
BROOKHAVEN – D Lazarus, H Ma, B A Magurno, P Pile, P Rehak
DUBNA – B Z Zalikhanov
MOSCOW, INR – G S Atoyan, S N Gninenko, V V Isakov, A A Poblaguev
NEW MEXICO U – B Bassalleck, J Lowe, D Wolfe
PSI, VILLIGEN – J Egger, W D Herold, H Kaspar, J Missimer
PITTSBURGH U – H M Gach, D E Krauss, I G Ober, P A Pomianowski, J A Thompson
TBILISI STATE U – Y S Bagaturia, D Mazavia, G V Melitauri, T M Sakhelashvili
YALE U – C J Alliegro, R Appel, D R Bergman, H D Do, J A Lozano, W A Majid, M E Zeller (Spokesperson)
ZURICH U – S Pislak, P Truoel

Accelerator BNL *Detector* Spectrometer, Calorimeter

Brief description Continuation of BNL-777 experiment, with a factor of approximately 70 improved sensitivity. Expected to run in 1994.

Related experiments BNL-777

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BNL-866

(Proposed May 1990, Approved Jun 1990, Began data-taking Apr 1992, In progress)

STUDIES OF PARTICLE PRODUCTION AT HIGH BARYON DENSITY USING THE Au BEAM

E-802 COLLABORATION
ARGONNE – S Kaufman
BROOKHAVEN – K Ashktorab, D Beavis, C Chasman (√ Spokesperson), Z Chen, Y Y Chu, J B Cumming, R Debbe, M Gonin, S Gushue, O Hansen, J H Lee, M J LeVine, B E Moskowitz, J Olness, L P Remsberg, D Roehrich, M J Tannenbaum, F Videbaek, H Wegner, F Zhu
COLUMBIA U – C Y Chi, B A Cole, M D Moulson, S Nagamiya, T K Nayak, P W Stankus, F Wang, Y Wang, Y Wu, Y Yang, W A Zajc
KYOTO U – H Kaneko
KYUSHU U – K Kimura
LIVERMORE – H C Britt, S J Luke, M N Namboodiri, T C Sangster, R A Soltz, J H Thomas
MIT – L Ahle, M D Baker, V Cianciolo, G A Heintzelman, W L Kehoe, D P Morrison, C A Ogilvie, M G Roland, P J Rothschild, J J Ryan, S G Steadman, G S F Stephans, T W Sung, D S Woodruff, D Zachary
BOHR INST – O Hansen
UC, BERKELEY, SPACE SCI DEPT – H J Crawford, J Engelage
UC, RIVERSIDE – J Chang, S Y Fung, J H Kang, R K Seto, H Xiang, G H Xu
TOKYO U – R S Hayano, H Sakurai, K Shigaki
TOKYO U, INS – Y Akiba, H Hamagaki (√ Spokesperson), S Homma, Y Tanaka
TSUKUBA U – S Hayashi, K Kurita, Y Miake, K Yagi

Accelerator BNL *Detector* Single-arm spectrometer

Reactions

^{197}Au nucleus → charged X	11.6 GeV/c (P_{lab}/N)

Particles studied p, π^+, π^-, K^+, K^-, $\bar{p}$

Brief description Studies many aspects of particle production in relativistic central and peripheral gold–gold collisions. Other possible targets are Al and Cu. Measures inclusive spectra of $\pi^\pm$, $K^\pm$, $p^\pm$ under well-defined, variable trigger conditions. The apparatus consists of two magnetic spectrometers. Approved for 2600 hours. Taking data (May 94).

Journal papers NP A553 (1993) 799c, NP A566 (1994) 27c, NP A566 (1994) 443c, and NP A566 (1994) 601c.

Related experiments BNL-802, BNL-859

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WWW Home-page
http://marie.mit.edu/server/e866/E866Main.html

BNL-868

(Proposed Sep 1990, Approved Nov 1990, Completed data-taking 1992)

INTERACTIONS OF 14.1 GeV/NUCLEON NUCLEI FROM ^{16}O TO ^{197}Au IN LIGHT AND HEAVY TARGETS

KLMM COLLABORATION
CRACOW – R Holynski, A Jurak, A Olszewski, M Szarska, A Trzupek, B Wilczynska, H Wilczynski, W Wolter, B Wosiek, K Wozniak
LOUISIANA STATE U – M L Cherry, W V Jones, K Sengupta, J P Wefel
MINNESOTA U – C J Waddington (√ Spokesperson)
MOSCOW, ITEP – A I Dubinina, O K Egorov, E D Kolganova, E A Pozharova, T Y Skorotko, V A Smirnitski

Accelerator BNL *Detector* Emulsion

Reactions

^{197}Au nucleus	10.6 GeV (T_{lab}/N)

Brief description Studies the multiple fragmentation of heavy ions into lighter nuclei and searches for evidence of the formation of a quark–gluon plasma. Photographic nuclear emulsions are exposed to high-energy AGS beams, including a gold beam.

Journal papers IJMP E2 (1993) 739, NP A566 (1994) 191c, and ZPHY C62 (1994) 25.

Related experiments BNL-869

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BNL-871

(Proposed Sep 1990, Approved Nov 1990, Began data-taking Jun 1992, In progress)

A NEW SEARCH FOR VERY RARE K_L DECAYS

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STANFORD U – K M Ecklund, K W Hartman, M J Hebert, G M Irwin, M C Pommot Maia, S G Wojcicki (√ Spokesperson)
TEXAS U – D Ambrose, S C Graessle, M Hamela, S Hamilton, G W Hoffmann, K Lang, J E McDonough, A Milder, P J Riley, J L Ritchie (√ Spokesperson), V Vassikakopoulos, C B Ware, S D Worm
WILLIAM AND MARY COLL – M Eckhause, A D Hancock, C Hoff, J R Kane (√ Spokesperson), Y N Kuang, R D Martin, R E Welsh, E Wollin
RICHMOND U – P D Rubin

Accelerator BNL *Detector* Spectrometer

Reactions

$K_L \to \mu^+ e^-$	—
$K_L \to \mu^- e^+$	—
$K_L \to \mu^+ \mu^-$	—
$K_L \to e^+ e^-$	—

Particles studied K_L

Brief description A search for the decays $K_L \to \mu e$, $K_L \to ee$, and $K_L \to \mu\mu$, building upon the experience and reusing some of the equipment of BNL-791. The detector consists of two dipoles, straw trackers, drift chambers, scintillation and gas Čerenkov counters, lead glass and a muon rangefinder. A novel feature of the experiment is the stopping of the neutral beam inside the spectrometer with a shielded tungsten 'beam

plug'. Test data were taken in 1991. An engineering run was completed in 1993. Approved for 3,600 hours. Taking data (May 94).

Related experiments BNL-791, BNL-791

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BNL-874

(Proposed Sep 1990, Approved Jan 1991, Began data-taking May 1992, Completed data-taking Jun 1993)

KAON–NUCLEUS QUASIELASTIC AND ELASTIC SCATTERING

BROOKHAVEN – S Bart, R E Chrien (√ Spokesperson), R Sawafta, R J Sutter
COLORADO U – B L Clausen, C Kormanyos, R J Peterson (√ Spokesperson), J R Shephard, J Wise
HOUSTON U – M Barakat, E V Hungerford (√ Spokesperson), K Johnston, B W Mayes, L S Pinsky
OHIO U – K H Hicks, R Michael
OSAKA U – T Kishimoto
TRIUMF – L Lee

Accelerator BNL *Detector* Spectrometer, Drift chamber

Reactions
K^+ nucleus 600 – 720 MeV/c (P_{lab})

Particles studied K^+

Brief description Studies kaon scattering from nuclear systems. Elastic K^+ scattering is studied with ^{6}Li and C, quasielastic with C, Ca, and Pb targets. Uses the kaon spectrometer, Moby Dick, with its associated detection apparatus.

Journal papers PRL 71 (1993) 2571.

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BNL-875

(Proposed Jan 1991, Approved Mar 1991, Completed data-taking Aug 1993)

STUDY OF PARTICLE PRODUCTION AND NUCLEAR FRAGMENTATION IN RELATIVISTIC HEAVY-ION COLLISIONS IN NUCLEAR EMULSIONS

SUNY, BUFFALO – P L Jain (√ Spokesperson), A Mukhopadhyay, G Singh
AMHERST COLL – A Z M Ismail

Accelerator BNL *Detector* Emulsion

Reactions
^{197}Au nucleus 10.6 GeV (T_{lab}/N)

Brief description Emphasis is on events produced in central collisions with low-energy fragments emitted from the target excitation. This may provide evidence for a new form of matter: quark matter.

Related experiments BNL-847, CERN-EMU-008, CERN-EMU-011

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BNL-876

(Proposed Jan 1991, Approved Mar 1991, In preparation)

μ^+ SURFACE BEAM CHARACTERIZATION

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GEORGE MASON U – W F Lankford
VIRGINIA STATE COLL – M R Davis, C E Stronach
WILLIAM AND MARY COLL – A Greer, W J Kossler (Spokesperson), H E Schone

Accelerator BNL *Detector* Counter

Particles studied μ^+

Brief description Studies surface muons produced at the AGS. Surface muons are muons that result from the decay of pions that have come to rest near the surface of the primary production target. Approved but not yet running.

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BNL-877

(Proposed Sep 1990, Approved Nov 1990, Began data-taking Apr 1992, In progress)

STUDY OF RELATIVISTIC NUCLEAR COLLISIONS WITH HEAVY BEAMS USING THE E814 CALORIMETRY AND MODIFIED FORWARD SPECTROMETER

BROOKHAVEN – G David, T Ludlam, S McCorkle, E O'Brien, C L Woody
DARMSTADT, GSI – N W Herrmann
MCGILL U – J Barrette, S Gilbert, R Lacasse, S K Mark, M Rosati, G Wang
IDAHO U – J Cole, M Drigert
PITTSBURGH U – W Cleland, M J Clemen, U Sonnadara, S Voloshin
SAO PAULO U – N C da Silva, O Dietzsch, E M Takagui
SUNY, STONY BROOK – P Braun-Munzinger (√ Spokesperson), W C Chang, J Dee, T K Hemmick, B S Hong, Y G Kwon, D Miskowiec, S Panitkin, T Piazza, M N Rao, S A Sedykh, J Stachel, J P Wessels, N Xu, Y C Zhang, C M Zou
WAYNE STATE U – R Bellwied, S J Bennett, T M Cormier, J R Hall, Q L Li, A Lukaszew, R Matheus, J T Murgatroyd, C Pruneau

Accelerator BNL-ION *Detector* Spectrometer, Calorimeter

Reactions
^{197}Au nucleus 10 GeV (T_{lab}/N)

Particles studied p, K^-, K^+, π^-, π^+, nucleon, γ

Brief description Combines 4π calorimetry with a high-resolution forward spectrometer, allowing a detailed study of particle production in central collisions. Targets are Al, Cu, Sn, and Pb. Topics include measurement of flow effects, a study of rapidity and transverse momentum distributions for baryons and mesons, and particle–particle correlations. Ran for 800 hours.

Journal papers PRL 70 (1993) 2996

Related experiments BNL-814

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WWW Home-page
http://rhic2.physics.wayne.edu/e877/e877.html

BNL-878

(Proposed Jan 1991, Approved Mar 1991, Began data-taking Apr 1992, Completed data-taking Oct 1993)

INVESTIGATION OF ANTINUCLEUS PRODUCTION AND SEARCH FOR NEW PARTICLES IN NUCLEUS–NUCLEUS COLLISIONS AT THE AGS

BROOKHAVEN – D Beavis, R Debbe
COLUMBIA U – S Nagamiya, P W Stankus
JOHNS HOPKINS U – L Medansky, R Welsh
KEK – J Chiba, K H Tanaka
UC, BERKELEY, SPACE SCI DEPT – H J Crawford (√ Spokesperson), J Engelage, L C Greiner
LBL – I Flores, H H Heckman, P J Lindstrom, R Wright
TOKYO U – R S Hayano
UCLA – J B Carroll, T Hallman, G Igo
UNIVERSITIES SPACE RESEARCH ASSOC – J Mitchell
WASEDA U – T Doke, T Kashiwagi, J H Kikuchi
YALE U – M Bennett, B S Kumar, J Nagle, K Pope

Accelerator BNL *Detector* Counter, Spectrometer, Drift chamber

Reactions

p nucleus → charged X	14.5 GeV (T_{lab}/N)
^{28}Si nucleus → charged X	"
^{197}Au nucleus → charged X	"

Particles studied π^-, K^-, $\bar{p}$

Brief description Investigates the π^-, K^-, and $\bar{p}$ spectrum at 0°. Studies antideuteron and rare particle production in heavy ion collisions. The proton program is designed to provide a check of the spectrometer. Data analysis in progress (May 94).

Journal papers NP A566 (1994) 439c.

Related experiments BNL-858, BNL-864, BNL-866, BNL-877, CERN-NA-052

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BNL-880

(Proposed Jun 1991, Approved Aug 1991, Began data-taking Apr 1994, In progress)

THE EFFECTS OF A PARTIAL SIBERIAN SNAKE ON POLARIZATION AT THE AGS

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BROOKHAVEN – L Ahrens, J Alessi, W van Asselt, E J Blesser, G Bunce, P Cameron, E D Courant, H W J Foelsche, C J Gardner, J Geller, Y Y Lee, A Lucio, Y I Makdisi, S R Mane, L Ratner, K Reece, T Roser (✓ Spokesperson), J F Skelly, A Soukas, S Tepikian, R E Thern, A G Upfimtsev
ARGONNE – M Beddo, D Grosnick, D Lopiano, H Spinka, L Teng, D G Underwood, A Yokosawa
KEK – S Hiramatsu, Y Mori, H Sato, K Yokoya
TRIUMF – U Wienands
FERMILAB – V Bharadwaj, S Hsueh

Accelerator BNL *Detector* Spectrometer

Reactions Polarized beam

$p\,p \rightarrow p\,p$	1–25 GeV/c

Particles studied p

Brief description The 5% spin rotator (AGS *partial snake*) for overcoming the imperfection-type spin depolarizing resonances is studied, and the impact of the partial snake solenoid on the beam dynamics in the AGS ring is analyzed. A magnetic spectrometer with scintillation counter hodoscopes is used to detect the polarization in pp elastic scattering at $-t = 0.15$ $(\mathrm{GeV}/c)^2$ from internal targets (carbon fiber and nylon) in the AGS. 320 hours of beam time requested. Preliminary run was in April 94. Next possible beam time in January 95.

Related experiments NONE

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BNL-881

(Proposed Jul 1991, Approved Aug 1991, In progress)

UTILIZING $\phi\phi$ SPECTROSCOPY TO SEARCH FOR EXOTIC GLUEBALLS, EXOTIC HYBRID, OR EXOTIC MULTIQUARK STATES

BROOKHAVEN & CITY COLL, NY – S J Lindenbaum (✓ Spokesperson)
BROOKHAVEN – R W Hackenburg, R S Longacre
CITY COLL, NY – C S Chan, E Efstathiadis, M A Kramer, K Zhao, Y Zhu
FERMILAB – K Vaziri
RENSSELAER POLY – G Adams, C Landberg, B Wojtsekhowski

Accelerator BNL *Detector* MPS-II

Reactions

$\pi^- p \rightarrow \phi\,\phi\,n$	8 GeV/c (P_{lab})
$\pi^- p \rightarrow \phi\,K^+\,K^-\,n$	"
$\pi^- p \rightarrow K^+\,K^-\,K^+\,K^-\,n$	"
$K^- p \rightarrow \phi\,\phi\,\Lambda$	"
$K^- p \rightarrow \phi\,\phi\,\Sigma$	"
$K^- p \rightarrow \phi\,K^+\,K^-\,\Lambda$	"
$K^- p \rightarrow \phi\,K^+\,K^-\,\Sigma$	"
$K^- p \rightarrow K^+\,K^-\,K^+\,K^-\,\Lambda$	"
$K^- p \rightarrow K^+\,K^-\,K^+\,K^-\,\Sigma$	"
$\bar{p}\,p \rightarrow \phi\,\phi\,\pi^0$	"
$\bar{p}\,p \rightarrow \phi\,K^+\,K^-\,\pi^0$	"
$\bar{p}\,p \rightarrow K^+\,K^-\,K^+\,K^-\,\pi^0$	"

Particles studied glueball, $f_2(2010)$, $f_2(2300)$, $f_2(2340)$

Brief description A search for exotic glueballs and exotic hybrids. Uses the MPS facility and the MESB beam at 8 GeV/c, tuned to contain π^-, K^-, and $\bar{p}$. Lowering the momentum to 8 GeV/c increases the rate of exchanges required to make exotics. Currently pausing (June 94).

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WWW Home-page
http://www.phy.bnl.gov/~e881/welcome_ags.html

BNL-882

(Proposed Jul 1991, Approved Aug 1991, Began data-taking 1992, Completed data-taking 1993)

SEARCH FOR PARTICLES WITH $|Z| > 3$ AND NEGATIVE CHARGE OR LARGE A/Z PRODUCED IN CENTRAL NUCLEUS–NUCLEUS COLLISIONS

UC, BERKELEY – Y D He, P B Price (✓ Spokesperson)

Accelerator BNL *Detector* Plastic

Reactions

^{28}Si Pb → charged X	14.6 GeV (T_{lab}/N)
^{197}Au Pb → charged X	"

Particles studied exotic

Brief description In a ^{28}Si run, uses CR39 plastic track detectors to study production of multiply charged composites in central collisions. In particular, searches for charged, mid-rapidity particles with $|Z| > 3$ and anomalously large A/Z, which would be a signature of strange matter. In a ^{197}Au run, uses PB-1 glass track-etch detectors. Studies projectile fragmentation, the nuclear charge pickup process, possible production of fractional charges and $Z > 79$ exotic composites, and dependence of the detector response on velocity.

Journal papers PL B298 (1993) 50, PRL 71 (1993) 1160, PR C48 (1993) 647, NIM B84 (1994) 67, NIM B86 (1994) 317, NP A566 (1994) 363c, and ZPHY A348 (1994) 105.

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BNL-885

(Proposed Jan 1992, Approved Feb 1992, In preparation)

EXPERIMENT TO DETECT ΛΛ HYPERNUCLEI

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CARNEGIE MELLON U – A Berdoz, G B Franklin (✓ Spokesperson), R Magahiz, F Merrill, C Meyer, B Quinn, R Schumacher, V Zeps
FREIBURG U – M Buerger, T Buerger, J Franz, E Roessle, H Schmitt
KYOTO U – T Iijima, K Imai
KYOTO SANGYO U – F Takeutchi
MANITOBA U & TRIUMF – C Davis, L Gan, M Landry, S Page, D Ramsay, W T H van Oers
NEW MEXICO U – B Bassalleck, J Lowe, A Rusek, R Stotzer, D Wolfe

Accelerator BNL *Detector* Spectrometer, Scintillator

Reactions

$K^- p \rightarrow \Xi^-\,K^+$	1.8 GeV/c (P_{lab})

K^- ^{12}C	"
Ξ^- ^{6}Li	0 GeV/c (P_{lab})
Ξ^- ^{12}C	"

Brief description Studies the properties of $\Lambda\Lambda$ hypernuclei. The K^- beam is incident on a polyethylene (CH_2) target where Ξ^- is produced. The Ξ^- is then stopped in a ^{12}C or ^{6}Li target producing $\Lambda\Lambda$ hypernuclei. The ^{12}C target is a scintillating fiber array. The K^- also interacts with the carbon nuclei in the primary CH_2 target, producing other $\Lambda\Lambda$ hypernuclear final states. Uses the spectrometer of the BNL-813, and a neutron TOF array. Data taking expected in 1995. In preparation (May 94).

Related experiments BNL-813, KEK-224

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BNL-886

(Proposed Jan 1992, Approved Feb 1992, Began data-taking Sep 1993, Completed data-taking Oct 1993)

SEARCH FOR NEW PARTICLES IN NUCLEUS–NUCLEUS COLLISIONS

KYOTO U – H Enyo, T Iijima, K Imai (✓ Spokesperson), A Masaike, S Mihara, N Saito, H Yamamoto, S Yamashita, S Yokkaichi
KYOTO SANGYO U – K Okada, F Takeutchi
BIRMINGHAM U – N Nelson, R Zybert
BROOKHAVEN – D Beavis, R E Chrien, P H Pile (✓ Spokesperson), R Sawafta, R Sutter
CARNEGIE MELLON U – G B Franklin, R Magahiz, F Merrill, B Quinn, R Schumacher, R Sukaton, V Zeps
YALE U – G Diebold (✓ Spokesperson)
LOS ALAMOS – P D Barnes
NEW MEXICO U – B Bassalleck, J Hall, A Rusek, D M Wolf
NEW MEXICO U & BIRMINGHAM U – J Lowe
FREIBURG U – M Buerger, J Franz, E Roessle, H Schmitt

Accelerator BNL *Detector* Spectrometer, Counter

Reactions

^{28}Si Pt	14.6 GeV (T_{lab}/N)
^{197}Au Pt	11.5 GeV (T_{lab}/N)

Brief description The goal is to search for new particles, such as strangelets, in nucleus–nucleus collisions. Uses the 2 GeV/c K-beamline as a mass spectrometer. By placing two electrostatic separators in the beam line spectrometer, a specific M/Z ratio may be selected and background particles deflected out. Also uses a scintillating fiber track detector, TOF and dE/dx detectors. Data analysis in progress (May 94).

Journal papers PR C48 (1993) 2984, and PR C (to be published).

Related experiments BNL-813, BNL-836, BNL-864

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BNL-887

(Proposed Jan 1992, Approved Feb 1992, Began data-taking Jun 1994)

DO NARROW Σ HYPERNUCLEAR STATES EXIST?

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HAMPTON U & CEBAF – K Baker, W Naing, L Tang
HOUSTON U – M Barakat, E V Hungerford
INDIANA U – W Franklin, S W Wissink
TOKYO U, INS – H Outa
OHIO U – K H Hicks (✓ Spokesperson), B Larson
TOKYO U – R S Hayano, Y Shimizu, H Tamura

Accelerator BNL *Detector* Spectrometer

Reactions

K^- nucleus → $\pi^\pm$ X	600 MeV/c (P_{lab})

Particles studied Σ^+, Σ^-

Brief description Measures hypernuclear mass spectra for in-flight ($K^-, \pi^\pm$) reactions with ^{6}Li, ^{7}Li, and ^{9}Be targets. The aim is to provide data with sufficient energy resolution and statistics in order to investigate systematically whether narrow Σ hypernuclear states exist below or above threshold in light hypernuclei. Uses the Moby Dick spectrometer. Taking data (June 94).

Related experiments BNL-774

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BNL-888

(Proposed Jan 1992, Approved Feb 1992, Began data-taking May 1992, Completed data-taking Jul 1992)

SEARCH FOR THE *H* DIBARYON

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UCLA – R D Cousins (✓ Spokesperson)
PRINCETON U – V L Fitch, J Klein, A J Schwartz (✓ Spokesperson)
STANFORD U – M V Diwan, K Ecklund, G M Irwin, D A Ouimette, S G Wojcicki
TEMPLE U – J Belz, V L Highland, S H Kettell, A Trandafir
TEXAS U – C A Allen, G W Hoffmann, K Lang, M R Marcin, J McDonough, C T Nguyen, P T Riley, J L Ritchie, B Ware, S Worm
WILLIAM AND MARY COLL – M Eckhause, A D Hancock, C Hoff, J R Kane, Y Kuang, R Martin, W F Vulcan, R E Welsh, R G Winter, M Witkowski

Accelerator BNL *Detector* Counter, Drift chamber, Spectrometer

Reactions

p nucleus → dibaryon($S = -2$) X	24 GeV/c (P_{lab})

Particles studied dibaryon($S = -2$)

Brief description Searches for the H dibaryon (a hypothetical six-quark $uuddss$ state) using the BNL-791 beamline and spectrometer, modified for two H-detection techniques. The first technique searches for short-lived H's which decay via the sequence $H \rightarrow \Lambda X \rightarrow p\pi^- X$, and the second searches for long-lived H's by diffractively dissociating such H's into di-lambda pairs: H A → ΛΛA → $2p2\pi^-$ A. Uses Cu, and Pt targets.

Related experiments NONE

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BNL-889

(Proposed Aug 1992, Approved Feb 1993, In preparation)

LONG BASELINE NEUTRINO OSCILLATION SEARCH

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UC, RIVERSIDE – I Stancu, G VanDalen
UC, SANTA BARBARA – D Bauer, D Caldwell, A Lu, S Yellin
LINFIELD COLL – I Cohen
LOS ALAMOS – R Burman, F Federspiel, G T Garvey, W C Louis, M Schillaci, D H White, D Whitehouse
LOUISIANA STATE U – R L Imlay, W Metcalf
NEW MEXICO U – B Dieterle, R Reeder
MONTREAL U – G Azuelos, P Depommier
PENN U – M Albert, J Hill, A K Mann (✓ Spokesperson)
TEMPLE U – L Auerbach, V Highland, J Margulies
TEXAS U – C F Moore
BEN GURION U & TEXAS U – S Mordechai
TRIUMF – J Beveridge, P Gumplinger, R Helmer, J M Poutissou, D Wright, S Yen

VALPARAISO U, INDIANA – D D Koetke, R W Mainweiler, T D S Stanislaus

Accelerator BNL *Detector* Counter

Particles studied ν_μ, ν_e

Brief description This is a long baseline, ν_μ appearance–disappearance experiment. The aim is to explore the region in the vacuum oscillation space, δm^2 *versus* $\sin^2(2\theta)$, suggested by earlier studies of atmospheric neutrinos in underground detectors. The apparatus consists of three linearly aligned, widely separated 3-kiloton imaging water Čerenkov detectors, 1 km, 3 km, and 24 km from source. Utilizes the new neutrino beam at AGS. In preparation (May 94).

Related experiments NONE

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WWW Home-page
http://dept.physics.upenn.edu/home/www/public_html/ BNL-889/

BNL-890

(Proposed Aug 1992, Approved 1994, In preparation)

TEST OF CHARGE SYMMETRY IN η PRODUCTION ON DEUTERIUM

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BROOKHAVEN – S Bart, R E Chrien (√ Spokesperson), P H Pile, R Sawafta, R J Sutter
JULICH, FORSCHUNGSZENTRUM – H Seyfarth
LOS ALAMOS – D M Jansen, M J Leitch, J C Peng (√ Spokesperson)
UCLA – M Clajus, B M K Nefkens (√ Spokesperson), J W Price, W B Tippens
BOSKOVIC INST, ZAGREB – M Batinić, A Marušić, I Supek, I Šlaus, A Švarc

Accelerator BNL *Detector* Spectrometer, Wire chamber

Reactions

π^- deut $\rightarrow n\ n\ \eta$	< 750 MeV/c (P_{lab})
π^- deut $\rightarrow n\ n\ \pi^0$	"
π^+ deut $\rightarrow p\ p\ \eta$	"
π^+ deut $\rightarrow p\ p\ \pi^0$	"

Particles studied π^0, η

Brief description The aim is a study of charge symmetry in the production of η and π^0 mesons from a liquid deuterium target. The η spectrometer consists of two identical γ detectors located symmetrically about the target. Each detector is an array of sixteen NaI counters. Scheduled to run Summer 94.

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BNL-891

(In preparation)

A SEARCH FOR QUARK MATTER (QGP) AND OTHER NEW PHENOMENA UTILIZING Au Au COLLISIONS AT THE AGS

BROOKHAVEN – S E Eisman, A Etkin, K J Foley, R W Hackenburg, S J Lindenbaum, R S Longacre, W A Love, E D Platner (Spokesperson), A C Saulys
CITY COLL, NY – C S Chan, E Efstathiadis, M A Kramer, K H Zhao, Y J Zhu
RICE U – S Ahmad, B E Bonner, J A Buchanan, J M Clement, G S Mutchler
UC, DAVIS – D A Cebra

Accelerator BNL *Detector* MPS

Reactions

^{197}Au nucleus	10 GeV (T_{lab}/N)

Brief description Searches for anomalous behavior in rapidities, multiplicities, strangeness enhancements, transverse momenta, energy flows, *etc.* The observations are on an event-by-event basis. Uses gold target. Successful tracking and momentum analysis of Λ, $\overline{\Lambda}$, and K^0 in the forward hemisphere may permit a very sensitive search for new phenomena such as a quark–gluon plasma (QGP) production.

Related experiments BNL-810

E-mail contact platner@bnldag.bnl.gov

BNL-896

(Proposed Aug 1993, Approved 1993, In preparation)

SEARCH FOR A SHORT-LIVED H_0 DIBARYON AND SHORT-LIVED STRANGE MATTER, AND STUDY OF HYPERON PRODUCTION IN 11.6 A GeV/c Au Au COLLISIONS

UC, BERKELEY, SPACE SCI DEPT – H J Crawford (√ Spokesperson), M Cronqvist, J Engelage, I Flores, L C Greiner
UCLA – J B Carroll, T J Hallman (√ Spokesperson), G Igo
CERN – P Sonderreger
WAYNE STATE U – R Bellwied, L Dou, J Hall, V Rykov
JOHNS HOPKINS U – L Madansky, R Welsh
BROOKHAVEN – W Christie, R Debbe, A Etkin, R Longacre, E Platner
LBL – K Crowe, D Greiner, P J Lindstrom, J Marx
TEXAS U – G Hoffmann, F Moore, S Paganis, P Riley, J Schambach
NASA, GODDARD – J W Mitchell
CATANIA U – S Costa, R Potenza
OHIO STATE U – T Humanic, G Vilkelis
MIT, LNS – E Judd
CREIGHTON U – I Sakrejda
YALE U – F Rotondo

Accelerator BNL *Detector* Drift chamber

Reactions

^{197}Au nucleus $\rightarrow$ dibaryon + X	11.6 GeV (T_{lab}/N)

Particles studied dibaryon($S = -2$), Λ, $\overline{\text{hyperon}}$

Brief description Searches for the H_0 dibaryon state and for new states of nuclear matter produced in gold-gold collisions. H_0 is the lowest lying 6-quark (*uuddss*) state. Extends the search into regions of short lifetime, on the order of τ_Λ, and complements an existing double strangeness exchange program by offering access to a new, more probable doorway channel, the coalescence of two Λ^0's into a bound di-lambda. Uses a detector capable of identifying the topological signature of unstable particle decays as well as the rigidity of each charged particle produced, affording a sensitive search for new metastable states and investigation of the properties of known strange particle states. In preparation (May 94).

Related experiments BNL-813, BNL-864, BNL-891

E-mail contact tjhallman@lbl.gov, hjcrawford@lbl.gov, crawford@bnldag.bnl.gov

WWW Home-page http://aquila.lbl.gov/bnl896/home_e896.html

BNL-RHIC-BRAHMS

(Proposed 1992, In preparation)

THE BRAHMS EXPERIMENT AT RHIC

BRAHMS COLLABORATION

Accelerator BNL-RHIC *Detector* BRAHMS

Brief description RHIC provides an opportunity for experiments investigating both the baryon-poor quark gluon plasma in the midrapidity region and the baryon-rich plasma in the fragmentation regions of rapidity. The most basic information available for understanding the phenomena that occur in heavy ion collisions comes from the momentum spectra and yields of the various emitted particles as a function of transverse momentum and rapidity. One of the goals of the experiment is to measure these

spectra in a wide region of rapidity and transverse momentum as a function of the centrality of a heavy ion reaction. Uses the BRAHMS (Broad RAnge Hadron Magnetic Spectrometers) detector, consisting of a magnetic forward angle hadron spectrometer and a midrapidity spectrometer. In preparation (May 94). For further details, please contact the spokesperson, Dr. Flemming Videbaek [BNL].

E-mail contact videbaek@hi2.hirg.bnl.gov

WWW Home-page
http://rsgi01.rhic.bnl.gov/export1/brahms/WWW/brahms.html

BNL-RHIC-PHENIX

(Proposed 1989, In preparation)

PHOTON–ELECTRON NEW HEAVY ION EXPERIMENT

PHENIX COLLABORATION

Accelerator BNL-RHIC *Detector* PHENIX

Brief description Studies thermodynamic conditions and particle states characterizing the high density matter created in ion collisions. Focuses specifically on the measurement of leptons and photons and should be capable of exploiting the highest luminosities envisioned for RHIC. The PHENIX detector system is based on an axial field magnet in which the central rapidity interval is covered by two detector arms, each subtending 90° in azimuth. The aperture is instrumented to detect electrons, photons, and hadrons. The muon arm, covering polar angles forward of 30°, has a good acceptance for muon pairs and allows electron–muon coincidence measurements. Under construction (May 94). The collaboration consists of almost four hundred scientists, engineers, and graduate students from 45 participating institutions in 10 countries. For further details, please contact the spokesperson, Dr. Shoji Nagamiya [Columbia U.].

E-mail contact nag@nevis.nevis.columbia.edu, nagamiya@bnlcl1.bnl.gov

WWW Home-page
http://rsgi01.rhic.bnl.gov/~phenix/phenix_home.html

BNL-RHIC-PHOBOS

(Proposed Jan 1992, In preparation)

PROPOSAL TO STUDY VERY LOW $p_\perp$ PHENOMENA AT RHIC

PHOBOS COLLABORATION

Accelerator BNL-RHIC *Detector* PHOBOS

Brief description Explores the low transverse momentum region near $y = 0$. Uses the PHOBOS detector, a two-arm multiparticle spectrometer with good particle identification and momentum resolution and an almost 4π multiplicity and pseudorapidity coverage. The detector is built around a single technology: silicon pads and strips. It is designed to handle the highest rates and particle densities expected at RHIC and to measure and identify very soft hadrons, whose production may have anomalous features related to the physics of a new phase of matter. In preparation (May 94). For further details, please contact the spokesperson, Dr. Wit Busza [MIT, LNS].

E-mail contact busza@mitlns.mit.edu

WWW Home-page http://rsgi01.rhic.bnl.gov/html/phobos.html

BNL-RHIC-STAR

(Proposed 1989, Approved Aug 1991, In preparation)

THE SOLENOIDAL TRACKER AT RHIC (STAR)

STAR COLLABORATION

Accelerator BNL-RHIC *Detector* STAR

Brief description STAR is designed to search for signatures of quark–gluon plasma formation and to investigate the behavior of strongly interacting matter at high energy density. The emphasis is on the measurement and correlation of global observables on an event-by-event basis and the use of hard scattering of partons to probe the properties of high density nuclear matter. The event-by-event measurement of global observables is possible because of the very high charged particle densities (dn/dy about 1000) expected at mid-rapidity in nucleus–nucleus collisions at RHIC. To fulfill the physics objectives, the experiment will provide tracking, momentum analysis, and particle identification of most of the charged particles at mid-rapidity. The baseline STAR detector includes a time projection chamber (TPC) in a solenoidal magnetic field of 0.5 T, covering approximately 4 units of the central rapidity. The cylindrical TPC is four meters in diameter. Ionization charge produced along particle trajectories is drifted to the two end plates, where induced signals and arrival times are read out on 150,000 cathode pads. Particle identification will be possible via dE/dx in the $1/\beta^2$ region. Upgrades being developed for STAR include an array of TOF counters to extend the PID capabilities to higher momenta, an electromagnetic calorimeter to provide for the measurement of neutral energy, and a silicon vertex detector which uses position sensitive silicon devices with a drift-time measurement technique. A further upgrade providing for external TPC's will extend the particle tracking coverage to a pseudorapidity of approximately 4. PAC approved August 91. In preparation (May 94). For further details, please contact the spokesperson, Dr. John W. Harris [LBL, Berkeley]. Deputy spokespersons are Drs. Timothy J. Hallman [UCLA], and Edward D. Platner [BNL].

E-mail contact jwharris@lbl.gov, tjhallman@lbl.gov, platner@bnldag.bnl.gov

WWW Home-page
http://rsgi01.rhic.bnl.gov/star/starlib/doc/www/star.html

CEBAF Experiments

CEBAF-89-004

(Proposed Oct 1989, Approved Mar 1990, In preparation)

ELECTROMAGNETIC PRODUCTION OF HYPERONS

CLAS COLLABORATION

CARNEGIE MELLON U – G Franklin, B Quinn, R A Schumacher (✓ Spokesperson)
CATHOLIC U – H Crannell, D I Sober
CEBAF – B A Mecking, M Mestayer, A Yegneswaran
OLD DOMINION U – C Hyde-Wright
FLORIDA STATE U – L C Dennis, K W Kemper
LOS ALAMOS – M J Leitch, J C Peng
VIRGINIA TECH – R A Arndt, D A Jenkins, L D Roper, R Workman

Accelerator CEBAF *Detector* CLAS

Reactions

$\gamma p \rightarrow K^+ \Lambda$	0.9–1.8 GeV (E_{lab})
$\gamma p \rightarrow K^+ \Sigma^0$	"
$\gamma p \rightarrow K^0 \Sigma^+$	"

Particles studied Λ, Σ^0, Σ^+

Brief description Photoproduction of low-mass hyperons off a nucleon is an elementary strangeness production reaction which is not adequately understood. Resonances which contribute are not well established, and the obtained effective couplings disagree with hadronic data. This experiment will study differential cross sections and polarization data, as well as polarization data for the produced hyperons. Real photons will be tagged, and the CLAS spectrometer will trigger on either K^+, or $\pi^+\pi^-$ pair. In most cases, all final state particles will be detected. Polarized photon and/or target extensions are foreseen. Scheduled to run in Hall B.

Related experiments CEBAF-89-024, CEBAF-89-045, CEBAF-91-014, CEBAF-93-030

E-mail contact reinhard@ernest.phys.cmu.edu

CEBAF-89-008

(Proposed Oct 1989, Approved Oct 1989, In preparation)

INCLUSIVE SCATTERING FOR NUCLEI AT $x > 1$ AND HIGH Q^2

BASEL U – J Jourdan, G Masson, I Sick
CAL TECH – B W Filippone (✓ Spokesperson), W Korsch, A Lung, R D McKeown, M Pitt
CEBAF – J H Mitchell
ILLINOIS U, URBANA – D H Beck
INFN, GENOA – L Mazzaschi
MIT, LNS – R G Milner
MARYLAND U – B Beise
PENN U – W Lorenzon
VIRGINIA U – D B Day (✓ Spokesperson), R Lourie, J S McCarthy, R C Minehart, R Sealock

Accelerator CEBAF *Detector* Spectrometer

Reactions

e^- nucleus $\rightarrow e^-$ X	1–4 GeV (T_{lab})

Brief description Measures the inelastic structure functions for nuclei, at $x > 1$, and Q^2 between 3 and 8 $(GeV/c)^2$. Uses HMS and SOS spectrometers. Targets are H, D, C, Fe, and Au. Scheduled to run in Hall C in 1995.

Related experiments SLAC-NE-03

E-mail contact brad@erin.caltech.edu, dbd@virginia.edu

CEBAF-89-009

(Proposed Oct 1989, In preparation)

INVESTIGATION OF THE SPIN DEPENDENCE OF THE ΛN EFFECTIVE INTERACTION IN THE P SHELL

BROOKHAVEN – S Bart, R E Chrien (Spokesperson), P H Pile, R J Sutter
CEBAF – A Stadler
HOUSTON U – E Hungerford (Spokesperson), L Pinsky
MISSISSIPPI U – J J Reidy
NORTH CAROLINA STATE U – S R Cotanch
OHIO U – K H Hicks
SFA, LANDOVER – P W Marshall

Accelerator CEBAF *Detector* ?

Brief description Scheduled to run in Hall C.

E-mail contact chrien@bnldag.bnl.gov, hunger@uh.edu

CEBAF-89-012

(Proposed Oct 1989, Approved 1990, In preparation)

TWO-BODY PHOTODISINTEGRATION OF THE DEUTERON AT FORWARD ANGLES AND PHOTON ENERGIES BETWEEN 1.5 AND 4.0 GeV

AMERICAN U – P Bosted
ARGONNE – D F Geesaman, R J Holt (✓ Spokesperson), H E Jackson, C E Jones, S Kaufman, T O'Neill, D H Potterveld, B Zeidman
CAL TECH – B W Filippone, R D McKeown
CEBAF – R Carlini, D Mack
COLORADO U – E R Kinney
HAMPTON U – O K Baker
ILLINOIS U, URBANA – D H Beck, H Gao, R M Laszewski, A M Nathan, B Terberg, S Williamson
MARYLAND U – B Beise
MIT, LNS – R G Milner
NORTHWESTERN U – R E Segel
RENSSELAER POLY – J Napolitano
RUTGERS U – R Gilman
TEMPLE U – Z E Meziani
VIRGINIA U – R C Minehart
WILLIAM AND MARY COLL – D Meekins

Accelerator CEBAF *Detector* Spectrometer

Reactions

γ deut $\rightarrow p\, n$	0.8–4.0 GeV (E_{lab})
γ deut $\rightarrow \pi^0$ deut	"

Brief description Uses HMS and SOS spectrometers. Target is LD2. Scheduled to run in Hall C in Winter 1995/96.

Related experiments SLAC-NE-08, SLAC-NE-17, CEBAF-89-019

E-mail contact holt@anlphy.phy.anl.gov

CEBAF-89-015

(Proposed Oct 1989, In preparation)

STUDY OF COINCIDENCE REACTIONS IN THE DIP AND Δ-RESONANCE REGIONS

MASSACHUSETTS U, AMHERST – R S Hicks, R A Miskimen, G A Peterson
SHIZUOKA U – A Hotta
TOHOKU U – T Tamae
VIRGINIA U – H Baghaei (Spokesperson)

Accelerator CEBAF *Detector* ?

Brief description Scheduled to run in Hall B.

E-mail contact hossain@virginia.edu

SUMMARIES OF CEBAF EXPERIMENTS

CEBAF-89-017

(Proposed Oct 1989, In preparation)

ELECTROEXCITATION OF THE Δ(1232) IN NUCLEI

CEBAF – V D Burkert, B A Mecking, M Mestayer, B B Niczyporuk, E Smith
FLORIDA STATE U – L C Dennis, K W Kemper
JAMES MADISON U – K Giovanetti
PITTSBURGH U – S A Dytman
RENSSELAER POLY – P Stoler
VIRGINIA U – R C Minehart, O A Rondon-Aramayo, R Sealock (Spokesperson), S T Thornton, H J Weber

Accelerator CEBAF *Detector* ?

Brief description Scheduled to run in Hall B.

E-mail contact sealock@virginia.edu

CEBAF-89-024

(Proposed 1987, Approved 1989, In preparation)

RADIATIVE DECAYS OF LOW-LYING HYPERONS

CLAS COLLABORATION
RICE U – S Ahmad, B E Bonner, J A Buchanan, G S Mutchler (√ Spokesperson)
WILLIAM AND MARY COLL – M Eckhause, A D Hancock, J R Kane, Y N Kuang, R E Welsh

Accelerator CEBAF *Detector* CLAS

Reactions

$\gamma\, p \rightarrow K^+\, Y^*$(unspec)	—

Particles studied $\Lambda(1405\,S_{01})$, $\Lambda(1520\,D_{03})$, $\Sigma(1385\,P_{13})^0$

Brief description Measures the electromagnetic branching ratios of low-lying excited hyperons, Λ(1405), Λ(1520) and Σ^0(1385). Uses the CLAS detector, a superconducting toroidal spectrometer with drift chambers and TOF scintillators. Determines the four-momentum of the excited hyperon from the energy of the tagged photon and K^+ momentum. The four-momentum of Λ (from the $Y^* \rightarrow \Lambda\gamma$ decay) can be reconstructed from the proton and π^- momentum. The good mass resolution with CLAS allows the suppression of the background due to π^0 decays. Target is LH2. Approved for 60 days of running in Hall B. Expected to run in Winter 1996/97.

Related experiments CEBAF-89-004, BNL-811

E-mail contact mutchler@physics.rice.edu

CEBAF-89-033

(Proposed Oct 1991, In preparation)

MEASUREMENT OF RECOIL POLARIZATION IN THE ^{16}O($\vec{e}, e'\vec{p}$) REACTION WITH 4 GeV ELECTRONS

UNKNOWN – J K Min
AMERICAN U – B S Flanders
BROOKHAVEN – M Khandaker
CAL STATE, LA – K Aniol, M B Epstein, D J Margaziotis
CEBAF – J J LeRose, R Madey, J H Mitchell, S Nanda (Spokesperson), A Saha, J W Van Orden (Spokesperson)
CHUNGNAM NATIONAL U – S H Kim, J C Yang
GEORGIA U – F T Baker
GEORGE WASHINGTON U – W R Dodge, A Mokhtari, Z Papandreou
HAMPTON U – K B Beard
INDIANA U – E J Stephenson
KENT STATE U – B D Anderson, A R Baldwin, D Keane, D M Manley, G (M) G Petratos, J W Watson, W M Zhang
LOS ALAMOS – G W R Edwards
MARYLAND U – C C (G) Chang (Spokesperson), H D Holmgren, P Markowitz
MIT – W Bertozzi
NIKHEF, AMSTERDAM – H P Blok, K de Jager, H de Vries, Sr , E Jans, L Lapikas, G van der Steenhoven,
NIST, WASH, DC – J S O'Connell
NORFOLK STATE U – V Punjabi
NSF, WASH, DC – J Lightbody
OLD DOMINION U – P E Ulmer, L B Weinstein
REGINA U – G M Huber, D Kolybaba, G J Lolos, N Mobed, R Ramadan, R Tacik, K Wolbaum
RUTGERS U – G Edwards, R Gilman, C Glashausser (Spokesperson), G Kumbartzki, R Ransome, P M Rutt
SACLAY – J Y Mougey
SASKATCHEWAN U – C Rangacharyulu
TEMPLE U – Z E Meziani
MAINZ U – I Blomqvist, W Boeglin
NEW HAMPSHIRE U – J Calarco
ROME U, TORVERGATA – S Frullani
VIRGINIA U – J Cohen, D B Day, R A Lindgren, R Lourie, J S McCarthy, O A Rondon-Aramayo
WILLIAM AND MARY COLL – J M Finn, M Jones, C F Perdrisat

Accelerator CEBAF *Detector* ?

Brief description Scheduled to run in Hall A.

E-mail contact nanda@cebaf.gov, vanorden@cebaf.gov, chang@enp.umd.edu, glashausser@ruthep.rutgers.edu

CEBAF-89-037

(Proposed Oct 1989, Approved May 1990, In preparation)

ELECTROPRODUCTION OF THE Δ(1232 P_{33}) RESONANCE

N* COLLABORATION
CEBAF – W Brooks, V D Burkert (√ Spokesperson), D Joyce, B A Mecking, M Mestayer, B B Niczyporuk, E Smith, A Yegneswaran
CHRISTOPHER NEWPORT U – D Doughty, D Heddle, Z J Li
DUKE U – H R Weller
FLORIDA STATE U – L C Dennis, P Dragovitsch, K W Kemper
FRASCATI – N Bianchi, G P Capitani, E De Sanctis, P Levi-Sandri, V Muccifora, E Polli, A R Reolon, P Rossi
INFN, GENOA – M Anghinolfi, P Corvisiero, G Gervino, L Mazzaschi, V Mokeev, G Ricco, M Ripani, M Sanzone, M Taiuti, A Zucchiatti
GEORGE MASON U – B J Lieb
JAMES MADISON U – K Giovanetti
KENT STATE U – D Keane, D M Manley
PITTSBURGH U – S A Dytman
RENSSELAER POLY – G S Adams, N C Mukhopadhyay, P Stoler
VIRGINIA U – D B Day, J S McCarthy, R C Minehart (√ Spokesperson), D Počanić, O A Rondon-Aramayo, R Sealock, L C Smith, S T Thornton, H J Weber
VIRGINIA STATE U – C E Stronach
VIRGINIA TECH – R A Arndt, D A Jenkins, L D Roper
WILLIAM AND MARY COLL – C E Carlson, H O Funsten, T Y Tung
YALE U – M Gai

Accelerator CEBAF *Detector* CLAS

Reactions

$e^-\, p \rightarrow e^-\, p\, \pi^0$	1.6, 2.4, 4.0 GeV (T_{lab})
$e^-\, p \rightarrow e^-\, n\, \pi^+$	"
e^- deut $\rightarrow e^-\, p\, p\, \pi^-$	"

Brief description The aim is to obtain precise information on the electric, magnetic, and scalar multipoles, E_{1+}, M_{1+}, and S_{1+}, for the transition in the mass region of Δ(1232). Scheduled to run in Hall B in 1996/97.

Related experiments CEBAF-89-038, CEBAF-89-040, CEBAF-89-042, CEBAF-89-043, CEBAF-91-002, CEBAF-93-036

E-mail contact burkert@cebaf.gov, minehart@virginia.edu

SUMMARIES OF CEBAF EXPERIMENTS

CEBAF-89-038

(Proposed Oct 1989, Approved May 1990, In preparation)

MEASUREMENT OF $p(e,e'\pi^+)n$, $p(e,e'p)\pi^0$, AND $n(e,e'\pi^-)p$ IN THE SECOND AND THIRD RESONANCE REGIONS

N* COLLABORATION

CEBAF – W Brooks, V D Burkert (✓ Spokesperson), D Joyce, B A Mecking, M Mestayer, B B Niczyporuk, E Smith, A Yegneswaran
CHRISTOPHER NEWPORT U – D Doughty, D Heddle, Z J Li
DUKE U – H R Weller
FLORIDA STATE U – L C Dennis, P Dragovitsch, K W Kemper
FRASCATI – N Bianchi, G P Capitani, E De Sanctis, P Levi-Sandri, V Muccifora, E Polli, A R Reolon, P Rossi
INFN, GENOA – M Anghinolfi, P Corvisiero, G Gervino, L Mazzaschi, V Mokeev, G Ricco, M Ripani, M Sanzone, M Taiuti, A Zucchiatti
GEORGE MASON U – B J Lieb
JAMES MADISON U – K Giovanetti
KENT STATE U – D Keane, D M Manley
PITTSBURGH U – S A Dytman
RENSSELAER POLY – G S Adams, N C Mukhopadhyay, P Stoler
VIRGINIA U – D B Day, J S McCarthy, R C Minehart (✓ Spokesperson), D Počanić, O A Rondon-Aramayo, R Sealock, L C Smith, S T Thornton, H J Weber
VIRGINIA STATE U – C E Stronach
VIRGINIA TECH – R A Arndt, D A Jenkins, L D Roper
WILLIAM AND MARY COLL – C E Carlson, H O Funsten, T Y Tung
YALE U – M Gai (✓ Spokesperson)

Accelerator CEBAF *Detector* CLAS

Reactions

$e^- p \to e^- p \pi^0$	2.0, 4.0 GeV (T_{lab})
$e^- p \to e^- n \pi^+$	"
$e^- p \to e^- p p \pi^-$	"

Brief description The experiment will measure transition form factors to nucleon excited states in the mass region from 1350 to 1800 MeV/c^2. Scheduled to run in Hall B within its first year of operation (1996/97).

Related experiments CEBAF-89-037, CEBAF-89-040, CEBAF-89-042, CEBAF-89-043, CEBAF-91-002, CEBAF-93-036

E-mail contact burkert@cebaf.gov, minehart@virginia.edu, moshe_gai@cs.yale.edu

CEBAF-89-039

(Proposed Oct 1991, In preparation)

AMPLITUDES FOR THE $N(1535\,S_{11})$ AND $N(1710\,P_{11})$ RESONANCES FROM THE $ep \to ep\eta$ SCATTERING

ABILENE CHRISTIAN U – D Isenhower, M Sadler
MIT, BATES LINEAR ACCELERATOR – L Ghedira
CEBAF – V D Burkert, D Joyce, B A Mecking, M Mestayer, B B Niczyporuk, E Smith, A Yegneswaran
CHRISTOPHER NEWPORT U – D Doughty
FLORIDA STATE U – L C Dennis, K W Kemper
GEORGE MASON U – B J Lieb
JAMES MADISON U – K Giovanetti (Spokesperson)
KANSAS STATE U – T R Donoghue
KENT STATE U – D Keane, D M Manley
MIT – W Y Kim
PITTSBURGH U – S A Dytman (Spokesperson)
RENSSELAER POLY – G S Adams, N C Mukhopadhyay, P Stoler
VIRGINIA U – D B Day, R Marshall, J S McCarthy, R C Minehart, O A Rondon-Aramayo, R Sealock, S T Thornton, H J Weber
VIRGINIA STATE U – C E Stronach
VIRGINIA TECH – R A Arndt, D A Jenkins, L D Roper
WILLIAM AND MARY COLL – C E Carlson, H O Funsten
YALE U – M Gai

Accelerator CEBAF *Detector* ?

Brief description Scheduled to run in Hall B.

E-mail contact fac_kgiovane@vax1.acs.jmu.edu, dytman@vms.cis.pitt.edu

CEBAF-89-042

(Proposed 1989, Approved May 1990, In preparation)

MEASUREMENT OF THE ELECTRON ASYMMETRY IN THE $p(e,e'p)\pi^0$ AND $p(e,e'\pi^+)n$ IN THE MASS REGION OF THE $\Delta(1232\,P33)$ FOR $Q^2 \leq 2$ (GeV/c)^2

N* COLLABORATION

CEBAF – W Brooks, V D Burkert (✓ Spokesperson), D Joyce, B A Mecking, M Mestayer, B B Niczyporuk, E Smith, A Yegneswaran
CHRISTOPHER NEWPORT U – D Doughty, D Heddle, Z J Li
DUKE U – H R Weller
FLORIDA STATE U – L C Dennis, P Dragovitsch, K W Kemper
FRASCATI – N Bianchi, G P Capitani, E De Sanctis, P Levi-Sandri, V Muccifora, E Polli, A R Reolon, P Rossi
INFN, GENOA – M Anghinolfi, P Corvisiero, G Gervino, L Mazzaschi, V Mokeev, G Ricco, M Ripani, M Sanzone, M Taiuti, A Zucchiatti
GEORGE MASON U – B J Lieb
JAMES MADISON U – K Giovanetti
KENT STATE U – D Keane, D M Manley
PITTSBURGH U – S A Dytman
RENSSELAER POLY – G S Adams, N C Mukhopadhyay, P Stoler
VIRGINIA U – D B Day, J S McCarthy, R C Minehart (✓ Spokesperson), D Počanić, O A Rondon-Aramayo, R Sealock, L C Smith, S T Thornton, H J Weber
VIRGINIA STATE U – C E Stronach
VIRGINIA TECH – R A Arndt, D A Jenkins, L D Roper
WILLIAM AND MARY COLL – C E Carlson, H O Funsten, T Y Tung
YALE U – M Gai

Accelerator CEBAF *Detector* CLAS

Reactions Polarized beam

$e^- p \to e^- p \pi^0$	1.6, 2.4, 4.0 GeV (T_{lab})
$e^- p \to e^- n \pi^+$	"
e^- deut $\to e^- p p \pi^-$	"

Brief description The aim is to measure the electron beam asymmetries. Scheduled to run in Hall B in 1996/97.

Related experiments CEBAF-89-037, CEBAF-89-038, CEBAF-89-040, CEBAF-89-043

E-mail contact burkert@cebaf.gov, minehart@virginia.edu

CEBAF-89-043

(Proposed Oct 1991, In preparation)

MEASUREMENTS OF THE ELECTROPRODUCTION OF THE Λ, $\Lambda(1520)$, AND $f_0(975)$ VIA THE K^+K^-p AND THE $K^+\pi^-p$ FINAL STATES

ABILENE CHRISTIAN U – D Isenhower, M Sadler
MIT, BATES LINEAR ACCELERATOR – L Ghedira
CEBAF – V D Burkert, D Joyce, B A Mecking, M Mestayer, B B Niczyporuk, E Smith, R R Whitney, A Yegneswaran
CARNEGIE MELLON U – R A Schumacher
CHRISTOPHER NEWPORT U – D Doughty
FLORIDA STATE U – L C Dennis (Spokesperson), K W Kemper
GEORGE MASON U – B J Lieb
GEORGE WASHINGTON U – A Mokhtari
JAMES MADISON U – K Giovanetti
KANSAS STATE U – T R Donoghue
KENT STATE U – D Keane, D M Manley
MIT – W Y Kim
PITTSBURGH U – S A Dytman
RENSSELAER POLY – G S Adams, N C Mukhopadhyay, P Stoler
VIRGINIA U – D B Day, R Marshall, J S McCarthy, R C Minehart, O A Rondon-Aramayo, R Sealock, S T Thornton, H J Weber

VIRGINIA STATE U – C E Stronach
VIRGINIA TECH – R A Arndt, D A Jenkins, L D Roper
WILLIAM AND MARY COLL – C E Carlson, H O Funsten (Spokesperson), C F Perdrisat
YALE U – M Gai

Accelerator CEBAF *Detector* ?

Brief description Scheduled to run in Hall B.

E-mail contact larry@fsulcd.physics.fsu.edu, funsten@cebaf.gov

CEBAF-89-045

(Proposed Oct 1991, In preparation)

STUDY OF KAON PHOTOPRODUCTION ON DEUTERIUM

CEBAF – V D Burkert, D Joyce, B A Mecking (Spokesperson), M Mestayer, B B Niczyporuk, E Smith, R R Whitney, A Yegneswaran
CARNEGIE MELLON U – R A Schumacher
CHRISTOPHER NEWPORT U – D Doughty, D Heddle
COLORADO U – J E Wise
HAMPTON U – L G Tang
HOUSTON U – E Hungerford, K Lan, B W Mayes, L Pinsky
MIT – W Y Kim
VIRGINIA U – R Sealock, S T Thornton

Accelerator CEBAF *Detector* ?

Brief description Scheduled to run in Hall B.

E-mail contact mecking@cebaf.gov

CEBAF-91-002

(Proposed Sep 1991, Approved 1991, In preparation)

THE STUDY OF EXCITED BARYONS AT HIGH MOMENTUM TRANSFER WITH THE CLAS SPECTROMETER

N* COLLABORATION
CEBAF – V D Burkert (✓ Spokesperson), B A Mecking, M Mestayer, B B Niczyporuk, E Smith, B Wojtsekhowski, A Yegneswaran
CHRISTOPHER NEWPORT U – D Doughty, D Heddle, Z J Li
CONNECTICUT U – M Gai
DUKE U – R Chasteler, D R Tilley, H R Weller
FLORIDA STATE U – L C Dennis, P Dragovitsch
FRASCATI – N Bianchi, G P Capitani, E De Sanctis, P Levi-Sandri, V Muccifora, E Polli, A R Reolon, P Rossi
INFN, GENOA – M Anghinolfi, P Corvisiero, G Gervino, L Mazzaschi, V Mokeev, G Ricco, M Ripani, M Sanzone, M Taiuti (✓ Spokesperson), A Zucchiatti
GEORGE MASON U – B J Lieb
HAMPTON U – K Beard
JAMES MADISON U – K Giovanetti
KENT STATE U – D M Manley
PITTSBURGH U – S A Dytman
RENSSELAER POLY – G S Adams, N C Mukhopadhyay, J Napolitano, P Stoler (✓ Spokesperson)
VIRGINIA U – D Crabb, D B Day, R Marshall, J S McCarthy, R C Minehart, D Počanić, O A Rondon-Aramayo, R Sealock, L C Smith, S T Thornton, H Weber
WILLIAM AND MARY COLL – C E Carlson, A Coleman, H O Funsten, T Y Tung

Accelerator CEBAF *Detector* CLAS

Reactions

$e^- p \to e^- p \pi^0$	> 4.0 GeV (T_{lab})
$e^- p \to e^- p \eta$	"
$e^- p \to e^- n \pi^+$	"

Particles studied $\Delta(1232\,P_{33})$, $N(1440\,P_{11})$, $N(1535\,S_{11})$, $N(1680\,F_{15})$

Brief description Studies the transition form factors of prominent resonances, $\Delta(1232\,P_{33})$, $N(1440\,P_{11})$, $N(1535\,S_{11})$, and $N(1680\,F_{15})$ at high momentum transfers, in the transition region where constituent-quark models are expected to become less relevant and gluons and current-quarks are believed to play more active role. Scheduled to run in Hall B in 1996.

E-mail contact burkert@cebaf.gov, stolerp@rpimep.phys.rpi.edu

CEBAF-91-003

(Proposed Sep 1991, Approved Sep 1991, In preparation)

A STUDY OF LONGITUDINAL CHARGED PION ELECTROPRODUCTION IN ^{2}D, ^{3}He, AND ^{4}He

ARGONNE – K P Coulter, D F Geesaman, H E Jackson (✓ Spokesperson), S Kaufman, D H Potterveld, B Zeidman
COLORADO U – E R Kinney
NORTHWESTERN U – R E Segel
RUTGERS U – R Gilman
SACLAY – J Y Mougey, B Saghai

Accelerator CEBAF *Detector* Spectrometer

Reactions

e^- nucleon $\to e^-$ nucleon pion	0.5–3.0 GeV (T_{lab})

Particles studied π^+, π^-

Brief description Uses the Short Orbit Spectrometer (SOS). Scheduled to run in Hall C in 1995/96.

Related experiments FNAL-866

E-mail contact hal@anl.gov

CEBAF-91-006

(Proposed Sep 1991, In preparation)

STUDY OF NUCLEAR MEDIUM EFFECTS BY RECOIL POLARIZATION UP TO HIGH MOMENTUM TRANSFERS

CAL STATE, LA – K Aniol, M B Epstein, D J Margaziotis
CEBAF – H Fanning, J Gomez, J J LeRose, S Nanda, A Saha (Spokesperson)
MARYLAND U – C C (G) Chang, H D Holmgren, P Markowitz, P G Roos
OLD DOMINION U – P E Ulmer
RUTGERS U – R Gilman, C Glashausser, R Ransome, P M Rutt
SACLAY – J Y Mougey
VIRGINIA U – R Lourie, S Van Verst

Accelerator CEBAF *Detector* ?

Brief description Scheduled to run in Hall A.

E-mail contact saha@cebaf.gov

CEBAF-91-007

(Proposed Sep 1991, In preparation)

MEASUREMENT OF THE NUCLEAR DEPENDENCE AND MOMENTUM TRANSFER DEPENDENCE OF QUASIELASTIC $(e, e'p)$ SCATTERING AT LARGE MOMENTUM TRANSFER

ARGONNE – K P Coulter, D F Geesaman, R J Holt, H E Jackson, C E Jones, S Kaufman, D H Potterveld, B Zeidman
CAL TECH – B W Filippone, T O'Neill
CEBAF – R Carlini, R Ent
MARYLAND U – B Beise
MIT – R G Milner (Spokesperson)
RENSSELAER POLY – J Napolitano
TRIUMF – W Lorenzon
WISCONSIN U – J F J van den Brand, H J Bulten

Accelerator CEBAF *Detector* ?

Brief description Scheduled to run in Hall C.

E-mail contact milner@mitlns.mit.edu

SUMMARIES OF CEBAF EXPERIMENTS

CEBAF-91-008

(Proposed Sep 1991, Approved Jan 1992, In preparation)

PHOTOPRODUCTION OF η AND η' MESONS

CLAS COLLABORATION
ARIZONA STATE U – B G Ritchie (✓ Spokesperson)
CATHOLIC U – H Crannell, J T O'Brien, D I Sober
CEBAF – B A Mecking
FLORIDA STATE U – L C Dennis
GEORGETOWN U – J Lambert
GEORGE WASHINGTON U – B L Berman, W J Briscoe, K Dhuga, W R Dodge
BOSKOVIC INST, ZAGREB – I Šlaus
SOUTH CAROLINA U – G Blanpied, C Djalali, M A Duval, B M Preedom, A Tam, S Whisnant
UCLA – B M K Nefkens

Accelerator CEBAF *Detector* CLAS

Reactions

$\gamma\, p \rightarrow \eta\, p$	0.65–2.25 GeV (E_{lab})
$\gamma\, p \rightarrow \eta'\, p$	"

Particles studied η, η'

Brief description Scheduled to run in Hall B.

Related experiments CEBAF-89-039, CEBAF-89-045, CEBAF-93-008, CEBAF-93-017

E-mail contact barry.ritchie@asu.edu

CEBAF-91-014

(Proposed Oct 1991, Approved Dec 1991, In preparation)

QUASIFREE STRANGENESS PRODUCTION IN NUCLEI

CATHOLIC U – H Crannell, J T O'Brien, D I Sober
CEBAF – B A Mecking
CARNEGIE MELLON U – R A Schumacher
FLORIDA STATE U – L C Dennis
GEORGE WASHINGTON U – B L Berman, P L Cole, K Dhuga, S Rugari
OLD DOMINION U – C E Hyde-Wright (✓ Spokesperson)
WASHINGTON U, SEATTLE – D W Storm

Accelerator CEBAF *Detector* CLAS

Reactions

γ nucleus $\rightarrow$ kaon X	—
γ nucleus $\rightarrow$ kaon Λ X	—
γ nucleus $\rightarrow$ kaon Σ X	—

Brief description Uses tagged photon beam on liquid ^{3}He, ^{4}He, and solid C targets. Approved for 456 hours in Hall B.

Related experiments CEBAF-89-004, CEBAF-89-045, CEBAF-91-016

E-mail contact hyde@cebaf.gov

CEBAF-91-015

(Proposed Oct 1991, Approved Jan 1992, In preparation)

HELICITY STRUCTURE OF PION PHOTOPRODUCTION

CLAS COLLABORATION
ARIZONA STATE U – B G Ritchie
CATHOLIC U – H Crannell, J T O'Brien, D I Sober (✓ Spokesperson)
CEBAF – V D Burkert, B A Mecking
DUKE U – R Chasteler, H R Weller
GEORGE WASHINGTON U – W J Briscoe, W R Dodge, L C Maximon
NORTH CAROLINA STATE U – D R Tilley
NIST, WASH, DC – E V Hayward
VIRGINIA U – D G Crabb, J S McCarthy, R Sealock, S T Thornton
VIRGINIA TECH – R A Arndt, J R Ficenec, D A Jenkins, L D Roper, R Workman

Accelerator CEBAF *Detector* CLAS

Reactions Polarized beam and target

$\gamma\, p \rightarrow$ pion(s) nucleon	0.8, 1.6, 2.4 GeV (E_{lab})

Brief description Studies one- and two-pion photoproduction contributions to the Drell-Hearn-Gerasimov sum rule. Uses circularly polarized tagged photons from longitudinally polarized electrons and a longitudinally polarized proton target. Scheduled to run in Hall B in 1997 or later.

Related experiments CEBAF-91-023, CEBAF-93-009, CEBAF-93-036

E-mail contact sober@cua.edu

CEBAF-91-016

(Proposed Oct 1991, Approved 1991, In preparation)

ELECTROPRODUCTION OF KAONS AND LIGHT HYPERNUCLEI

ARGONNE – D F Geesaman, R J Holt, H E Jackson, C E Jones, S Kaufman, V Papavassiliou, D H Potterveld, J P Schiffer, B Zeidman (✓ Spokesperson)
BROOKHAVEN – S Bart, R E Chrien, R I Sawafta, R J Sutter
CAL TECH – B W Filippone
CEBAF – R Carlini, R Ent, D J Mack, S A Wood
COLORADO U – E R Kinney
HAMPTON U – O K Baker, W Buck, L G Tang
HOUSTON U – E Hungerford, K Lan, B W Mayes
MISSISSIPPI U – J J Reidy
MIT – N C R Makins, R G Milner
NORTHWESTERN U – R E Segel
OLD DOMINION U – A Klein
RENSSELAER POLY – J Napolitano
RUTGERS U – R Gilman
PENN U – W Lorenzon
WISCONSIN U – J F J van den Brand

Accelerator CEBAF *Detector* Spectrometer

Reactions Polarized target

e^- nucleus $\rightarrow e^-\, K^+$ X	3 GeV (T_{lab})

Particles studied K^+

Brief description This is a coincidence experiment (e, K^+) on cryogenic D, ^{3}He, and ^{4}He targets, to study bound and barely unbound hypernuclei and Λ–nucleon(s) systems with low-Q^2 virtual photons. Measures production rates and t-dependence of missing mass spectra. Uses SOS and HMS spectrometers. Scheduled to run in Hall C.

E-mail contact zeidman@anlphy.phy.anl.gov

CEBAF-91-023

(Proposed Oct 1991, Approved May 1992, In preparation)

MEASUREMENT OF POLARIZED STRUCTURE FUNCTIONS IN INELASTIC ELECTRON–PROTON SCATTERING USING THE CEBAF LARGE ACCEPTANCE SPECTROMETER

N* COLLABORATION
CEBAF – W Brooks, V D Burkert (✓ Spokesperson), D Joyce, B A Mecking, M Mestayer, B B Niczyporuk, E Smith, A Yegneswaran
CHRISTOPHER NEWPORT U – D Doughty, D Heddle, Z J Li
DUKE U – H R Weller
FLORIDA STATE U – L C Dennis, P Dragovitsch, K W Kemper
FRASCATI – N Bianchi, G P Capitani, E De Sanctis, P Levi-Sandri, V Muccifora, E Polli, A R Reolon, P Rossi

INFN, GENOA – M Anghinolfi, P Corvisiero, G Gervino, L Mazzaschi, V Mokeev, G Ricco, M Ripani, M Sanzone, M Taiuti, A Zucchiatti
GEORGE MASON U – B J Lieb
HAMPTON U – K B Beard
JAMES MADISON U – K Giovanetti
KENT STATE U – D Keane, D M Manley
PITTSBURGH U – S A Dytman
RENSSELAER POLY – G S Adams, N C Mukhopadhyay, P Stoler
VIRGINIA U – D G Crabb (√ Spokesperson), D B Day, J S McCarthy, R C Minehart (√ Spokesperson), O A Rondon-Aramayo, R Sealock, L C Smith, S T Thornton, H J Weber
VIRGINIA STATE U – C E Stronach
VIRGINIA TECH – R A Arndt, D A Jenkins, L D Roper
WILLIAM AND MARY COLL – C E Carlson, H O Funsten, T Y Tung
YALE U – M Gai

Accelerator CEBAF *Detector* CLAS

Reactions Polarized beam and target

$e^- p \rightarrow e^- X$	1.2 – 4.0 GeV (T_{lab})

Brief description Measures the inclusive polarized structure functions, A_1 and A_2, in the range $0.2 \leq Q^2 \leq 1.5$ (GeV/c)^2 and $1.1 < W < 1.8$ GeV. Uses polarized NH_3 target. Scheduled to run in Hall B in 1997/98.

Related experiments CEBAF-93-009, CEBAF-93-009

E-mail contact burkert@cebaf.gov, dcrabb@virginia.edu, minehart@virginia.edu

CEBAF-91-024

(Proposed Oct 1991, Approved Dec 1991, In preparation)

SEARCH FOR MISSING RESONANCES IN THE ELECTROPRODUCTION OF ω MESONS

N* COLLABORATION
CEBAF – W Brooks, V D Burkert (√ Spokesperson), D Joyce, B A Mecking (√ Spokesperson), M Mestayer, B B Niczyporuk, E Smith, A Yegneswaran
CHRISTOPHER NEWPORT U – D Doughty, D Heddle, Z J Li
FLORIDA STATE U – L C Dennis
FRASCATI – N Bianchi, G P Capitani, E De Sanctis, P Levi-Sandri, V Muccifora, E Polli, A R Reolon, P Rossi
INFN, GENOA – M Anghinolfi, P Corvisiero, G Gervino, L Mazzaschi, V Mokeev, G Ricco, M Ripani, M Sanzone, M Taiuti, A Zucchiatti
GEORGE MASON U – B J Lieb
HAMPTON U – K B Beard
JAMES MADISON U – K Giovanetti
KENT STATE U – D M Manley (√ Spokesperson)
PITTSBURGH U – S A Dytman
RENSSELAER POLY – G S Adams, N C Mukhopadhyay, P Stoler
VIRGINIA U – D G Crabb, D B Day, R Marshall, J S McCarthy, R C Minehart, D Počanić, O A Rondon-Aramayo, R Sealock, L C Smith, S T Thornton, H J Weber
VIRGINIA STATE U – C E Stronach
WILLIAM AND MARY COLL – C E Carlson, H O Funsten (√ Spokesperson), T Y Tung
YALE U – M Gai

Accelerator CEBAF *Detector* CLAS

Reactions

$e^- p \rightarrow e^- p \pi^+ \pi^- X$	1.6, 2.4, 4.0 GeV (T_{lab})

Brief description The experiment is aimed at searching for 'missing' 3-quark baryon states in the mass range from 1.7 to 2.2 GeV/c^2 in the $p\omega$ decay channel. Scheduled to run in Hall B in 1996/97.

E-mail contact burkert@cebaf.gov, mecking@cebaf.gov, manley@ksuvxa.kent.edu, funsten@cebaf.gov

CEBAF-91-026

(Proposed Oct 1991, In preparation)

MEASUREMENT OF THE ELECTRIC AND MAGNETIC STRUCTURE FUNCTIONS OF DEUTERON AT LARGE MOMENTUM TRANSFERS

CAL STATE, LA – K Aniol, D J Margaziotis
CEBAF – J Gomez, S Nanda
KENT STATE U – G (M) G Petratos (Spokesperson)
MARYLAND U – C C (G) Chang, H D Holmgren, P G Roos
OLD DOMINION U – S E Kuhn
TEMPLE U – C J Martoff, Z E Meziani

Accelerator CEBAF *Detector* ?

Brief description Scheduled to run in Hall A.

E-mail contact gpetrato@kentvm.kent.edu

CEBAF-93-006

(Proposed Apr 1993, Approved Jun 1993, In preparation)

TWO PION DECAY OF ELECTROPRODUCED LIGHT QUARK BARYON RESONANCES

N* COLLABORATION
CEBAF – W Brooks, V D Burkert (√ Spokesperson), B A Mecking, B B Niczyporuk, E Smith, A Yegneswaran
CHRISTOPHER NEWPORT U – D Doughty, D Heddle, Z J Li
DUKE U – R Chasteler, H R Weller
FLORIDA STATE U – L C Dennis, P Dragovitsch
FRASCATI – N Bianchi, G P Capitani, E De Sanctis, P Levi-Sandri, V Muccifora, E Polli, A R Reolon, P Rossi
INFN, GENOA – M Anghinolfi, P Corvisiero, V Mokeev, G Ricco, M Ripani (√ Spokesperson), M Sanzone, M Taiuti, A Zucchiatti
GEORGE MASON U – B J Lieb
HAMPTON U – K B Beard
JAMES MADISON U – K Giovanetti
KENT STATE U – D M Manley
NORTH CAROLINA STATE U – D R Tilley
PITTSBURGH U – S A Dytman
RENSSELAER POLY – G S Adams, N C Mukhopadhyay, J Napolitano, P Stoler
VIRGINIA U – D G Crabb, D B Day, R Marshall, J S McCarthy, R C Minehart, D Počanić, O A Rondon-Aramayo, R Sealock, L C Smith, S T Thornton, H J Weber
WILLIAM AND MARY COLL – C E Carlson, A Coleman, H O Funsten, T Y Tung
YALE U – M Gai

Accelerator CEBAF *Detector* CLAS

Reactions

$e^- p \rightarrow e^- N \pi \pi X$	1.6, 2.4, 4.0 GeV (T_{lab})
$e^- n \rightarrow e^- N \pi \pi X$	"

Brief description Studies some aspects of baryon spectra in the non-strange sector, *e.g.*, the form factors of some poorly known states. It also looks for highly excited nucleon states around 1.6 GeV (mostly $[56, 0+]$ and $[70, 1-]$ multiplets) and the 'missing' states around 2 GeV (mostly $[56, 2+]$ and $[70, 2+]$ multiplets) predicted by quark models. Such states would strongly decay through $\Delta\pi$, and ρN channels, both giving a final state with two pions. Approved for 800 hours with hydrogen target and 400 hours with deuterium target. Expected to run in Hall B in 1996/97.

Related experiments CEBAF-91-024, CEBAF-91-002, CEBAF-93-033

E-mail contact burkert@cebaf.gov, ripani@genova.infn.it

SUMMARIES OF CEBAF EXPERIMENTS

CEBAF-93-008

(Proposed Apr 1993, Approved Jun 1993, In preparation)

INCLUSIVE η PHOTOPRODUCTION IN NUCLEI

ARIZONA STATE U – B G Ritchie
CEBAF – B A Mecking, A Yegneswaran
GIESSEN U – H Stroher
GEORGE MASON U – B J Lieb
MASSACHUSETTS U, AMHERST – R A Miskimen
OLD DOMINION U – C E Hyde-Wright
PITTSBURGH U – S A Dytman
RICE U – S Ahmad, B E Bonner, G S Mutchler
RICHMOND U – G P Gilfoyle, W Major, P D Rubin, J B Seaborn, M F Vineyard (√ Spokesperson)
WILLIAM AND MARY COLL – H O Funsten

Accelerator CEBAF *Detector* CLAS

Reactions

γ deut →	0.8–1.5 GeV (E_{lab})
γ ^{3}He →	"
γ He →	"
γ ^{12}C →	"

Brief description Scheduled to run in Hall B.

E-mail contact vineyard@urvax.urich.edu

CEBAF-93-009

(Proposed Apr 1993, Approved Jun 1993, In preparation)

THE POLARIZED STRUCTURE FUNCTION G_{1n} AND THE Q^2 DEPENDENCE OF THE GERASIMOV-DRELL-HEARN SUM RULE FOR THE NEUTRON

N* COLLABORATION
CEBAF – W K Brooks, V D Burkert, B A Mecking, B B Niczyporuk
CHRISTOPHER NEWPORT U – Z J Li
DUKE U – R Chasteler, H R Weller
OLD DOMINION U – C Hyde-Wright, A Klein, S E Kuhn (√ Spokesperson), B A Raue, L B Weinstein
SOUTH CAROLINA U – M Guidal
VIRGINIA U – D G Crabb, D B Day, R C Minehart

Accelerator CEBAF *Detector* CLAS

Reactions Polarized beam and target

e^- deut → e^- X	1.6–4.0 GeV (T_{lab})

Particles studied N^*(unspec)

Brief description Measures inclusive cross section asymmetry $A_{\parallel}$ for electron scattering on deuterium over a large range of Q^2 (0.15–2 (GeV/c)^2) and ν (from threshold to 3.6). Uses polarized ND3 target. In combination with CEBAF-91-023, extracts the neutron spin structure function G_{1n} at moderate Q^2, in the resonance region and beyond. Tests models of Q^2 dependence of the Ellis-Jaffe integral which converges to the Drell-Hearn-Gerasimov sum rule for small Q^2. Scheduled to run in Hall B for 40 days. Likely starting date in 1997/98.

Related experiments CEBAF-91-023

E-mail contact kuhn@cebaf.gov

CEBAF-93-012

(Proposed Apr 1993, Approved Jun 1993, In preparation)

ELECTROPRODUCTION OF LIGHT QUARK MESONS

CLAS COLLABORATION
CEBAF – V D Burkert, D Joyce, B A Mecking, M D Mestayer, B B Niczyporuk, E S Smith
CHRISTOPHER NEWPORT U – D Doughty, D Heddle, Z J Li
MOSCOW, ITEP – S Boiarinov, P V Degtyarenko, E Doroshkevich, M V Kossov (√ Spokesperson), N A Pivnyuk, O I Pogorelko, A V Vlassov
MASSACHUSETTS U, AMHERST – L Elouadrhiri, R S Hicks, R A Miskimen, G A Peterson, K Wang
OLD DOMINION U – A Klein, S E Kuhn, L B Weinstein
WILLIAM AND MARY COLL – A Coleman, M Eckhause, H O Funsten, J Kane, P Rubin, T Tung, R Welsh

Accelerator CEBAF *Detector* CLAS

Reactions

e^- nucleon → e^- ρ X	1.6, 2.4, 4.0 GeV (T_{lab})
e^- nucleon → e^- ω X	"

Brief description Uses H_2 and D_2 targets. Scheduled to run in Hall B.

E-mail contact kossov@cebaf.gov

CEBAF-93-017

(Proposed Apr 1993, Approved Jun 1993, In preparation)

STUDY OF $\gamma d \to pn$ AND $\gamma d \to p\Delta^0$ REACTIONS FOR SMALL MOMENTUM TRANSFERS

FRASCATI – N Bianchi, G P Capitani, E De Sanctis (√ Spokesperson), A Ebolese, A Fantoni, P Levi-Sandri, V Muccifora, E Polli, A R Reolon-Cora, P Rossi (√ Spokesperson)
INFN, GENOA – M Anghinolfi, P Corvisiero, L Mazzaschi, V Mokeev, G Ricco, M Ripani, M Sanzone, M Tauiti, A Zucchiatti
MOSCOW, ITEP – A Kaidalov, L A Kondratyuk, M Krivoruchenko
CEBAF – V Burkert, B Mecking, A Yegneswaran
CATHOLIC U – H Crannell, S Matthews, J O'Brien, D Sober
YEREVAN PHYS INST – H R Avakian, V H Giourdjian

Accelerator CEBAF *Detector* CLAS

Reactions

γ deut → p n	500–1500 MeV (E_{lab})
γ deut → p $\Delta(1232\,P_{33})^0$	"

Brief description Tests the Quark Gluon String (QGS) model and Regge phenomenology by studying the energy behavior of the above reactions at fixed t. Studies another QGS prediction, the forward and backward peaks in the angular distributions of the $\gamma d \to pn$ reaction. Measures values of the forward-to-backward ratio of the cross sections. Provides data set over broad angular and energy ranges to test different theoretical models of deuteron, from low energies where pion exchange phenomena are dominant, to higher energies where quark phenomena are expected to be important. Scheduled to run in Hall B. In preparation (June 94).

Journal papers PR C48 (1993) 2491.

Related experiments CEBAF-89-012, CEBAF-89-045, SLAC-NE-08, SLAC-NE-17

E-mail contact rossi@lnf.infn.it, desanctis@lnf.infn.it

CEBAF-93-018

(Proposed Apr 1993, Approved Jun 1993, In preparation)

LONGITUDINAL / TRANSVERSE CROSS SECTION SEPARATION IN KAON ELECTROPRODUCTION FOR $0.5 \le Q^2 \le 2.0$ (GeV/c)^2, $W \ge 1.7$ GeV AND $T_{min} \ge 0.1$ (GeV/c)^2

ARGONNE – B Zeidman
BUCHAREST U – T A Angelescu, A Mihul
CEBAF – L S Cardman, R Carlini, D J Mack, R Madey, S Majewski, J H Mitchell, W Vulcan, S A Wood, C Yan
HAMPTON U – O K Baker (Spokesperson), K B Beard, S Beedoe, W Buck, K Maung-Maung, L G Tang
HOUSTON U – E Hungerford, K Lan, B W Mayes
MARYLAND U – C C (G) Chang, P Markowitz

NORTH CAROLINA A-T STATE U – S K Mtingwa
RENSSELAER POLY – J Napolitano
WILLIAM AND MARY COLL – D Abbott

Accelerator CEBAF *Detector* Spectrometer

Reactions

$e^- p \rightarrow e^- K^+ \Lambda$	—
$e^- p \rightarrow e^- K^+ \Sigma^0$	—

Brief description Scheduled to run in Hall C.

E-mail contact baker@cebaf.gov

CEBAF-93-021

(Proposed Apr 1993, Approved Jun 1993, In preparation)

THE CHARGED PION FORM FACTOR

CEBAF – R Carlini, D J Mack (Spokesperson), J H Mitchell, W Vulcan, S A Wood, C Yan
HAMPTON U – O K Baker, S Beedoe, L G Tang
OLD DOMINION U – A Klein
RENSSELAER POLY – G S Adams, J Napolitano, P Stoler
WILLIAM AND MARY COLL – D Abbott, D Meekins
YEREVAN PHYS INST – T A Amatuni, R G Badalian, A Gasparian, H Mkrtchyan

Accelerator CEBAF *Detector* ?

Reactions

$e^- p \rightarrow e^- \pi^+ n$	—

Brief description Scheduled to run in Hall C.

E-mail contact mack@cebaf.gov

CEBAF-93-022

(Proposed Apr 1993, Approved Jun 1993, In preparation)

MEASUREMENT OF THE POLARIZATION OF THE ϕ IN ELECTROPRODUCTION

ADELAIDE U – A G (T) Williams
CEBAF – W K Brooks, V D Burkert, B A Mecking, M Mestayer, B B Niczyporuk, E Smith (Spokesperson), T Y Tung, A Yegneswaran
FLORIDA STATE U – L C Dennis, P Dragovitsch
HAMPTON U – O K Baker, K B Beard
MOSCOW, ITEP – M Kossov
RICHMOND U – P D Rubin (Spokesperson)
SOUTH CAROLINA U – A Tam
VIRGINIA TECH – J R Ficenec, D A Jenkins
WILLIAM AND MARY COLL – A Coleman, M Eckhause, H O Funsten (Spokesperson), J R Kane, R E Welsh

Accelerator CEBAF *Detector* CLAS

Brief description Scheduled to run in Hall B.

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CEBAF-93-024

(Proposed Apr 1993, Approved Jun 1993, In preparation)

MEASUREMENT OF THE MAGNETIC FORM FACTOR OF THE NEUTRON AT LARGE MOMENTUM TRANSFERS

CEBAF – J Gomez (Spokesperson)
KENT STATE U – G (M) G Petratos (Spokesperson)

Accelerator CEBAF *Detector* ?

Brief description Scheduled to run in Hall A.

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CEBAF-93-026

(Proposed Apr 1993, Approved Jun 1993, In preparation)

THE CHARGE FORM FACTOR OF THE NEUTRON

BASEL U – A Feltham, D Fritschi, J Jourdan, M Loppacher, S Robinson, I Sick, P Trueb
CEBAF – R Carlini, D J Mack, J H Mitchell, C K Sinclair, W Vulcan, S A Wood, C Yan
VIRGINIA U – C Cothran, D G Crabb, D B Day (✓ Spokesperson), R A Lindgren, R Lourie, J S McCarthy, P McKee, R C Minehart, D Počanić, O A Rondon-Aramayo, R Sealock, C Smith, A Tobias

Accelerator CEBAF *Detector* Spectrometer

Reactions Polarized beam and target

e^- deut	4 GeV (T_{lab})

Particles studied n

Brief description The detector is the High Momentum Spectrometer (HMS) in combination with plastic scintillator wall. Uses a longitudinally polarized electron beam and a polarized deuteron target. Studies asymmetries in the scattering rates for elastic scattering. The asymmetry for electrons with helicity parallel and antiparallel to the electron momentum is proportional to the product of the magnetic and the electric form factors of neutron. It is maximized when the target polarization is perpendicular to the momentum transfer and in the scattering plane. By measuring this asymmetry, the electric form factor of neutron can be found with good precision. Measurement will be done at four momentum transfers up to 2 $(GeV/c)^2$. Scheduled to run in Hall C in late 1995, or 1996.

Related experiments SLAC-E-143

E-mail contact dbd@virginia.edu

CEBAF-93-027

(Proposed Apr 1993, Approved Jun 1993, In preparation)

ELECTRIC FORM FACTOR OF PROTON BY RECOIL POLARIZATION

NORFOLK STATE U – V Punjabi (✓ Spokesperson)
WILLIAM AND MARY COLL – C F Perdrisat (✓ Spokesperson)

Accelerator CEBAF *Detector* Spectrometer

Reactions Polarized beam

$e^- p \rightarrow e^- p$	0.8–4.0 GeV (T_{lab})

Particles studied p

Brief description Uses the Hall A spectrometer pair and focal plane polarimeter in hadron arm. Target is a high-power liquid hydrogen.

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CEBAF-93-030

(Proposed Apr 1993, Approved Jun 1993, In preparation)

MEASUREMENT OF THE STRUCTURE FUNCTIONS FOR KAON ELECTROPRODUCTION

CLAS COLLABORATION
CEBAF – M Mestayer (✓ Spokesperson), E Smith
CARNEGIE MELLON U – R Magahiz, R A Schumacher
CHRISTOPHER NEWPORT U – D Doughty
FLORIDA STATE U – S Capstick
GEORGE WASHINGTON U – C Bennhold
OHIO U – T Adami, R W Finlay, S Grimes, K H Hicks (✓ Spokesperson), A Kumar, D S Onley, J Rapaport, L E Wright
PITTSBURGH U – S A Dytman
RICHMOND U – P D Rubin
SOUTH CAROLINA U – A Tam
WILLIAM AND MARY COLL – H O Funsten

Accelerator CEBAF *Detector* CLAS

Reactions

$e^- p \to e^- K^+ \Lambda$	2.4, 3.2, 4.0 GeV (T_{lab})
$e^- p \to e^- K^+ \Sigma^0$	"

Brief description Measures L, T, LT, and TT structure functions for Q^2 between 1 and 2 $(GeV/c)^2$ and W between 1.8 and 2.2 GeV. Measures isospin dependence by comparing Λ and Σ productions. Studies production ratio of hyperons up to the $\Lambda(1520)$. Measures polarization of Λ. Searches for N^* resonances which decay to hyperon–K^+ final states. Scheduled to run in Hall B in 1996.

Journal papers NIM A323 (1992) 191, and IEEE TNS 39 (1992) 690.

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CEBAF-93-031

(Proposed Apr 1993, Approved Jun 1993, In preparation)

PHOTOPRODUCTION OF VECTOR MESONS AT HIGH t

GEORGE WASHINGTON U – B L Berman, W J Briscoe, P L Cole, J P Connelly, K Dhuga, W R Dodge, S Rugari
INFN, GENOA – M Anghinolfi (√ Spokesperson), P Corvisiero, L Mazzaschi, V Mokeev, G Ricco, M Ripani, M Sanzone, M Taiuti, A Zucchiatti
ORSAY, IPN – R Frascaria, M Morlet, J Van de Wiele
RENSSELAER POLY – G S Adams, J Napolitano, P Stoler, B B Wojtsekhowski
SACLAY – G Audit, A Boudard, G Fournier, M Guidal, F Kunne-Perrot, J M Laget (√ Spokesperson), C Marchand (√ Spokesperson), R Mendez-Galain, L Murphy, B Saghai
SOUTH CAROLINA U – G Blanpied, C Djalali, B M Preedom, A Tam, S Whisnant

Accelerator CEBAF *Detector* CLAS

Reactions

$\gamma p \to \phi p$	3.0–3.6 GeV (E_{lab})
$\gamma p \to \rho p$	"
$\gamma p \to \omega p$	"
$\gamma p \to K^+ \Sigma$	"

Particles studied ρ, ω, ϕ, Λ, Σ

Brief description Studies the interplay between two competing mechanisms in photoproduction at high momentum transfers, $1 \leq -t \leq 5$ $(GeV/c)^2$. The ϕ production proceeds mainly through exchange of two gluons, while the ρ or ω productions are a result of an interchange of two quarks. The experiment aims at determining the t distribution in the ϕp and ρp channels at the highest energy available at CEBAF (up to 4 and possibly 6 GeV). Recoil proton is detected in coincidence with kaons (for ϕ production), or pions (for ρ production). The full kinematics of exclusive reactions is recorded. The large acceptance of the detector also allows a good measurement of cross sections in these and other channels. Uses monochromatic tagged photons. Targets are cryogenic liquid hydrogen, deuterium, and ^{3}He. Scheduled to take data in Hall B in 1997.

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CEBAF-93-033

(Proposed Apr 1993, Approved Jun 1993, In preparation)

A SEARCH FOR MISSING BARYONS FORMED IN $\gamma p \to p\pi^+\pi^-$ USING THE CLAS DETECTOR

CLAS COLLABORATION
RENSSELAER POLY – G S Adams, J Napolitano (√ Spokesperson), P Stoler, M Witkowski, B B Wojtsekhowski
CARNEGIE MELLON U – R Schumacher
RICE U – G Mutchler
KENT STATE U – D M Manley

Accelerator CEBAF *Detector* CLAS

Reactions

$\gamma p \to p \pi^+ \pi^-$	0.5–2.3 GeV (E_{lab})

Brief description Uses tagged photons and liquid hydrogen target. Scheduled to run in Hall B in 1996/97.

Related experiments CEBAF-89-004, CEBAF-89-024

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CEBAF-93-036

(Proposed Apr 1993, Approved Jun 1993, In preparation)

MEASUREMENT OF SINGLE PION ELECTROPRODUCTION FROM THE PROTON WITH POLARIZED BEAM AND POLARIZED TARGET USING CLAS

N* COLLABORATION
CEBAF – W Brooks, V D Burkert, D Joyce, B A Mecking, B B Niczyporuk, E S Smith, A Yegneswaran
CHRISTOPHER NEWPORT U – D Doughty, D Heddle, Z J Li
DUKE U – R Chasteler (√ Spokesperson), H R Weller (√ Spokesperson)
FLORIDA STATE U – L C Dennis, P Dragovitsch
FRASCATI – N Bianchi, G P Capitani, E De Sanctis, P Levi-Sandri, V Muccifora, E Polli, A R Reolon, P Rossi
INFN, GENOA – M Anghinolfi, P Corvisiero, G Gervino, L Mazzaschi, V Mokeev, G Ricco, M Ripani, M Sanzone, M Taiuti, A Zucchiatti
GEORGE MASON U – B J Lieb
HAMPTON U – K B Beard
JAMES MADISON U – K Giovanetti
KENT STATE U – D M Manley
PITTSBURGH U – S A Dytman
RENSSELAER POLY – G S Adams, N C Mukhopadhyay, P Stoler
VIRGINIA U – D G Crabb, D B Day, J S McCarthy, R C Minehart (√ Spokesperson), D Počanić, O A Rondon-Aramayo, R Sealock, L C Smith, S T Thornton, H J Weber
VIRGINIA STATE U – C E Stronach
WILLIAM AND MARY COLL – C E Carlson, H O Funsten
YALE U – M Gai

Accelerator CEBAF *Detector* CLAS

Reactions Polarized beam and target

$e^- p \to e^- \pi^+ n$	1.2–4.0 GeV (T_{lab})
$e^- p \to e^- p \pi^0$	"

Brief description Measures polarization asymmetries for exclusive single-pion channels. Scheduled to run in Hall B in 1997/98.

Related experiments CEBAF-89-037, CEBAF-89-038, CEBAF-89-040, CEBAF-89-042, CEBAF-89-043, CEBAF-91-002

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CEBAF-93-038

(Proposed Apr 1993, Approved Jun 1993, In preparation)

THE ELECTRIC AND MAGNETIC FORM FACTORS OF THE NEUTRON FROM THE $d(\vec{e}, e'\vec{n})p$ REACTION

AMERICAN U – B S Flanders
MIT, BATES LINEAR ACCELERATOR – G Dodson, M Farkhondeh
CEBAF – R Carlini, D J Mack, J H Mitchell, R R Whitney, S A Wood, C Yan
DUKE U – C Howell, W Tornow, R L Walter
GETTYSBURG COLL – P J Pella
HAMPTON U – O K Baker, K B Beard, S Beedoe, W Buck, R Madey (√ Spokesperson), L G Tang
INDIANA U – J M Cameron
KENT STATE U – B D Anderson, A R Baldwin, D Keane, A Lai, D M Manley, G G Petratos, J W Watson, W M Zhang

MARYLAND U – C C (G) Chang, J J Kelly, P Markowitz
MIT – W Bertozzi, W K Korsch, S B Kowalski, B Turchinetz
OLD DOMINION U – P E Ulmer, L B Weinstein
VIRGINIA U – R Lourie
WILLIAM AND MARY COLL – J M Finn
MAINZ U – H Arenhovel

Accelerator CEBAF *Detector* Spectrometer

Reactions Polarized beam

e^- deut $\rightarrow e^-$ n p 1.6–2.4 GeV (T_{lab})

Particles studied n

Brief description Uses the HMS spectrometer, and a neutron polarimeter to analyze the recoil neutron. Scheduled to run in Hall C.

Journal papers NIM A338 (1994) 432.

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CEBAF-93-049

(Proposed Apr 1993, Approved Jun 1993, In preparation)

POLARIZATION TRANSFER IN THE REACTION ^{4}He($\vec{e}$, $e'\vec{p}$)^{3}H IN THE QUASIELASTIC SCATTERING REGION

CEBAF – R Ent (Spokesperson), J Gomez, J J LeRose, S Nanda, A Saha
NIKHEF, AMSTERDAM – E Jans, G van der Steenhoven
OLD DOMINION U – P E Ulmer (Spokesperson)
RUTGERS U – J E Brash, R Gilman, C Glashausser, G Kumbartzki, R Ransome, P M Rutt
WILLIAM AND MARY COLL – J M Finn, C F Perdrisat
WISCONSIN U – M Bucholz, H J Bulten, M Miller, J F J van den Brand (Spokesperson), O Unal, Z L Zhou

Accelerator CEBAF *Detector* ?

Brief description Scheduled to run in Hall A.

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CERN Experiments

CERN-EMU-001

(Proposed Apr 1984, Approved Nov 1984, Completed data-taking Aug 1990)

STUDY OF PARTICLE PRODUCTION AND NUCLEAR FRAGMENTATION IN COLLISIONS OF ^{16}O BEAMS WITH EMULSION NUCLEI AT 13–200 A GeV

ALMA ATA, PHYS INST – N P Andreeva, Z V Anson, V I Bubnov, Y I Chasnikov, G Z Eligbaeva, L E Eremenko, A S Gaitinov, G S Kalyachkina, E K Kanygina, V N Lepetan, C I Shakova
BEIJING, IHEP – G F Xu, P Y Zheng
PANJAB U – M M Aggarwal, R Arora, V S Bhatia, I S Mittra
HUNAN EDUCATION INST – Y X Li, L Liang, Z G Liu, Z Q Weng, Y L Xia
DUBNA – S A Krasnov, S Kulikova, T N Maksimkina, J J Musulmanbekov, G S Shabratova, K D Tolstov
RAJASTHAN U – K B Bhalla, S K Gupta, V Kumar, P Lal, S Lokanathan, S Mookerjee, H S Palsania, R Raniwala, S Raniwala
JAMMU U – S K Badyal, A Bhasin, V K Gupta, S Kachroo, S Kitroo, L Mangotra, N K Rao
KOSICE U – L Just, M Karabova, M Tothova, S Vokal, J Vrlakova
SHANXI NORMAL U – S B Lou, Y M Qin, D H Zhang
LUND U – S Garpman, B Jakobsson, J Nystrand, I Otterlund (Spokesperson), K Soderstrom, E Stenlund
MARBURG U – E Ganssauge, J T Rhee
LEBEDEV INST – M I Adamovich, Y A Alexandrov, M M Chernyavsky, S G Gerassimov, S P Kharlamov, V G Larionova, N V Maslennikova, G I Orlova, N G Peresadko, V M Rappoport, N A Salmanova, M I Tretyakova
WASHINGTON U, SEATTLE – T H Burnett, J Grote, J J Lord, D Skelding, R J Wilkes
KHLOPIN RADIUM INST – V G Bogdanov, V A Plyushchev, Z I Solovieva
TASHKENT, IFY – E S Basova, H Nasrullaeva, S Z Nasyrov, N V Petrov, D A Qarshiev, T P Trofimova, U I Tuleeva
TASHKENT, FTI – L P Chernova, K G Gulamov, F G Kadyrov, N S Lukicheva, V S Navotny, N Saidkhanov, L N Svechnikova, S I Zhokhova
HUA-ZHONG NORMAL U – X Cai, H Huang, L S Liu, W Y Qian, H Q Wang, D C Zhou
YEREVAN PHYS INST – F A Avetyan, N A Marutyan, L G Sarkisova, V R Sarkisyan

Accelerator CERN-SPS *Detector* Emulsion

Reactions

^{16}O nucleus	13–200 GeV (T_{lab}/N)
^{32}S nucleus	200 GeV (T_{lab}/N)

Brief description Studies (1) multiplicities of produced charged particles, (2) pseudo-rapidity density distributions globally and in selected regions of pseudo-rapidity, (3) density fluctuations and multiplicity and angular distributions of nuclear fragments and recoiling protons, and (4) cross sections for production and interaction of light and medium projectile fragments. Uses emulsion chambers and emulsion stacks. See also the BNL-815 experiment.

Journal papers PL B201 (1988) 397, NIM A269 (1988) 134, CPC 55 (1989) 103, CPC 55 (1989) 233, HEPNP 13 (1989) 865, PR C40 (1989) 66, NP A498 (1989) 541c, PL B223 (1989) 262, PL B227 (1989) 285, PL B230 (1989) 175, PRL 62 (1989) 2801, PS T32 (1990) 168, MPL A5 (1990) 169, PL B234 (1990) 180, PL B242 (1990) 512, PRL 65 (1990) 412, HEPNP 15 (1991) 131, NP A525 (1991) 551c, MPL A6 (1991) 469 [erratum: MPL A6 (1991) 1629], ZPHY C49 (1991) 395, PRL 67 (1991) 1201, PL B262 (1991) 369, PL B263 (1991) 539, PRL 69 (1992) 745, NP A544 (1992) 153c, NP B388 (1992) 3, ZPHY C55 (1992) 235, ZPHY C56 (1992) 509, MPL A8 (1993) 21, JPHY G19 (1993) 2035, and PR D47 (1993) 3726.

Related experiments BNL-815, BNL-863

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CERN-EMU-003

(Proposed Oct 1984, Approved Nov 1984, Began data-taking 1990, Completed data-taking Aug 1990)

INTERACTIONS OF ^{16}O PROJECTILE AND ^{32}S AND THEIR FRAGMENTS IN NUCLEAR EMULSIONS AT ABOUT 60 AND 200 GeV/NUCLEON

CAIRO U – A Abdalla, Z Abou-Moussa, O E Badawy, F A El Wahed, M El-Nadi (Spokesperson), A Fakiha, A A Hamed, A Hussien, S Kamel, N Mettwalli, A Mohamed, W Osman, M Selait, E A Shaat, S Talaat, T Talâat

Accelerator CERN-SPS *Detector* Emulsion

Reactions

^{16}O nucleus	60, 200 GeV (T_{lab}/N)
^{32}S nucleus	"

Brief description Studies the e^+e^- decays of neutral bosons produced in the inelastic collisions of ^{32}S ions with emulsion nuclei at 200 A GeV. An unbiased sample of 1331 events has been analyzed, 346 e^+e^- pairs observed, and masses and lifetimes of 60 neutral bosons calculated. Studies also the mean free paths, average multiplicities, multiplicity distributions, and correlations of the produced particles, target fragments and projectile fragments, with both ^{32}S and ^{16}O beams. Data analysis in progress (May 94).

CERN-EMU-005

(Proposed Oct 1985, Approved Feb 1986, Completed data-taking Aug 1990)

STUDY OF EXTREMELY SHORT-RANGE PARTICLE CORRELATIONS IN HIGH-ENERGY ION COLLISIONS

ALABAMA U, HUNTSVILLE – C H Chan, B L Dong, J G Duthie, J C Gregory, T Hayashi, T Shiina, Y Takahashi (Spokesperson)
COLUMBIA U – S Nagamiya
NASA, MARSHALL – M J Christl, J H Derrickson, P B Eby, W F Fountain, T A Parnell, F E Roberts, J W Watts
TOKYO U – S Dake, M Fuki, A Iyono, O Miyamura, T Ogata

Accelerator CERN-SPS *Detector* Emulsion

Reactions

^{16}O nucleus	15, 50, 200 GeV (T_{lab}/N)

Brief description Uses an emulsion chamber with air gaps between plates in a 2-tesla magnetic field. Measures two-particle angular correlations for both like-charge and unlike-charge pairs. Took data in 1987 and 1990.

Journal papers NP A498 (1989) 529c.

Related experiments CERN-EMU-016

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CERN-EMU-007

(Proposed Mar 1987, Approved Jun 1987, Feb 1989, Began data-taking 1987, Completed data-taking Aug 1990)

INTERACTIONS OF 60–200 GeV/NUCLEON ^{16}O AND ^{32}S (Pb) NUCLEI IN LIGHT AND HEAVY ABSORBERS

CRACOW – R Holynski, A Jurak, A Olszewski, M Szarska, A Trzupek, B Wilczynska, H Wilczynski, W Wolter, B Wosiek, K Wozniak
LOUISIANA STATE U – M L Cherry, W V Jones, K Sengupta, J P Wefel (√ Spokesperson)
MOSCOW, ITEP – A I Dubinina, O K Egorov, E D Kolganova, E A Pozharova, T Y Skorotko, V A Smirnitski
MINNESOTA U – C J Waddington

Accelerator CERN-SPS *Detector* Emulsion

Reactions

^{16}O nucleus	60, 200 GeV (T_{lab}/N)

^{32}S nucleus 200 GeV (T_{lab}/N)

Brief description Studies (1) projectile fragmentation modes, including transverse momentum distributions and possible dependencies on topology, (2) pseudo-rapidity distributions, including searches for structure and correlations, (3) the dependence of charged particle multiplicity on the number of interacting nucleons, and (4) possible enhanced production of direct photons or electrons in high density matter. Ran in 1987 and 1990.

Journal papers PRL 60 (1988) 405, PRL 62 (1989) 733, NP A498 (1989) 535c, PR C39 (1989) 1385, PR C40 (1989) 2449, ZPHY C59 (1993) 399, PR D47 (1993) 1751, and PR D48 (1993) 3174.

Related experiments BNL-808

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CERN-EMU-009

(Proposed Jan 1989, Approved Apr 1989, Began data-taking 1990, Completed data-taking Aug 1990)

AN EMULSION HYBRID SETUP FOR THE STUDY OF SULPHUR–NUCLEUS COLLISIONS AT 200 GEV/N

EMU09 COLLABORATION
BARI U & INFN, BARI – N Armenise, M T Muciaccia, S Simone
CERN – G Poulard
UNIVERSITY COLL, DUBLIN – A C Breslin
ALABAMA U, HUNTSVILLE – J C Gregory, T Hayashi, Y Takahashi
NASA, MARSHALL – J H Derrickson, T A Parnell, J Watts
UNIVERSITY COLL, LONDON – D H Davis, D Tovee
NAGOYA U – S Aoki, K Hoshino, H Kitamura, M Kobayashi, K Kodama, M Miyanishi, K Nakamura, M Nakamura, S Nakanishi, K Niu, K Niwa, H Tajima
ROME U & INFN, ROME – S Dell'Uomo, S Di Liberto, M A Mazzoni, F Meddi, G Rosa, C Sgarbi
SALERNO U & INFN, SALERNO – G Grella, G Romano (✓ Spokesperson)
TURIN U & INFN, TURIN – B Allessandro, V Bisi, P Giubellino, A Marzari-Chiesa, L Ramello, L Riccati

Accelerator CERN-SPS *Detector* Emulsion

Reactions
^{32}S nucleus 200 GeV (T_{lab}/N)

Particles studied charm

Brief description The setup includes silicon detectors and emulsion tapes or chambers. Some of the exposures are in a 2.5 T field. The main aims are: (1) a search for charmed particles produced in central interactions on silver and lead targets, (2) a study of charged-particle correlations as a function of charge and momentum differences, and (3) a search for electromagnetic dissociation of sulfur in the field of Fe, Ag, and Pb targets. Data analysis in progress (May 94).

Related experiments NONE

E-mail contact gromano@vxcern.cern.ch

CERN-EMU-010

(Proposed Nov 1989, Approved Feb 1990, Began data-taking 1990, Completed data-taking Aug 1990)

STUDY OF EVENT STRUCTURES OF 200 GeV/NUCLEON ^{32}S INTERACTIONS WITH NUCLEI BY THE MAGNETIC EMULSION SPECTROMETER AT THE CERN SPS

GIFU U – K Nakazawa
MIYAZAKI U – T Hasegawa, T Shuin
SAGA U, JAPAN – A Hisatomi, H Itoh (Spokesperson), T Murooka
SAKUYO COLL – R Ihara
TOHOKU U – T Hayashino

Accelerator CERN-SPS *Detector* Spectrometer

Reactions
^{32}S nucleus 200 GeV (T_{lab}/N)

Brief description A search for anomalous event structure which may be caused by phase transitions. Investigates the space–time structure of nuclear collisions by pion interferometry through the charged particle exclusive measurement. Uses ten magnetic emulsion spectrometers (ESSPER's).

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CERN-EMU-011

(Proposed 1991, Approved Nov 1991, In preparation)

STUDY OF PARTICLE PRODUCTION AND NUCLEAR FRAGMENTATION IN RELATIVISTIC HEAVY ION COLLISIONS IN NUCLEAR EMULSION

SUNY, BUFFALO – A Z M Ismail, P L Jain (✓ Spokesperson), G Singh

Accelerator CERN-SPS *Detector* Emulsion

Reactions
^{197}Au nucleus 10.6, 200 GeV (T_{lab}/N)
^{207}Pb nucleus 60, 200 GeV (T_{lab}/N)
^{16}O nucleus "
^{32}S nucleus 200 GeV (T_{lab}/N)
^{28}Si nucleus 14.5 GeV (T_{lab}/N)

Brief description Measures (1) the shower particle multiplicity, the pseudorapidity density, and density fluctuations of charged particles, (2) the charge multiplicity and angular distributions of projectile fragments, and (3) production and interaction cross sections of heavily ionizing particles emitted from the target fragmentation. Emphasis is placed on central collisions. Uses stacks of pellicles. Scheduled to run in November 94.

Related experiments BNL-847, BNL-875

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CERN-EMU-012

(Proposed 1991, Approved Nov 1991, In preparation)

PARTICLE PRODUCTION, DENSITY FLUCTUATIONS, AND BREAK UP OF DENSE NUCLEAR MATTER IN CENTRAL Pb Ag AND Pb Pb INTERACTIONS AT 60–160 A GeV

ALMA ATA, PHYS INST – N P Andreeva, Z V Anzon, V I Bubnov, I Y Chasnikov, G Z Eligbaeva, L E Eremenko, A S Gaitinov, G S Kalyachkina, E K Kanygina, A M Seitembetov, C I Shakova
BEIJING, IHEP – P Y Zheng
PANJAB U – M M Aggarwal, R Arora, V S Bhatia, I S Mittra
DUBNA – S A Krasnov, J J Musulmanbekov, G S Shabratova
YEREVAN PHYS INST – F A Avetyan, N A Marutyan, L G Sarkisova, V R Sarkisyan
HUNAN EDUCATION INST – Y X Li, L Liang, Z G Liu, Z Q Weng, Y L Xia
RAJASTHAN U – K B Bhalla, S K Gupta, V Kumar, S Lokanathan, S Mokerjee, R Raniwala, S Raniwala
JAMMU U – S K Badyal, A Bhasin, V K Gupta, S Kachroo, S Kitroo, L Mangotra, N K Rao
KOSICE U – L Just, M Karabova, M Tothova, S Vokal, J Vrlakova
LUND U – S Garpman, B Jakobsson, J Nystrand, I Otterlund (Spokesperson), K Soderstrom, E Stenlund
MARBURG U – E Ganssauge, M Roeper
LEBEDEV INST – M I Adamovich, Y A Alexandrov, M M Chernyavsky, S G Gerassimov, S P Kharlamov, V G Larionova, N V Maslennikova, G I Orlova, N G Peresadko, N A Salmanova, M I Tretyakova
KHLOPIN RADIUM INST – V G Bogdanov, V A Plyushchev, Z I Solovieva
SHANXI NORMAL U – S B Lou, Y M Qin, D H Zhang
SYDNEY U – A M Bakich, L S Peak

TASHKENT, IFY – E S Basova, I K Bazarov, D A Carshiev, S Z Nasyrov, N V Petrov, T P Trofimova, U I Tuleeva, B P Tursonov
TASHKENT, FTI – L P Chernova, K G Gulamov, N S Lukicheva, V S Navotny, N Saidkhanov, S N Shpilev, E L Surin, L N Svechnikova, S I Zhokhova
WASHINGTON U, SEATTLE – T H Burnett, J Grote, J J Lord, D Skelding, R J Wilkes
HUA-ZHONG NORMAL U – X Cai, Y D Li, L S Liu, W Y Quian, H Q Wang, C B Yang, D C Zhou

Accelerator CERN-SPS *Detector* Emulsion

Reactions

^{207}Pb nucleus	60 – 160 GeV (T_{lab}/N)

Brief description Studies the multiparticle production globally and locally, fluctuations in particle densities, and the breakup of dense nuclear matter in central interactions. Uses emulsion chambers with thin Pb and Ag target foils as well as conventional emulsion pellicle stacks. Scheduled to run in 1994/95.

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CERN-EMU-013

(Proposed 1991, Approved Nov 1991, In preparation)

INTERACTIONS OF 180 GeV/NUCLEON ^{207}Pb NUCLEI IN EMULSION CHAMBERS WITH COPPER AND LEAD TARGETS

KLMM COLLABORATION
CRACOW – A Dabrowska, R Holynski, A Olszewski, M Szarska, A Trzupek, B Wilczynska, H Wilczynski, W Wolter (√ Spokesperson), B Wosiek, K Wozniak
LOUISIANA STATE U – M L Cherry, P Deines-Jones, W V Jones, K Sengupta, J P Wefel
MINNESOTA U – C J Waddington
MOSCOW, ITEP – A J Dubinina, E D Kolganova, E A Pozharova, T Y Skorodko, V A Smirnitski

Accelerator CERN-SPS *Detector* Emulsion

Reactions

^{207}Pb nucleus	180 GeV (T_{lab}/N)

Brief description Measures the pseudorapidity distributions of charged particles including analysis of particle fluctuations in pseudorapidity and azimuthal angle distributions, and the transverse momentum distribution of α fragments from the projectile nucleus. In preparation (May 94).

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CERN-EMU-014

(Approved Jun 1992, In preparation)

STUDY OF MULTIPLICITY AND ANGULAR CHARACTERISTICS IN Pb + A INTERACTION AT 200 A GeV/c

JADAVPUR U – D Ghosh (Spokesperson), J D Roy

Accelerator CERN-SPS *Detector* ?

Brief description The aim is to study the characteristics of particle production in relativistic heavy ion interactions in general and search for signatures for formation of quark–gluon plasma in particular. Measures event-by-event (i) multiplicity and pseudorapidity η distributions of singly charged relativistic hadrons globally and in limited regions of η, and (ii) multiplicity and angular distributions of recoiling protons and nuclear fragments to study the general features. This data may also be used to study the relevant signatures of quark–gluon plasma, *e.g.*, pseudorapidity density distributions and its fluctuations. Since the signatures of axion in emulsion plates exposed to heavy ion beams are already reported, we propose to scan these plates for further search of axions. Another possible topic is a study of multifractality in particle production. In preparation (May 94).

CERN-EMU-015

(Proposed May 1992, Approved Jun 1993, In preparation)

INVESTIGATION OF CENTRAL Au Au AND Pb Pb INTERACTIONS AT ENERGIES OF 160 GeV/NUCLEON WITH THE HELP OF THE EMULSION MAGNETIC CHAMBER

ALMA ATA, PHYS INST – E G Boos, T N Kvochkina, N A Loktionova
LEBEDEV INST – O D Chernavskaya, N A Dobrotin, I M Dremin, E L Feinberg, L V Filkov, L A Goncharova, N S Konovalova, K A Kotelnikov (√ Spokesperson), A G Martynov, N G Polukhina, I I Royzen, M I Tretyakova, V A Tsarev
IOFFE PHYS TECH INST – V A Dergachev, Y F Gagarin, V A Lukin, E A Yakubovskij

Accelerator CERN-SPS *Detector* Emulsion

Reactions

Pb Pb	160 GeV (T_{lab}/N)

Brief description The aim is to investigate high-energy heavy ion central collisions by the use of an emulsion magnetic chamber with high spatial resolution. The emulsion chamber consists of 50 emulsion layers, 50 microns thick, each coated on 25-microns mylar base. A thin lead target plate 300 microns thick is installed immediately in front of the first emulsion layer. The chamber is placed in a transverse magnetic field of about 2 T with its layer planes perpendicular to the Pb nucleus beam. This setup enables the measurement of full 3-momenta, and charge signs of secondary particles. The specific goal is to carry out detailed analysis of individual events with super-high multiplicity of secondaries. These data are to be used for investigation of properties of super hot/dense matter, in particular to look for and analyze possible manifestations of quark–gluon plasma. In preparation (May 94).

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CERN-EMU-016

(Approved Nov 1993, In preparation)

ISOSPIN CORRELATIONS IN HIGH ENERGY Pb Pb INTERACTIONS

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TOKYO U – S Dake, M Fuki, A Iyono, M Makida, O Miyamura, T Ogata, A Yamamoto, H Yokomi

Accelerator CERN-SPS *Detector* Emulsion

Brief description Studies multi-particle correlations and isospin fluctuations. The detector and analysis system to be used are the MAGIC chambers (Magnetic Interferometric Emulsion Chamber) and the automated CAVIA microscope (Computer Assisted Visual Image Analysis) for track analyses. One exposure is planned with the 1.8 T conventional magnet at the West Hall, another with a new 7.4 T superconducting magnet that was created recently for this experiment. The 7.4 T magnet allows also a detailed study of the particle ratio $K^{\pm}/\pi^{\pm}$, and the charged hyperon production (Σ, Ξ, Ω) at small rapidities ($y < 2$). The finite temperature chiral symmetry restoration will also be explored by analyzing the unlike-sign, two-particle invariant mass distribution in terms of the resonance production and hypothetical mass reduction of the scalar–isoscalar (σ) mesons, a chiral doublet vector mesons (σ and A_1) or pseudo-scalar (η) mesons. In preparation (May 94).

Related experiments CERN-EMU-005

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CERN-EMU-017

(Proposed Oct 1993, Approved Nov 1993, In preparation)

FRAGMENTATION OF Pb PROJECTILES AT SPS ENERGIES

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Accelerator CERN-SPS *Detector* Plastic

Reactions
^{208}Pb nucleus 100 GeV (T_{lab}/N)

Brief description Exposes stacks consisting of solid state nuclear track detectors (CR39 plastic and BP-1 glass) and different target materials to beams of Pb projectiles. The detectors record tracks of relativistic nuclei with charge numbers of $Z > 5$ for CR39 and $Z > 74$ for BP-1. Measurement is done using completely automated microscope systems. BP-1 detectors are used to study the total charge-changing cross sections and elemental production cross sections for heavy projectile fragments. Multifragmentation events in which several intermediate mass fragments are emitted from the heavy Pb projectile are studied using stacks containing CR39 detector foils. Charge, emission angles and transverse momenta of the fragments will be determined. In preparation (May 94).

Related experiments BNL-883

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CERN-EMU-018

(Proposed May 1993, Approved Nov 1993, In preparation)

EXPOSURES OF CR39 STACKS TO LEAD IONS AT THE CERN-SPS

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Accelerator CERN-SPS *Detector* Plastic

Reactions
^{208}Pb nucleus 160 GeV (T_{lab}/N)

Brief description Stacks of CR39 and lexan sheets are exposed to lead ions of 160 GeV per nucleon. The main purpose of the exposures is the calibration of the CR39 sheets used for a large area experimental search for magnetic monopoles at the Gran Sasso Laboratory (experiment UNDERGROUND-MACRO). Tests will be made for exposures in a space station aimed at the study of the primary ray composition. Studies will be done of the fragmentation properties of lead nuclei, and of limits on fractionally charged nuclear fragments. Etched tracks are analyzed automatically with the Elbek image analyzer system in Bologna. At least two stacks will be exposed at low temperatures to study the temperature dependence of the response. Some old CR39 sheets will also be exposed in order to see possible effects of aging. In preparation (May 94).

Related experiments UNDERGROUND-MACRO

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CERN-IS-021

(Approved Apr 1990, Completed data-taking Dec 1990)

A SEARCH FOR AXIONS BY NUCLEAR RESONANCE SCATTERING

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CERN – A De Rujula, H L Ravn

Accelerator CERN-SC *Detector* ?

Particles studied axion

Brief description A search for axions utilizing a strong, high purity source of ^{125}I produced at ISOLDE.

CERN-IS-300

(Proposed Sep 1991, Approved Sep 1991, In preparation)

A SEARCH FOR AXIONS AND MASSIVE NEUTRINOS

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CHALMERS UNIV TECH – B Jonson, G Nyman

Accelerator CERN-SC *Detector* Spectrometer

Particles studied axion, ν

Brief description A search for axions and a heavy neutrino by using a strong, high purity source of ^{125}I. Uses Mössbauer spectrometer. In preparation (May 94).

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CERN-LEP-ALEPH

(Proposed 1982, Approved Nov 1982, Began data-taking Aug 1989, In progress)

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Accelerator CERN-LEP *Detector* ALEPH

Reactions
$e^+ e^-$ < 120 GeV (E_{cm})

Particles studied W^+, W^-, Z^0, hvy-lepton, higgs, hvy-flavor

Brief description A 4π detector designed to give as much detailed information as possible about complex events. Strong points of the detector are a precision of momentum measurements for charged particles, due to a high magnetic field and a TPC, a good identification of electrons and muons even when they are immersed in jets, and a spatial resolution obtained in $e\gamma$ calorimetry. A minivertex detector provides a capability for identifying secondary vertices, and a silicon–tungsten calorimeter installed in 1992, allows a significant reduction of the luminosity error. Taking data (May 94).

Journal papers NIM 217 (1983) 305, NIM 217 (1983) 317, NIM 225 (1984) 481, NIM 226 (1984) 82, IEEE TNS 32 (1985) 605, NIM 228 (1985) 327, NIM A234 (1985) 47, NIM A235 (1985) 296, NIM A239 (1985) 192, NIM A244 (1986) 516, NIM A247 (1986) 438, NIM A251 (1986) 449, NIM A252 (1986) 392, NIM A252 (1986) 399, NIM A252 (1986) 403, IEEE TNS 34 (1987) 133, CPC 45 (1987) 229, CPC 45 (1987) 283, CPC 45 (1987) 433, NIM A257 (1987) 587, IEEE TNS 35 (1988) 316, NIM A263 (1988) 43, NIM A263 (1988) 58, NIM A268 (1988) 144, NIM A271 (1988) 449, CPC 57 (1989) 401, IEEE TNS 36 (1989) 1459, IEEE TNS 36 (1989) 1464, IEEE TNS 36 (1989) 1514, NIM A277 (1989) 358, NIM A279 (1989) 212, NIM A283 (1989) 573, PL B231 (1989) 519, IJMP C1 (1990) 147, IEEE TNS 37 (1990) 1210, NIM A286 (1990) 61, NIM A289 (1990) 176, NIM A294 (1990) 121 [erratum: NIM A303 (1991) 393], NIM A297 (1990) 153, NIM A297 (1990) 390, HEPNP 14 (1990) 966, PL B234 (1990) 209, PL B234 (1990) 399, PL B235 (1990) 399, PL B236 (1990) 86, PL B236 (1990) 233, PL B236 (1990) 501, PL B236 (1990) 511, PL B237 (1990) 291, PL B241 (1990) 141, PL B241 (1990) 623, PL B241 (1990) 635, PL B244 (1990) 541, PL B244 (1990) 551, PL B245 (1990) 289, PL B246 (1990) 306, PL B250 (1990) 172, ZPHY C48 (1990) 365, NIM A306 (1991) 446, NP (PROC SUPPL) B23 (1991) 291, PL B255 (1991) 623, PL B257 (1991) 479, PL B257 (1991) 492, PL B258 (1991) 236, PL B259 (1991) 377, PL B262 (1991) 139, PL B263 (1991) 112, PL B263 (1991) 325, PL B264 (1991) 476, PL B265 (1991) 430, PL B265 (1991) 475, PL B266 (1991) 218, PL B273 (1991) 181, NIM A315 (1992) 121, NIM A320 (1992) 177, NIM A323 (1992) 213, PL B276 (1992) 247, PL B278 (1992) 209, PL B279 (1992) 411, PL B284 (1992) 151, PL B284 (1992) 163, PL B284 (1992) 177, PL B285 (1992) 309, PL B292 (1992) 210, PL B294 (1992) 145, PL B295 (1992) 174, PL B295 (1992) 396, PL B297 (1992) 432, PL B297 (1992) 449, PL B297 (1992) 459, PRPL 216 (1992) 253, ZPHY C53 (1992) 1, ZPHY C53 (1992) 21, ZPHY C53 (1992) 375, ZPHY C54 (1992) 75, ZPHY C54 (1992) 211, ZPHY C55 (1992) 209, PL B298 (1993) 479, PL B303 (1993) 198, PL B307 (1993) 187, PL B307 (1993) 194, PL B307 (1993) 209, PL B308 (1993) 425, PL B311 (1993) 425 [erratum: PL B316 (1993) 631], PL B313 (1993) 299, PL B313 (1993) 312, PL B313 (1993) 498, PL B313 (1993) 509, PL B313 (1993) 520, PL B313 (1993) 535, PL B313 (1993) 549, PL B314 (1993) 459, ZPHY C57 (1993) 17, ZPHY C59 (1993) 215, ZPHY C59 (1993) 369, ZPHY C60 (1993) 71, IEEE TNS 41 (1994) 236, PL B321 (1994) 168, PL B322 (1994) 275, PL B322 (1994) 441, ZPHY C62 (1994) 1, and ZPHY C62 (1994) 179.

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CERN-LEP-DELPHI

(Proposed 1982, Approved Nov 1982, Began data-taking Aug 1989, In progress)

THE DELPHI DETECTOR (*DE*TECTOR WITH *L*EPTON *P*HOTON AND *H*ADRON *I*DENTIFICATION)

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MADRID U – J A Barrio, J Sanchez
OVIEDO U – J Cuevas Maestro

Accelerator CERN-LEP *Detector* DELPHI

Reactions

$e^+ e^-$ < 200 GeV (Ecm)

Particles studied W^+, W^-, Z^0, hvy-lepton, higgs, hvy-flavor

Brief description A general purpose LEP detector for physics on and above the Z^0, offering 3-dimensional information on curvature and energy deposition with fine spatial granularity, as well as identification of leptons and hadrons over most of the solid angle. A superconducting coil provides a 1.2 T solenoidal field of high uniformity. Tracking relies on a microvertex detector, an inner detector, a Time Projection Chamber (TPC), an outer detector, and forward drift chambers. A 3-layer silicon microvertex detector allows a precision measurement of the interaction vertex and decay vertices of short-lived particles such as bottom and charm hadrons and τ leptons. Electromagnetic showers are measured in the barrel with high granularity by the High Density Projection Chamber (HPC) and in endcaps by $1^\circ \times 1^\circ$ projective towers composed of lead glass as active material and photo-triode readout. Hadron identification is provided mainly by liquid and gas ring-imaging Čerenkov counters (RICH). A segmented yoke serves for hadron calorimetry and as a filter for muons which are identified in two drift chamber layers. In addition, scintillator systems are implemented in the barrel and forward regions. A small angle

Shashlik-type calorimeter (STIC) is used for the luminosity determination. Taking data (May 94).

Journal papers NIM 225 (1984) 477, NIM 225 (1984) 606, NIM A235 (1985) 310, NIM A241 (1985) 429, NIM A243 (1986) 77, NIM A243 (1986) 91, NIM A248 (1986) 317, NIM A252 (1986) 188, NIM A252 (1986) 413, NIM A252 (1986) 418, NIM A252 (1986) 435, NIM A252 (1986) 524, NIM A252 (1986) 573, NIM A254 (1987) 111, NIM A256 (1987) 65, NIM A256 (1987) 267, NIM A257 (1987) 499, NIM A260 (1987) 124, IEEE TNS 34 (1987) 227, NIM A263 (1988) 215, NIM A265 (1988) 218, NIM A269 (1988) 652, NIM A270 (1988) 393, NIM A273 (1988) 553, NIM A273 (1988) 565, NIM A273 (1988) 841, NIM A273 (1988) 847, IEEE TNS 36 (1989) 390, NIM A275 (1989) 49, NIM A277 (1989) 154, NIM A277 (1989) 160, NIM A277 (1989) 338, NIM A277 (1989) 347, NIM A279 (1989) 473, NIM A279 (1989) 518, NIM A283 (1989) 502, NIM A283 (1989) 567, NIM A283 (1989) 792, NIM A289 (1990) 400, NIM A290 (1990) 320, NIM A290 (1990) 327, NIM A292 (1990) 75, NIM A292 (1990) 319, NIM A292 (1990) 551, NIM A294 (1990) 424, PL B231 (1989) 539, PL B240 (1990) 271, PL B241 (1990) 435, PL B241 (1990) 449, PL B242 (1990) 536, PL B245 (1990) 276, PL B247 (1990) 137, PL B247 (1990) 148, PL B247 (1990) 157, PL B247 (1990) 167, PL B252 (1990) 140, PL B252 (1990) 149, NP B342 (1990) 1, IEEE TNS 38 (1991) 861, NIM A303 (1991) 233, NIM A305 (1991) 344, NIM A310 (1991) 596, PL B255 (1991) 466, PL B260 (1991) 240, PL B267 (1991) 422, PL B268 (1991) 296, NP B367 (1991) 511, ZPHY C50 (1991) 185, ZPHY C51 (1991) 25, ZPHY C52 (1991) 271, IEEE TNS 39 (1992) 166, NIM A315 (1992) 143, NIM A315 (1992) 393, NIM A323 (1992) 209, NIM A323 (1992) 351, NIM A323 (1992) 363, PL B274 (1992) 230, PL B274 (1992) 498, PL B275 (1992) 222, PL B275 (1992) 231, PL B276 (1992) 247, PL B276 (1992) 254, PL B276 (1992) 536, PL B277 (1992) 371, PL B281 (1992) 383, PL B286 (1992) 201, PL B289 (1992) 199, PL B295 (1992) 320, PL B295 (1992) 383, PL B298 (1992) 236, PL B298 (1992) 247, ZPHY C53 (1992) 41, ZPHY C53 (1992) 555, ZPHY C53 (1992) 567, ZPHY C54 (1992) 55, ZPHY C55 (1992) 555, ZPHY C56 (1992) 47, ZPHY C56 (1992) 63, NP B373 (1992) 3, NP B386 (1992) 471, NIM A327 (1993) 296, NIM A328 (1993) 447, PL B301 (1993) 145, PL B302 (1993) 356, PL B311 (1993) 379, PL B307 (1993) 221, PL B311 (1993) 408, PL B312 (1993) 253, PL B316 (1993) 620, PL B318 (1993) 249, ZPHY C57 (1993) 181, ZPHY C59 (1993) 21, ZPHY C59 (1993) 357, ZPHY C59 (1993) 533, NP B403 (1993) 3, PL B322 (1994) 459, PL B324 (1994) 500, ZPHY C61 (1994) 407, and NP B417 (1994) 3.

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WWW Home-page http://delinfo.cern.ch/Delphi/Welcome.html

CERN-LEP-L3

(Proposed 1982, Approved Nov 1982, Began data-taking Aug 1989, In progress)

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Accelerator CERN-LEP *Detector* L3

Reactions

$e^+ e^-$ < 100 GeV (E_{cm})

Particles studied Z^0, hvy-lepton, higgs, s-particle

Brief description The detector consists of a high-volume low-field solenoid magnet, a small central tracking chamber with very high resolution, a high-resolution electromagnetic calorimeter encapsulating the central detector, a hadron calorimeter acting also as a muon filter, and high-precision muon tracking chambers. The detector is designed to measure energy and position of leptons with the highest obtainable precision allowing a mass resolution $\Delta m/m$ smaller than 2% in dilepton final states. Hadronic energy flux is detected by a fine-grained calorimeter, which also serves as a muon filter and tracking device. Taking data (May 94).

Journal papers NIM 214 (1983) 525, NIM 225 (1984) 493, NIM 228 (1985) 294, NIM A235 (1985) 464, NIM A251 (1986) 258, NIM A252 (1986) 304, CPC 45 (1987) 391, NIM A253 (1986) 15, NIM A254 (1987) 535, NIM A256 (1987) 261, NIM A257 (1987) 125, NIM A257 (1987) 528, HEPNP 12 (1987) 587, NIM A258 (1987) 58, NIM A263 (1988) 14, NIM A263 (1988) 343, NIM A265 (1988) 50, NIM A265 (1988) 252, NIM A270 (1988) 397, NIM A272 (1988) 713, NIM A273 (1988) 471, NIM A273 (1988) 814, NIM A274 (1989) 113, NIM A275 (1989) 71, NIM A275 (1989) 81, NIM A277 (1989) 187, NIM A278 (1989) 699, NIM A279 (1989) 671, NIM A280 (1989) 25, NIM A283 (1989) 799, NIM A285 (1989) 403, PL B231 (1989) 509, PL B233 (1989) 530, MPL A5 (1990) 1381, NIM A288 (1990) 364, NIM A289 (1990) 35, NIM A289 (1990) 103, NIM A289 (1990) 335, NIM A290 (1990) 115, PL B236 (1990) 109, PL B237 (1990) 136, PL B238 (1990) 122, PL B241 (1990) 416, PL B247 (1990) 177, PL B247 (1990) 473, PL B248 (1990) 203, PL B248 (1990) 227, PL B248 (1990) 464, PL B249 (1990) 341, PL B250 (1990) 183, PL B250 (1990) 199, PL B250 (1990) 205, PL B251 (1990) 311, PL B251 (1990) 321, PL B252 (1990) 511, PL B252 (1990) 518, PL B252 (1990) 525, PL B252 (1990) 703, PL B252 (1990) 713, NIM A302 (1991) 53, NIM A306 (1990) 150, NIM A309 (1991) 318, PL B257 (1991) 450, PL B257 (1991) 469, PL B259 (1991) 199, PL B261 (1991) 169, PL B261 (1991) 177, PL B262 (1991) 155, PL B263 (1991) 551, PL B265 (1991) 451, PL B270 (1991) 111, PL B271 (1991) 453, PL B271 (1991) 461, ZPHY C51 (1991) 179, PL B275 (1992) 209, PL B276 (1992) 247, PL B283 (1992) 454, PL B284 (1992) 471, PL B286 (1992) 403, PL B288 (1992) 395, PL B288 (1992) 404, PL B288 (1992) 412, PL B292 (1992) 454, PL B292 (1992) 463, PL B292 (1992) 472, PL B294 (1992) 457, PL B294 (1992) 466, PL B295 (1992) 337, PL B295 (1992) 371, PL B297 (1992) 469, ZPHY C55 (1992) 39, PL B301 (1993) 136, PL B303 (1993) 391, PL B306 (1993) 187, PL B307 (1993) 187, PL B307 (1993) 237, PL B309 (1993) 451, PL B313 (1993) 326, PL B315 (1993) 494, PL B316 (1993) 427, PL B317 (1993) 467, PL B317 (1993) 474, PL B317 (1993) 637, PL B318 (1993) 575, PRPL 236 (1993) 1, ZPHY C57 (1993) 355, NIM A340 (1994) 396, and PL B321 (1994) 283.

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CERN-LEP-OPAL

(Proposed 1982, Approved Nov 1982, Began data-taking Aug 1989, In progress)

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UC, RIVERSIDE – S L Chu, M Dittmar, J W Gary, P Giacomelli, W Gorn, E Heflin, C Jui, J G Layter, J R Letts, P Schenk, B C Shen, G J Vandalen, G Wilson
RUTHERFORD – K W Bell, R M Brown, N I Geddes, T Geralis, J D Gillies, P W Jeffreys, R P Middleton, G N Patrick, W G Scott, M Sproston
SACLAY – B Fabbro, A Gaidot, F X Gentit, P Le Du, J P Pansart, G Vasseur
TECHNION – S Dado, J Goldberg
TEL AVIV U – G Alexander, A Beck, G Bella, I Cohen, E Etzion
TOKYO U – S Asai, T Kawamoto, T Kobayashi, S Komamiya, T Mashimo, T Mori, M Morii, S Orito, M Sasaki, T Tsukamoto
BRITISH COLUMBIA U – D A Axen, R Howard, J A McKenna
VICTORIA U – A Astbury, M Fincke-Keeler, A Honma, R K Keeler, C Oram, D Pitman, P Poffenberger, M J Roney, M Rosvick, T J Smith, R Sobie, J Steuerer, M Vincter
WEIZMANN INST – E Duchovni, R Folman, D Hochman, D Lellouch, L Levinson, G Mikenberg, P Paschievici, A D Schaile, T Wlodek, G Wolf, R Yaari, G Yekutieli

Accelerator CERN-LEP *Detector* OPAL

Reactions

$e^+ e^-$ < 190 GeV (E_{cm})

Particles studied Z^0, W^+, W^-, γ, τ, hvy-flavor, gluon, higgs, s-particle

Brief description OPAL is a general purpose detector designed to study a wide range of unexplored physics at LEP. Among the central physics issues are the study of the Z^0 and $W^\pm$ bosons (*e.g.*, the determination of their exact masses and widths, and couplings to leptons and quarks), the physics of heavy flavors (such as the spectroscopy of b-quarks and the determination of the mixing and lifetimes of B states), and various QCD topics. A general search for new particles, in particular the Higgs bosons, is being made. The main components of the apparatus, in order of increasing distance from the interaction point, are a silicon microvertex detector, central detectors consisting of a vertex and a jet chamber, and a barrel of Z chambers, a warm conductor solenoid providing a uniform magnetic field of 0.4 T, a TOF scintillator barrel detector, a 4π lead glass electromagnetic calorimeter, a hadron calorimeter, an external muon identifier, and a forward detector which includes a new small-angle silicon–tungsten calorimeter. Taking data (May 94).

Journal papers NIM A236 (1985) 284, IEEE TNS 32 (1985) 736, NIM A242 (1986) 247, NIM A244 (1986) 416, NIM A250 (1986) 503, NIM A252 (1986) 331, NIM A252 (1986) 511, IEEE TNS 34 (1987) 240, CPC 47 (1987) 55, NIM A260 (1987) 132, NIM A260 (1987) 329, NIM A265 (1988) 11, NIM A265 (1988) 445, IEEE TNS 36 (1989) 380, NIM A278 (1989) 725, NIM A279 (1989) 236, NIM A279 (1989) 523, NIM A283 (1989) 492, NIM A283 (1989) 515, NIM A283 (1989) 650, PL B231 (1989) 530, IEEE TNS 37 (1990) 1584, NIM A286 (1990) 99, NIM A286 (1990) 107, NIM A286 (1990) 117, NIM A290 (1990) 76, NIM A293 (1990) 145, NIM A294 (1990) 431, PL B235 (1990) 379, PL B235 (1990) 389, PL B236 (1990) 224, PL B236 (1990) 364, PL B240 (1990) 250, PL B240 (1990) 261, PL B240 (1990) 497, PL B241 (1990) 133, PL B242 (1990) 299, PL B244 (1990) 135, PL B246 (1990) 285, PL B247 (1990) 448, PL B247 (1990) 458, PL B247 (1990) 617, PL B248 (1990) 211, PL B251 (1990) 211, PL B252 (1990) 159, PL B252 (1990) 290, ZPHY C47 (1990) 505, NIM A302 (1991) 434, NIM A305 (1991) 275, NIM A310 (1991) 527, PL B253 (1991) 511, PL B254 (1991) 293, PL B257 (1991) 531, PL B261 (1991) 334, PL B262 (1991) 341, PL B262 (1991) 351, PL B263 (1991) 123, PL B263 (1991) 311, PL B264 (1991) 219, PL B264 (1991) 467, PL B265 (1991) 462, PL B266 (1991) 201, PL B266 (1991) 485, PL B267 (1991) 143, PL B268 (1991) 122, PL B273 (1991) 338, PL B273 (1991) 355, ZPHY C49 (1991) 1, ZPHY C49 (1991) 49, ZPHY C49 (1991) 375, ZPHY C50 (1991) 373, ZPHY C52 (1991) 175, ZPHY C52 (1991) 543, NIM A313 (1992) 103, NIM A314 (1992) 74, NIM A317 (1992) 47, NIM A320 (1992) 183, NIM A323 (1992) 169, PL B274 (1992) 513, PL B276 (1992) 247, PL B276 (1992) 379, PL B276 (1992) 547, PL B278 (1992) 485, PL B281 (1992) 394, PL B281 (1992) 405, PL B287 (1992) 389, PL B287 (1992) 401, PL B288 (1992) 373, PL B291 (1992) 503, PL B294 (1992) 436, PL B295 (1992) 347, PL B295 (1992) 357, ZPHY C53 (1992) 539, ZPHY C54 (1992) 193, ZPHY C55 (1992) 1, ZPHY C55 (1992) 191, ZPHY C56 (1992) 521, NIM A324 (1993) 34, NIM A325 (1993) 129, NIM A325 (1993) 271, NIM A325 (1993) 494, NIM A333 (1993) 330, PL B298 (1993) 456, PL B302 (1993) 523, PL B305 (1993) 407, PL B305 (1993) 415, PL B307 (1993) 187, PL B307 (1993) 247, PL B311 (1993) 391, PL B312 (1993) 501, PL B313 (1993) 333, PL B316 (1993) 435, ZPHY C58 (1993) 207, ZPHY C58 (1993) 219, ZPHY C58 (1993) 387, ZPHY C58 (1993) 405, ZPHY C58 (1993) 523, ZPHY C59 (1993) 1, ZPHY C59 (1993) 183, ZPHY C60 (1993) 19, ZPHY C60 (1993) 199, ZPHY C60 (1993) 217, ZPHY C60 (1993) 397, ZPHY C60 (1993) 579, ZPHY C60 (1993) 593, ZPHY C60 (1993) 601, PL B320 (1994) 417, PL B327 (1994) 397, PL B327 (1994) 411, PL B328 (1994) 207, ZPHY C61 (1994) 19, ZPHY C61 (1994) 199, ZPHY C61 (1994) 209, and ZPHY C61 (1994) 357. More papers accepted for publication.

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WWW Home-page http://www1.cern.ch/Opal/

CERN-LEP-05

(Proposed Nov 1987, Approved Apr 1989, Began data-taking Feb 1990, Completed data-taking Feb 1992)

A SINGLE BREMSSTRAHLUNG MONITOR TO MEASURE LUMINOSITY AT LEP

LEP-5 COLLABORATION
ROME U & INFN, ROME – C Bini, D De Pedis, G De Zorzi, G Di Cosimo, A Di Domenico, G Diambrini-Palazzi (√ Spokesperson), P Gauzzi, D Zanello

Accelerator CERN-LEP *Detector* Calorimeter

Reactions

$e^+ e^- \rightarrow e^+ e^- \gamma$ 90 GeV (E_{cm})

Brief description Measures the luminosity and the beam divergence by detecting the energy and the angular distribution of single-bremsstrahlung photons emitted at a very forward angle. The Compton scattering of thermal photons has also been measured for the first time in a particle accelerator. The apparatus consists of a low Z absorber and of an EM calorimeter made of lead and scintillating fibers. Data analysis in progress (May 94).

Journal papers NIM A306 (1991) 467, PL B262 (1991) 135, NIM A315 (1992) 327, and NIM A (to be published).

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CERN-LEP-06

(Approved Sep 1989, Completed data-taking Feb 1992)

THE SEARCH FOR HIGHLY IONIZING PARTICLES IN e^+e^- COLLISIONS AT LEP USING MODAL (*MO*NOPOLE *D*ETECTOR *AT LEP*)

ALBERTA U – J L Pinfold (Spokesperson)
BOLOGNA U & INFN, BOLOGNA – G Giacomelli, F Patrizii, F Predieri, P Serra
HARVARD U – K Kinoshita

Accelerator CERN-LEP *Detector* Plastic

Particles studied monopole

Brief description The MODAL detector is designed to search for monopoles, dyons, and other highly ionizing particles. It is formed from lexan/CR39 dielectric track detector modules arranged in a polyhedral configuration around the intersection region.

Journal papers PRL (submitted).

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CERN-NA-012-2

(Proposed Aug 1985, Approved Feb 1986, Began data-taking Oct 1986, Completed data-taking Nov 1993)

SEARCH FOR MESONS AND GLUEBALLS DECAYING INTO MULTIPHOTON FINAL STATES PRODUCED IN CENTRAL HADRON COLLISIONS AND STUDY OF INCLUSIVE PRODUCTION OF HEAVY QUARK MESONS

GAMS COLLABORATION

ANNECY – T Kinashi, J P Peigneux, M Poulet, M Spighel
KEK – S Inaba, M Kobayashi, K Takamatsu, T Tsuru
LOS ALAMOS – D Alde, E A Knapp
PISA U & INFN, PISA – R Bellazzini, A Brez, M M Massai, M R Torquati
SERPUKHOV – S V Donskov, A V Inyakin, G V Khaustov, A V Kulik, A A Lednev, V A Polovnikov, S A Polyakov, Y D Prokoshkin (√ Spokesperson), S A Sadovsky, V D Samoylenko, P M Shagin, A V Shtannikov, A V Singovsky, V P Sugonyaev
BRUSSELS U, IISN – F G Binon, J P Stroot (√ Spokesperson)
CHIBA U – H Kawai
MIYAZAKI U – T Nakamura
YAMAGATA U – H Shimizu
CERN – M Boutemeur

Accelerator CERN-SPS *Detector* GAMS-4000

Reactions

$\pi^- p \to p \pi^- 2\gamma$ (γ's)	300 GeV/c
$\pi^- p \to 2\gamma$ (γ's) X	"
$\pi^- n \to n \pi^- 2\gamma$ (γ's)	"
$p p \to 2p\ 2\gamma$ (γ's)	450 GeV/c

Particles studied glueball, exotic, meson^0, $\eta_c(1S)$, χ_c(unspec)

Brief description Searches for neutral mesons, exotics like glueballs, hybrids, and many-quark states produced in central hadron–proton collisions. Studies the inclusive hadronic production of neutral heavy quark mesons. Uses the 4092-cell electromagnetic calorimeter GAMS-4000 supplemented with a forward magnetic spectrometer and microstrip gas chambers. Data analysis in progress (May 94).

Journal papers NIM A268 (1988) 112, NIM A269 (1988) 101, PL B201 (1988) 160, YF 47 (1988) 1273, YF 47 (1988) 1639, NIM A276 (1989) 652, YF 49 (1989) 712, ZPHY C43 (1989) 541, DANS 316 (1991) 900, and NIM A315 (1992) 21.

Related experiments CERN-NA-012, BNL-852

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CERN-NA-031

(Proposed Dec 1981, Approved Sep 1982, Nov 1987, Completed data-taking Dec 1989)

MEASUREMENT OF $|\eta_{00}|^2/|\eta_{+-}|^2$

CAMBRIDGE U – V Gibson
CERN – G Barr, P Buchholz, H Burkhardt, R Carosi, D C Cundy, N Doble, D Fournier, L Gatignon, P Grafstrom, R Hagelberg, M Holder, G Kesseler, G Quast, J Steinberger, J van der Lans, H Wahl (Spokesperson)
EDINBURGH U – D J Candlin, K J Peach
MAINZ U, INST PHYS – H Bluemer, R Heinz, K Kleinknecht, P Mayer, P Panzer, B Renk, H Rohrer
ORSAY, LAL – E Auge, I Harrus, P Heusse, L Iconomidou-Fayard, O Perdereau, A C Schaffer, L Serin
PISA U & INFN, PISA – L Bertanza, A Bigi, P Calafiura, M Calvetti, M C Carrozza, R Casali, C Cerri, R Fantechi, A Giacomucci, I Mannelli, V Marzolli, A Nappi, G M Pierazzini
UC, SANTA BARBARA – B Keay, H Nelson
SIEGEN U – A Kreutz, M Rost, H G Sander, W Weihs, R Werthenbach, G Zech

Accelerator CERN-SPS *Detector* Calorimeter, Wire chamber

Reactions

$K_L \to \pi^+ \pi^-$	50–150 GeV/c
$K_L \to \pi^0 \pi^0$	"
$K_S \to \pi^+ \pi^-$	"
$K_S \to \pi^0 \pi^0$	"

Particles studied K_L, K_S

Brief description Measures the two decay modes $K^0 \to 2\pi^0$ and $K^0 \to \pi^+\pi^-$ simultaneously, and alternately in K_L and K_S beams.

Journal papers PL B199 (1987) 139, NIM A268 (1988) 116, PL B206 (1988) 169, PL B214 (1988) 303, PL B235 (1990) 356, PL B304 (1993) 381, and PL B328 (1994) 528.

Related experiments CERN-NA-031-2

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CERN-NA-034

(Proposed Aug 1983, Approved Mar 1984, Began data-taking Apr 1987, Completed data-taking Dec 1989)

LEPTON PRODUCTION

HELIOS COLLABORATION

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CERN – H W Atherton, H Beker, C W Fabjan, V Hedberg, A Mazzoni, F Piuz, G Poulard, J Schukraft, H Sletten, W J Willis (√ Spokesperson)
HEIDELBERG U, PHYS INST – L Olsen, A Pfeiffer
KYOTO SANGYO U – H En'yo
UNIVERSITY COLL, LONDON – J Dodd, M J Esten
LUND U – S Johansson
MCGILL U – C Leroy, P Yepes
MONTREAL U – P Aubry, G Beaudoin, P Depommier
LEBEDEV INST – A Chikanian, S Muraviev, A Shmeleva, V Tikhomirov
MOSCOW PHYS ENG INST – B Dolgoshein, A Kalinovsky, S Smirnov, V Tcherniatin
NOVOSIBIRSK, IYF – S Eidelman, V Sidorov
PITTSBURGH U – M Clemen, Y M Park, P Pomianowski, E Stern, J Thompson, L Weber
ROME U & INFN, ROME – F Meddi
RUTHERFORD – N A McCubbin
STOCKHOLM U – B Sellden
TEL AVIV U – O Benary, S Dagan, Y Oren
TURIN U & INFN, TURIN – P Giubellino
NIKHEF, AMSTERDAM – R Veenhof
FERRARA U – E Mazzucato
MUNICH U, EXP PHYS – K Dederichs
VIENNA, OAW – C Erd

Accelerator CERN-SPS *Detector* HELIOS

Reactions

p Be $\to e^{\pm}$(s) X	450 GeV/c
p Be $\to$ muon(s) X	"
p Be $\to \nu$(s) X	"
p Be $\to e^{\pm}$ muon X	"
p Be $\to e^{\pm}\ \nu$ X	"
p Be $\to$ muon ν X	"
p Be $\to \gamma$ X	"
p Be $\to e^+ e^- \gamma$ X	"
p Be $\to \mu^+ \mu^- \gamma$ X	"

Particles studied charm

Brief description Investigates open questions in lepton production by hadrons, such as e/μ universality, anomalies in single-lepton production, the contribution of charm decay to lepton pair production, and 'anomalous' low-mass pair and low-$p_\perp$ photon production. Target is a beryllium wire, 50 μm diameter.

Journal papers NIM A252 (1986) 272, NIM A252 (1986) 471, NIM A253 (1987) 500, NIM A262 (1987) 243, NP A461 (1987)

403c, ZPHY C38 (1988) 397, ZPHY C49 (1991) 355, and ZPHY C52 (1991) 219.

Related experiments CERN-NA-034-2, CERN-NA-034-3

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CERN-NA-034-2

(Proposed May 1984, Approved Nov 1984, Completed data-taking May 1988)

STUDY OF HIGH ENERGY DENSITIES OVER EXTENDED NUCLEAR VOLUMES VIA NUCLEUS–NUCLEUS COLLISIONS AT THE SPS

HELIOS COLLABORATION

BARI U – N Armenise, M T Muciaccia
CERN – T Akesson, U Goerlach
UNIVERSITY COLL, DUBLIN – A Breslin, A Montwill
HEIDELBERG U, PHYS INST – H W Bartels, A Drees, V Kroh, H J Specht
JAPAN U GROUP COLLAB – K Chiba, T Hayashino, K Hoshino, M Kazuno, K Kodama, Y Maeda, K Niu, K Niwa, M Ohashi, M Okabe, Y Sato, S Tasaka, M Teranaka, I Tezuka, M Ushida, J Yokota
LOS ALAMOS – H van Hecke, B Jacak, J W Sunier
LUND U – R Haglund
MCGILL U – A Angelis, F Lamarche, C Leroy
MONTREAL U – G Beaudoin, J M Beaulieu, L A Hamel, L Lessard, A Lounis, P Taras
LEBEDEV INST – I Gavrilenko, S Mayburov, A Shmeleva
MOSCOW PHYS ENG INST – B Dolgoshein, V Kantserov, A Sumarokov
PITTSBURGH U – M Murray
ROME U & INFN, ROME – G Baroni, S Dell'Uomo, S Diliberto, G Rosa, C Sgarbi
SACLAY – A Gaidot, G W London (Spokesperson), J P Pansart, G Vasseur
STOCKHOLM U – B Erlandsson
TURIN U & INFN, TURIN – V Bisi, F Martelli, A Marzari-Chiesa, M Masera, L Ramello, L Riccati
WEIZMANN INST – I Blevis, Z Fraenkel
SALERNO U – G Romano

Accelerator CERN-SPS *Detector* HELIOS

Reactions

^{16}O nucleus	200 GeV/c (P_{lab}/N)
^{32}S nucleus	"
p nucleus	450 GeV/c

Brief description Uses disk targets or a multiwire active target and combines 4π calorimeter coverage with measurements, in restricted rapidity regions, of charged particle multiplicity, inclusive identified particle spectra, 2-particle correlations, low- and high-mass muon pairs, and photons. The disk targets are Al, Ag, W, Pt, Pb, and U. The target wires are Al, Ag, and W. Data analysis in progress (May 94).

Journal papers NIM A262 (1987) 243, IEEE TNS 35 (1988) 432, EPL 6 (1988) 131, ZPHY C38 (1988) 15, ZPHY C38 (1988) 59, ZPHY C38 (1988) 73, ZPHY C38 (1988) 85, ZPHY C38 (1988) 383, ZPHY C38 (1988) 397, PL B214 (1988) 295, NIM A283 (1989) 762, PL B252 (1990) 303, ZPHY C46 (1990) 361, ZPHY C46 (1990) 369, NP B333 (1990) 48, NP B342 (1990) 279, ZPHY C49 (1991) 355, ZPHY C52 (1991) 219, NP B353 (1991) 1, ZPHY C53 (1992) 183, and ZPHY C58 (1993) 239.

Related experiments CERN-NA-034, CERN-NA-034-3

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CERN-NA-034-3

(Proposed 1988, Approved Nov 1988, Began data-taking Jun 1990, Completed data-taking Aug 1990)

MEASUREMENT OF LOW MASS MUON PAIRS IN SULPHUR–NUCLEUS COLLISIONS WITH AN OPTIMIZED HELIOS MUON SPECTROMETER

HELIOS COLLABORATION

BARI U & INFN, BARI – G Catanesi, M Gallio, M T Muciaccia, S Simone
CERN – A L S Angelis, H Beker, S Dagan, M Esten, C W Fabjan, U Goerlach, G Poulard
KOSICE, IEF – J Antos, I Kralik, L Sandor, J Urban
MONTREAL U – M Beaulieu, L A Hamel, J P Martin, P Taras
MOSCOW PHYS ENG INST – B Dolgoshein, S Smirnov
LEBEDEV INST – S Konovolov, S Muraviev, A Shmeleva
ROME U & INFN, ROME – S Di Liberto, M A Mazzoni, F Meddi, G Rosa
SACLAY – J Bystricky, C Guerra, G W London (Spokesperson)
TURIN U & INFN, TURIN – P Cerello, G Dellacasa, P Giubellino, F Martelli, M Masera, L Ramello, L Riccati, E Scomparin, E Vercellin

Accelerator CERN-SPS *Detector* HELIOS

Reactions

Su Wt → μ^+ μ^- X	200 GeV/c (P_{lab}/N)
Su Wt → μ^+ μ^- X	"

Brief description Measures the low-mass dimuon continuum and production of vector resonances in order to test the possible formation of a quark–gluon plasma in heavy ion collisions. Uses the HELIOS muon spectrometer in combination with a light absorber and silicon ring detectors. Data analysis in progress (May 94).

Related experiments CERN-NA-034, CERN-NA-034-2

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CERN-NA-035

(Proposed 1982, Approved Feb 1983, Nov 1984, Began data-taking 1986, Completed data-taking May 1992)

STUDY OF RELATIVISTIC NUCLEUS–NUCLEUS COLLISIONS

NA35 COLLABORATION

ATHENS U – A Panagiotou, A Petridis, G Vasileiadis, M Vassiliou
BARI U – E Nappi, F Posa
CRACOW – J Bartke, E Gladysz, M Kowalski, P Stefanski
DARMSTADT, GSI – R Bock, R Brockmann, P Buncic, B Fleischmann, P Foka, M Fuchs, A Sandoval, M Wensveen
FRANKFURT U – H Appelshaeuser, D Brinkmann, B Eberlein, J Eschke, D Ferenc, M Gazdzicki, J Guenter, S Kabana, A Kuehmichel, J Y Lee, R Renfordt, D Roehrich, G Roland, H Rothard, R Sendelbach, R Stock, H Stroebele, S Wenig
FREIBURG U – J Baechler, M Hoffmann, K Runge, E Schmoetten
LBL – M Bloomer, S Chase, J Harris, P Jacobs, P Jones, S Margetis, J T Mitchell, R Morse, G Odyniec, A Poskanzer, G Rai, J Schambach, L Teitelbaum
MARBURG U – F Eckhardt, G Jin, A Piper, F Puehlhofer
MUNICH, MAX PLANCK INST – T Alber, I Derado, V Eckardt, H Fessler, K Kadija, W Rauch, N Schmitz, J Seyboth, P Seyboth (√ Spokesperson), J Seyerlein
WARSAW, INST NUCL STUDIES – H Bialkowska
WARSAW U, IEP – J Kosiec, W Retyk, E Skrzypczak
WASHINGTON U, SEATTLE – W Braithwaite, J G Cramer, T A Trainor, X Z Zhu
BOSKOVIC INST, ZAGREB – A Ljubičić, G Paić, D Vranić

Accelerator CERN-SPS *Detector* Streamer chamber, TPC, Calorimeter

Reactions

p nucleus	200 GeV (T_{lab})
deut nucleus	"
^{16}O nucleus	60, 200 GeV (T_{lab}/N)
^{32}S nucleus	200 GeV (T_{lab}/N)

Particles studied chgd-hadrons, K^+, K^0, Λ, $\overline{\Lambda}$

Brief description Determines for each event the charged-particle multiplicity, the proton and pion rapidity distributions, the charged pion transverse momentum distribution, the charged particle momentum correlations, the energy flow, and strange-particle production. Studies the stopping power of nuclear

matter with different nuclear targets (C, S, Cu, Ag, Au), and searches for evidence of formation of quark matter or quark–gluon plasma.

Journal papers PL B184 (1987) 271, NP A461 (1987) 465c, PL B203 (1988) 320, PL B205 (1988) 583, ZPHY C38 (1988) 19, ZPHY C38 (1988) 79, ZPHY C38 (1988) 89, ZPHY C38 (1988) 125, ZPHY C43 (1989) 25, ZPHY C48 (1990) 191, NP A525 (1991) 59c, NP A525 (1991) 221c, NP A525 (1991) 327c, NP A525 (1991) 689c, ZPHY C51 (1991) 157, ZPHY C52 (1991) 239, NP A544 (1992) 293c, NP A544 (1992) 531c, NP A544 (1992) 609c, NP A545 (1992) 321c, ZPHY C56 (1992) 347, ZPHY C57 (1993) 541, ZPHY C58 (1993) 367, PRL 72 (1994) 1419, NP A566 (1994) 35c, NP A566 (1994) 415c, NP A566 (1994) 503c, NP A566 (1994) 527c, and ZPHY C61 (1994) 551.

Related experiments CERN-NA-005, CERN-NA-049

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WWW Home-page http://hpna49-1.cern.ch/na35.html

CERN-NA-036

(Proposed Feb 1984, Approved Nov 1984, Completed data-taking Aug 1990)

THE PRODUCTION OF STRANGE BARYONS AND ANTIBARYONS IN RELATIVISTIC ION COLLISIONS

NA36 COLLABORATION

BERGEN U – E Andersen, G Lovhoiden, T F Thorsteinsen
BIRMINGHAM U – E Judd, J M Nelson, R Zybert
CERN – J P M Kuipers, B Powell
CRACOW – Z Natkaniec, K Wozniak
CREIGHTON U – M Cherny, I Sakrejda
LBL – D E Greiner (√ Spokesperson), C R Gruhn, P G Jones
MADRID, CIEMAT – B de la Cruz, P Ladron de Guevara, C Perez de los Heros
SANTIAGO DE COMPOSTELA U – C Fernandez, C Garabatos, J Garzon, J Mosquera, M Plo, A Ramil, A Yanez
STRASBOURG, CRN – R Blaes, J M Brom, W M Geist, M Hafidouni, M Ladrem, C Voltolini
VIENNA, OAW – J Hrubec, J McNaughton, G Neuhofer, P Porth, H Rohringer, J Traxler

Accelerator CERN-SPS *Detector* TPC, Wire chamber, Calorimeter

Reactions

^{32}S nucleus → Λ X	200 GeV/c (P_{lab}/N)
^{32}S nucleus → $\overline{\Lambda}$ X	"
^{32}S nucleus → Ξ^- X	"
^{32}S nucleus → $\overline{\Xi}^+$ X	"
^{32}S nucleus → K_S X	"

Particles studied Λ, $\overline{\Lambda}$, Ξ^-, $\overline{\Xi}^+$

Brief description Measures differential cross sections of K^0's and strange baryons and antibaryons, and searches for possible indications of the quark–gluon plasma. Targets are S and Pb. Data analysis in progress (May 94).

Journal papers NP A461 (1987) 391c, PL B206 (1988) 146, PL B220 (1989) 328, NIM A301 (1991) 69, NIM A320 (1992) 300, PL B294 (1992) 127, PR C46 (1992) 727, PL B316 (1993) 603, NP A553 (1993) 817c, NP A566 (1994) 217c, and PL B327 (1994) 433.

Related experiments CERN-NA-035, CERN-NA-049, CERN-WA-085, CERN-WA-094

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CERN-NA-037

(Proposed Feb 1985, Approved Jun 1985, Began data-taking May 1986, Completed data-taking Dec 1989)

DETAILED MEASUREMENTS OF STRUCTURE FUNCTIONS FROM NUCLEONS AND NUCLEI

NMC COLLABORATION

NIKHEF, AMSTERDAM – M de Jong, M Ballintijn, J Beaufays, T Ketel, J Oberski, R van Dantzig, M van der Heijden, G van Middelkoop (√ Spokesperson)
BIELEFELD U – G Baum, F Sever, M Siebler
FREIBURG U – A Bruell, H Engelin, R Kaiser, U Landgraf, A Witzmann
HEIDELBERG, MAX PLANCK INST – I G Bird, W Brueckner, U Gaul, Y Mizuno, D Nowotny, B Povh, K Rith, C Scholz, T A Shibata, A Simon, Y Tzamouranis, F Zetsche
MAINZ U, INST PHYS – D von Harrach, E Kabuss, F Klein, G Mallot, R Rieger, K Rohrich, R Seitz, T Walcher
MONS U – R Windmolders
NEUCHATEL U – C Broggini, L D Fluri, A Paić, J L Vuilleumier
DAPNIA, SACLAY – T Granier, A Milsztajn, M Virchaux
UC, SANTA CRUZ – C Heusch
PSI, VILLIGEN – M Botje, W Burger, Q Ingram
TURIN U & INFN, TURIN – M Arneodo, M I Ferrero, C Mariotti, C Peroni-Predazzi, A Staiano
UPPSALA U – A Arvidson, B Badelek, P Bjorkholm, A Dyring, K Janson, S Kullander, T Lindqvist
WARSAW U, IEP – J Ciborowski, J Nassalski, E Rondio, L Ropelewski, A Sandacz

Accelerator CERN-SPS *Detector* EMC

Reactions

muon p	90, 120, 280 GeV/c
muon deut	"
muon nucleus	90, 120, 200, 280 GeV/c

Brief description Studies the deep inelastic muon scattering for Q^2 from 1 to 200 (GeV/c)^2 and x from 0.005 to 0.75. Investigates the structure function F_2^A on hydrogen, deuterium, and heavier nuclei, the ratio $R = \sigma_L/\sigma_T$, the cross section for J/ψ production, the EMC effect, *etc.* Uses the modified EMC detector.

Journal papers PL B249 (1990) 366, PL B258 (1991) 493, PRL 66 (1991) 2712, ZPHY C51 (1991) 387, PL B294 (1992) 120, PL B295 (1992) 159, NP B371 (1992) 3, NP B371 (1992) 553, ZPHY C53 (1992) 73, ZPHY C54 (1992) 239, PL B309 (1993) 222, and PR D50 (1994) 1.

Related experiments CERN-NA-002, CERN-NA-009, CERN-NA-028, CERN-NA-047

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CERN-NA-038

(Proposed Mar 1985, Approved Sep 1985, Feb 1989, Completed data-taking May 1992)

STUDY OF HIGH-ENERGY NUCLEUS–NUCLEUS INTERACTIONS WITH THE ENLARGED NA10 DIMUON SPECTROMETER

ANNECY – C Baglin, A Bussiere, J P Guillaud, R Kossakowski, P Liaud, B Ronceux
CERN – P Sonderegger
CLERMONT-FERRAND U – A Baldit, C Barriere, J Castor, T Chambon, A Devaux, B Espagnon, J Fargeix, P Force, G Landaud, L Luquin, P Saturnini, F Vazeille
LISBON, LIFEP – M C Abreu, P Bordalo, R Ferreira, J M Gago, J Guimaraes, C Lourenco, S Ramos, S Silva, J Varela
LYON, IPN – M Bedjidian, D Contardo, E Descroix, O Drapier, J Y Grossiord, A Guichard, R Haroutunian, M Jacquin, F Malek, R Mandry, J R Pizzi
ORSAY, IPN – C Gerschel, D Jouan, S Papillon, X Tarrago
ECOLE POLYTECHNIQUE – A Borhani, P Busson, C Charlot, B Chaurand, L Kluberg (√ Spokesperson), A Romana, R Salmeron
STRASBOURG, CRN – P Gorodetzky, B Grosdidier, R Mazini, C Racca

Accelerator CERN-SPS *Detector* Spectrometer

Reactions

p ^{238}U → μ^+ μ^- X	200 GeV/c (P_{lab}/N)
^{16}O ^{238}U → μ^+ μ^- X	"

^{32}S $^{238}U \rightarrow \mu^+ \mu^- X$ "

Brief description Aims to detect evidence for the quark–gluon plasma produced in collisions of ultrarelativistic ions on heavy nuclear targets. Signatures studied are thermal muon pairs in the 1–3 GeV/c^2 mass range, suppressed J/ψ production, and enhanced ϕ and ω production.

Journal papers ZPHY C38 (1988) 117, ZPHY C38 (1988) 129, PL B220 (1989) 471, NP A498 (1989) 249, PL B251 (1990) 465, PL B251 (1990) 472, PL B255 (1991) 459, PL B262 (1991) 362, PL B268 (1991) 453, PL B270 (1991) 105, PL B272 (1991) 449, NP A525 (1991) 449, NP A525 (1991) 465, NP A525 (1991) 469, NP A525 (1991) 665, NP A544 (1992) 209, ZPHY C55 (1992) 365, NP A566 (1994) 77, and NP A566 (1994) 371.

Related experiments CERN-NA-010, CERN-NA-050

E-mail contact kluberg@cernvm.cern.ch

WWW Home-page http://lyoinfo.in2p3.fr/eiexp/na38.html

CERN-NA-042

(Proposed Jul 1986, Approved Oct 1986, Completed data-taking May 1988)

STUDY OF UNEXPLAINED HARD PHOTON PRODUCTION BY ELECTRONS CHANNELED IN A CRYSTAL

ANNECY – G Bologna, J-P Peigneux, D Sillou, M Spighel
LYON, IPN – X Artru, A Belkacem, M Chevallier, N Cue, M J Gaillard, R Genre, R Kirsch, J C Poizat, J Remillieux (Spokesperson)
SUNY, ALBANY – N Cue, J C Kimball, B Marsh

Accelerator CERN-SPS *Detector* Counter, Calorimeter

Reactions

$e^{\pm}$ crystal $\rightarrow \gamma$(s) $e^{\pm}$ crystal	20–200 GeV/c

Brief description Continues studies of CERN-NA-033. Devoted to the systematic study of radiation spectra and associated photon multiplicities for axially aligned e^- and e^+ between 20 and 200 GeV in very thin (75–200 μm) targets.

Journal papers PL B206 (1988) 561.

Related experiments CERN-NA-033

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CERN-NA-043

(Proposed Sep 1987, Approved Feb 1988, Began data-taking 1989, Completed data-taking Sep 1991)

INVESTIGATIONS OF THE ENERGY AND ANGULAR DEPENDENCE OF ULTRASHORT RADIATION LENGTHS IN Si, Ge, AND W SINGLE CRYSTALS

AARHUS U – K Elsener, R Medenwaldt, S P Moller, A H Sorensen, S Tang-Petersen, E Uggerhoj (Spokesperson)
STRASBOURG, CRN – P Siffert, J Stoqkurt
STUTTGART, MAX PLANCK INST – K Maier
FLORENCE U – P Sona

Accelerator CERN-SPS *Detector* Calorimeter

Reactions

e^- crystal	> 30 GeV/c
e^+ crystal	"

Brief description Following on CERN experiments NA-033 and WA-081, this experiment investigates the shower development in Si, Ge, and W crystals of different thickness for energies 30 GeV and up. The earlier experiments found remarkable enhancements in radiation energy loss for energetic $e^{\pm}$ incident along crystal axes.

Journal papers PL B227 (1989) 483, PRL 63 (1989) 2827, PL B242 (1990) 517, and PL B260 (1991) 235.

Related experiments CERN-NA-033, CERN-NA-043-2, CERN-WA-081

CERN-NA-043-2

(Proposed 1991, Approved Feb 1991, Began data-taking In progress)

INVESTIGATIONS OF THE COHERENT HARI PHOTON YIELDS FROM 50–300 GeV/c $e^{\pm}$ IN CRYSTALLINE FIELDS OF DIAMOND, Si, ANI CRYSTALS

AARHUS U – R Medenwaldt, S P Moller, A H Sorenser E Uggerhoj (Spokesperson), T Worm
YEREVAN PHYS INST – R O Avakian, H I Avetisian, S P Taroian
FLORENCE U & INFN, FLORENCE – P Sona
WITWATERSRAND U – S H Connell, J P F Sellschop
STRASBOURG, CRN – M Hage-Ali, P Siffert, J P Stoc

Accelerator CERN-SPS *Detector* Drift chamber, Spe

Reactions

e^- crystal	50 – 300 GeV/c (P_{lab})
e^+ crystal	"

Brief description The aim is to measure the influence fields on emission of coherent radiation. Multi-GeV e and positrons penetrate single crystals near axial/pla directions. Taking data (May 94).

Journal papers PL B281 (1992) 153.

Related experiments CERN-NA-043

CERN-NA-044

(Proposed Oct 1988, Approved Feb 1989, Began data-t In progress)

A FOCUSSING SPECTROMETER FOR ONE A PARTICLES

BROOKHAVEN – V Polychronakos
CERN – K Bussmann, G Di Tore, C W Fabjan, A Fran B Holzer, F Piuz, G Poulard, J M Rieubland, H Scho K Shigaki, D Williams
COLUMBIA U – J R Dodd, S K Kasow, M Leltchouk, A Medvedev, S Nagamiya, M Potekhin, J L Scanlin,
BOHR INST – H Boggild (✓ Spokesperson), K Hansen
CREIGHTON U – M Cherney, E Noteboom
HIROSHIMA U – S Esumi, N Maeda, N Matsumoto, S A Sakaguchi, T Sugitate, Y Sumi
KEK – T Kobayashi
LOS ALAMOS – J Boissevain, D Fields, B V Jacak, M J Simon-Gillo, W Sondheim, J P Sullivan, H van Hec
LUND U – B Lorstad, A Miyabayaski
NANTES U – G Paić
OHIO STATE U – T J Humanic, S U Pandey, G Vilkeli
PITTSBURGH U – R Jayanti, H Kalechofsky, Y Y Lee
TBILISI STATE U – R Kvatadze
TEXAS A AND M – M Murray, K Wolf
TSUKUBA U – Y Miake
BOSKOVIC INST, ZAGREB – D Rendić

Accelerator CERN-SPS *Detector* Spectrometer

Reactions

p Be $\rightarrow \pi^{\pm}$ X	450 GeV (T_{lab})
p Be $\rightarrow K^{\pm}$ X	"
p Be $\rightarrow p$ X	"
p Be $\rightarrow \overline{p}$ X	"
p Su $\rightarrow \pi^{\pm}$ X	"
p Su $\rightarrow K^{\pm}$ X	"
p Su $\rightarrow p$ X	"
p Su $\rightarrow \overline{p}$ X	"
p Pb $\rightarrow \pi^{\pm}$ X	"
p Pb $\rightarrow K^{\pm}$ X	"
p Pb $\rightarrow p$ X	"
p Pb $\rightarrow \overline{p}$ X	"

Su Su → π^+ π^+ X	200 GeV (T_{lab}/N)
Su Su → π^- π^- X	"
Su Su → K^+ K^+ X	"
Su Su → K^- K^- X	"
Su Su → p p X	"
Su Su → $\overline{p}$ $\overline{p}$ X	"
Su Ag → π^+ π^+ X	"
Su Ag → π^- π^- X	"
Su Ag → K^+ K^+ X	"
Su Ag → K^- K^- X	"
Su Ag → p p X	"
Su Ag → $\overline{p}$ $\overline{p}$ X	"
Su Pb → π^+ π^+ X	"
Su Pb → π^- π^- X	"
Su Pb → K^+ K^+ X	"
Su Pb → K^- K^- X	"
Su Pb → p p X	"
Su Pb → $\overline{p}$ $\overline{p}$ X	"
Pb Pb → π^+ π^+ X	160 GeV (T_{lab}/N)
Pb Pb → π^- π^- X	"
Pb Pb → K^+ K^+ X	"
Pb Pb → K^- K^- X	"
Pb Pb → p p X	"
Pb Pb → $\overline{p}$ $\overline{p}$ X	"

Brief description A dedicated spectrometer for high precision measurements of single particle spectra and for intensity interferometry in hadronic systems of high energy density using hadrons and heavy ions. Taking data (May 94).

Journal papers NIM A287 (1990) 389, PL B302 (1993) 510 [erratum: PL B306 (1993) 418], NP A566 (1994) 115c, and NP A566 (1994) 515c.

Related experiments BNL-802, BNL-859, CERN-NA-035

E-mail contact boggild@nbivax.nbi.dk

WWW Home-page http://www.cern.ch/NA44/Welcome.html

CERN-NA-045

(Proposed Jun 1988, Approved Feb 1989, Began data-taking Apr 1992, In progress)

STUDY OF ELECTRON PAIR PRODUCTION IN HADRON AND NUCLEAR COLLISIONS AT THE CERN SPS

CERES COLLABORATION

BROOKHAVEN – P Holl, J Kemmer, H Kraner, P Rehak
CERN – J Schukraft
DARMSTADT, GSI – R Averbeck, R Holzmann, A Schubert, R S Simon
DUBNA – G Agakichiev, Y Minaev, Y Panebrattsev, S Razin, S Shimanskiy, V Yurevich
GANIL – M Marques, T Matulewicz, R Ostendorf, Y Schutz
GIESSEN U – M Appenheimer, A Brenschede, M Franke, W Kuehn, V Metag, M Notheisen, R Novotny, H Stroeher
GRONINGEN U – H Loehner, J V Pol, H Wilschut
HEIDELBERG, MAX PLANCK INST – U Faschingbauer, C Fuchs, M Hemberger, F Hess, C Jacob, J P Wurm
HEIDELBERG U, PHYS INST – R Baur, A Drees, P Fischer, J Frieben, P Glaessel, T Guenzel, D Irmscher, B Lenkeit, R Maenner, L H Olsen, A Pfeiffer, A Schoen, H J Specht, S Tapprogge, T S Ullrich, K Vogt
MILAN POLYTECHNIC – E Gatti, A Longoni, M Sampietro
VALENCIA U – J Diaz, J L Ferrero, A Marin, G Martinez, J C Pachelo, J A Ruiz
WEIZMANN INST – A Breskin, R Chechik, C De Los Heros, Z Fraenkel, I Ravinovich, E Socol, V Steiner, G Tel-Zur, I Tserruya (✓ Spokesperson)

Accelerator CERN-SPS *Detector* Spectrometer, Drift chamber, Calorimeter

Reactions

p nucleus → e^+ e^- X	450 GeV/c (P_{lab}/N)
p nucleus → e^+ e^- γ	"
^{32}S nucleus → e^+ e^- X	200 GeV/c (P_{lab}/N)

Particles studied ρ, ω, ϕ, η, η'

Brief description Studies the e^+e^- pair continuum in the mass range 0.1–2 GeV/c^2, and vector mesons ρ/ω and ϕ. The spectrometer covers the rapidity range y = 2.0–2.6 . The apparatus also allows a high-statistics study of real photons and high-$p_\perp$ pions. Uses a magnetic spectrometer based solely on ring-imaging Čerenkov (RICH) techniques and silicon radial-drift chambers. The TAPS calorimeter, added in 1993, consists of BaF_2 crystals and covers the rapidity interval y = 3.1–4.0 . Targets are Be, Pt, and Au. Taking data (May 94).

Journal papers IEEE TNS 35 (1988) 404, IEEE TNS 35 (1988) 432, NIM A273 (1988) 798, IEEE TNS 37 (1990) 241, IEEE TNS 39 (1992) 619, NIM A316 (1992) 259, NIM A326 (1993) 273, NIM A343 (1994) 87, NIM A343 (1994) 231, NP A566 (1994) 347c, and PL B (to be published).

Related experiments CERN-NA-034, CERN-NA-034-3

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CERN-NA-046

(Proposed Oct 1988, Approved Apr 1989, Completed data-taking Jul 1991)

DARMSTADTON HUNTING IN THE INTERACTION γ–CRYSTAL

ANNECY – G Bassompierre, D Boget, J Dufournaud, M Gouanere, M Richard, D Sillou, M Spighel
LYON, IPN – M A Chevallier (Spokesperson), B Farizon-Mazuy, M Farizon, M J Gaillard, R Genre, B Ille, R Kirsch, P Lautesse
TURIN U & INFN, TURIN – G Bologna, E Botta, S Costa, A Feliciello, R Garfagnini, E Rossetta

Accelerator CERN-SPS *Detector* Calorimeter, Microstrip

Reactions

γ crystal → e^+ e^- X	—

Particles studied axion, neutral

Brief description A search for evidence of the 'darmstadton' at 1.8 MeV/c^2 mass in the e^+e^- spectrum. The γ beam is obtained from a 150 GeV electron beam. The angular measurements are performed by a microstrip detector at a large distance ($\simeq$ 80 m) from the target. Energy measurements are done by magnetic analysis and independently with lead glass calorimeters.

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CERN-NA-047

(Proposed Dec 1988, Approved Apr 1989, Began data-taking Aug 1991, In progress)

MEASUREMENT OF THE SPIN-DEPENDENT STRUCTURE FUNCTIONS OF THE NEUTRON AND PROTON

SPIN MUON COLLABORATION (SMC)

NIKHEF, AMSTERDAM & AMSTERDAM, VRIJE U & FOM, AMSTERDAM – N De Groot, T J Ketel, L Klostermann, M Litmaath, J E J Oberski, H Postma, E P Sichtermann, R Van Dantzig, G Van Middelkoop
BIELEFELD U – G Baum, S Bueltmann, D Kraemer
CERN – P Hautle, J Kyynarainen, L Naumann, T O Niinikoski, R Piegaia, S Rock, Y Semertzidis, U Stiegler, R Voss
DUBNA – A Karev, Y Kisselev, V Krivokhijine, V Kukhtin, K Medved, A Nagajcev, D Peshekhonov, D Pose, I Savin, G Smirnov
FREIBURG U – H J Kessler, U Landgraf, A Witzmann
GKSS, GEESTHACHT – H Stuhrmann, R Willumeit, J Zhao
HELSINKI U – P Berglund

^{32}S $^{238}U \rightarrow \mu^+ \mu^-$ X "

Brief description Aims to detect evidence for the quark–gluon plasma produced in collisions of ultrarelativistic ions on heavy nuclear targets. Signatures studied are thermal muon pairs in the 1–3 GeV/c^2 mass range, suppressed J/ψ production, and enhanced ϕ and ω production.

Journal papers ZPHY C38 (1988) 117, ZPHY C38 (1988) 129, PL B220 (1989) 471, NP A498 (1989) 249, PL B251 (1990) 465, PL B251 (1990) 472, PL B255 (1991) 459, PL B262 (1991) 362, PL B268 (1991) 453, PL B270 (1991) 105, PL B272 (1991) 449, NP A525 (1991) 449, NP A525 (1991) 465, NP A525 (1991) 469, NP A525 (1991) 665, NP A544 (1992) 209, ZPHY C55 (1992) 365, NP A566 (1994) 77, and NP A566 (1994) 371.

Related experiments CERN-NA-010, CERN-NA-050

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WWW Home-page http://lyoinfo.in2p3.fr/eiexp/na38.html

CERN-NA-042

(Proposed Jul 1986, Approved Oct 1986, Completed data-taking May 1988)

STUDY OF UNEXPLAINED HARD PHOTON PRODUCTION BY ELECTRONS CHANNELED IN A CRYSTAL

ANNECY – G Bologna, J-P Peigneux, D Sillou, M Spighel
LYON, IPN – X Artru, A Belkacem, M Chevallier, N Cue, M J Gaillard, R Genre, R Kirsch, J C Poizat, J Remillieux (Spokesperson)
SUNY, ALBANY – N Cue, J C Kimball, B Marsh

Accelerator CERN-SPS *Detector* Counter, Calorimeter

Reactions

$e^{\pm}$ crystal $\rightarrow \gamma$(s) $e^{\pm}$ crystal	20–200 GeV/c

Brief description Continues studies of CERN-NA-033. Devoted to the systematic study of radiation spectra and associated photon multiplicities for axially aligned e^- and e^+ between 20 and 200 GeV in very thin (75–200 μm) targets.

Journal papers PL B206 (1988) 561.

Related experiments CERN-NA-033

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CERN-NA-043

(Proposed Sep 1987, Approved Feb 1988, Began data-taking 1989, Completed data-taking Sep 1991)

INVESTIGATIONS OF THE ENERGY AND ANGULAR DEPENDENCE OF ULTRASHORT RADIATION LENGTHS IN Si, Ge, AND W SINGLE CRYSTALS

AARHUS U – K Elsener, R Medenwaldt, S P Moller, A H Sorensen, S Tang-Petersen, E Uggerhoj (Spokesperson)
STRASBOURG, CRN – P Siffert, J Stoqkurt
STUTTGART, MAX PLANCK INST – K Maier
FLORENCE U – P Sona

Accelerator CERN-SPS *Detector* Calorimeter

Reactions

e^- crystal	> 30 GeV/c
e^+ crystal	"

Brief description Following on CERN experiments NA-033 and WA-081, this experiment investigates the shower development in Si, Ge, and W crystals of different thickness for energies 30 GeV and up. The earlier experiments found remarkable enhancements in radiation energy loss for energetic $e^{\pm}$ incident along crystal axes.

Journal papers PL B227 (1989) 483, PRL 63 (1989) 2827, PL B242 (1990) 517, and PL B260 (1991) 235.

Related experiments CERN-NA-033, CERN-NA-043-2, CERN-WA-081

CERN-NA-043-2

(Proposed 1991, Approved Feb 1991, Began data-taking 1991, In progress)

INVESTIGATIONS OF THE COHERENT HARD PHOTON YIELDS FROM 50–300 GeV/c $e^{\pm}$ IN STRONG CRYSTALLINE FIELDS OF DIAMOND, Si, AND Ge CRYSTALS

AARHUS U – R Medenwaldt, S P Moller, A H Sorensen, E Uggerhoj (Spokesperson), T Worm
YEREVAN PHYS INST – R O Avakian, H I Avetisian, S P Taroian
FLORENCE U & INFN, FLORENCE – P Sona
WITWATERSRAND U – S H Connell, J P F Sellschop
STRASBOURG, CRN – M Hage-Ali, P Siffert, J P Stoquert

Accelerator CERN-SPS *Detector* Drift chamber, Spectrometer

Reactions

e^- crystal	50 – 300 GeV/c (P_{lab})
e^+ crystal	"

Brief description The aim is to measure the influence of strong fields on emission of coherent radiation. Multi–GeV electrons and positrons penetrate single crystals near axial/planar directions. Taking data (May 94).

Journal papers PL B281 (1992) 153.

Related experiments CERN-NA-043

CERN-NA-044

(Proposed Oct 1988, Approved Feb 1989, Began data-taking 1990, In progress)

A FOCUSSING SPECTROMETER FOR ONE AND TWO PARTICLES

BROOKHAVEN – V Polychronakos
CERN – K Bussmann, G Di Tore, C W Fabjan, A Franz, B Holzer, F Piuz, G Poulard, J M Rieubland, H Schoellnberger, K Shigaki, D Williams
COLUMBIA U – J R Dodd, S K Kasow, M Leltchouk, A Medvedev, S Nagamiya, M Potekhin, J L Scanlin, W J Willis
BOHR INST – H Boggild (✓ Spokesperson), K Hansen
CREIGHTON U – M Cherney, E Noteboom
HIROSHIMA U – S Esumi, N Maeda, N Matsumoto, S Nishimura, A Sakaguchi, T Sugitate, Y Sumi
KEK – T Kobayashi
LOS ALAMOS – J Boissevain, D Fields, B V Jacak, M Sarabura, J Simon-Gillo, W Sondheim, J P Sullivan, H van Hecke
LUND U – B Lorstad, A Miyabayaski
NANTES U – G Paić
OHIO STATE U – T J Humanic, S U Pandey, G Vilkelis
PITTSBURGH U – R Jayanti, H Kalechofsky, Y Y Lee
TBILISI STATE U – R Kvatadze
TEXAS A AND M – M Murray, K Wolf
TSUKUBA U – Y Miake
BOSKOVIC INST, ZAGREB – D Rendić

Accelerator CERN-SPS *Detector* Spectrometer

Reactions

p Be $\rightarrow \pi^{\pm}$ X	450 GeV (T_{lab})
p Be $\rightarrow K^{\pm}$ X	"
p Be $\rightarrow p$ X	"
p Be $\rightarrow \bar{p}$ X	"
p Su $\rightarrow \pi^{\pm}$ X	"
p Su $\rightarrow K^{\pm}$ X	"
p Su $\rightarrow p$ X	"
p Su $\rightarrow \bar{p}$ X	"
p Pb $\rightarrow \pi^{\pm}$ X	"
p Pb $\rightarrow K^{\pm}$ X	"
p Pb $\rightarrow p$ X	"
p Pb $\rightarrow \bar{p}$ X	"

Su Su → π^+ π^+ X	200 GeV (T_{lab}/N)
Su Su → π^- π^- X	"
Su Su → K^+ K^+ X	"
Su Su → K^- K^- X	"
Su Su → p p X	"
Su Su → $\overline{p}$ $\overline{p}$ X	"
Su Ag → π^+ π^+ X	"
Su Ag → π^- π^- X	"
Su Ag → K^+ K^+ X	"
Su Ag → K^- K^- X	"
Su Ag → p p X	"
Su Ag → $\overline{p}$ $\overline{p}$ X	"
Su Pb → π^+ π^+ X	"
Su Pb → π^- π^- X	"
Su Pb → K^+ K^+ X	"
Su Pb → K^- K^- X	"
Su Pb → p p X	"
Su Pb → $\overline{p}$ $\overline{p}$ X	"
Pb Pb → π^+ π^+ X	160 GeV (T_{lab}/N)
Pb Pb → π^- π^- X	"
Pb Pb → K^+ K^+ X	"
Pb Pb → K^- K^- X	"
Pb Pb → p p X	"
Pb Pb → $\overline{p}$ $\overline{p}$ X	"

Brief description A dedicated spectrometer for high precision measurements of single particle spectra and for intensity interferometry in hadronic systems of high energy density using hadrons and heavy ions. Taking data (May 94).

Journal papers NIM A287 (1990) 389, PL B302 (1993) 510 [erratum: PL B306 (1993) 418], NP A566 (1994) 115c, and NP A566 (1994) 515c.

Related experiments BNL-802, BNL-859, CERN-NA-035

E-mail contact boggild@nbivax.nbi.dk

WWW Home-page http://www.cern.ch/NA44/Welcome.html

CERN-NA-045

(Proposed Jun 1988, Approved Feb 1989, Began data-taking Apr 1992, In progress)

STUDY OF ELECTRON PAIR PRODUCTION IN HADRON AND NUCLEAR COLLISIONS AT THE CERN SPS

CERES COLLABORATION

BROOKHAVEN – P Holl, J Kemmer, H Kraner, P Rehak
CERN – J Schukraft
DARMSTADT, GSI – R Averbeck, R Holzmann, A Schubert, R S Simon
DUBNA – G Agakichiev, Y Minaev, Y Panebrattsev, S Razin, S Shimanskiy, V Yurevich
GANIL – M Marques, T Matulewicz, R Ostendorf, Y Schutz
GIESSEN U – M Appenheimer, A Brenschede, M Franke, W Kuehn, V Metag, M Notheisen, R Novotny, H Stroeher
GRONINGEN U – H Loehner, J V Pol, H Wilschut
HEIDELBERG, MAX PLANCK INST – U Faschingbauer, C Fuchs, M Hemberger, F Hess, C Jacob, J P Wurm
HEIDELBERG U, PHYS INST – R Baur, A Drees, P Fischer, J Frieben, P Glaessel, T Guenzel, D Irmscher, B Lenkeit, R Maenner, L H Olsen, A Pfeiffer, A Schoen, H J Specht, S Tapprogge, T S Ullrich, K Vogt
MILAN POLYTECHNIC – E Gatti, A Longoni, M Sampietro
VALENCIA U – J Diaz, J L Ferrero, A Marin, G Martinez, J C Pachelo, J A Ruiz
WEIZMANN INST – A Breskin, R Chechik, C De Los Heros, Z Fraenkel, I Ravinovich, E Socol, V Steiner, G Tel-Zur, I Tserruya (√ Spokesperson)

Accelerator CERN-SPS *Detector* Spectrometer, Drift chamber, Calorimeter

Reactions

p nucleus → e^+ e^- X	450 GeV/c (P_{lab}/N)
p nucleus → e^+ e^- γ	"
^{32}S nucleus → e^+ e^- X	200 GeV/c (P_{lab}/N)

Particles studied ρ, ω, ϕ, η, η'

Brief description Studies the e^+e^- pair continuum in the mass range 0.1–2 GeV/c^2, and vector mesons ρ/ω and ϕ. The spectrometer covers the rapidity range y = 2.0–2.6 . The apparatus also allows a high-statistics study of real photons and high-$p_\perp$ pions. Uses a magnetic spectrometer based solely on ring-imaging Čerenkov (RICH) techniques and silicon radial-drift chambers. The TAPS calorimeter, added in 1993, consists of BaF_2 crystals and covers the rapidity interval y = 3.1–4.0 . Targets are Be, Pt, and Au. Taking data (May 94).

Journal papers IEEE TNS 35 (1988) 404, IEEE TNS 35 (1988) 432, NIM A273 (1988) 798, IEEE TNS 37 (1990) 241, IEEE TNS 39 (1992) 619, NIM A316 (1992) 259, NIM A326 (1993) 273, NIM A343 (1994) 87, NIM A343 (1994) 231, NP A566 (1994) 347c, and PL B (to be published).

Related experiments CERN-NA-034, CERN-NA-034-3

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CERN-NA-046

(Proposed Oct 1988, Approved Apr 1989, Completed data-taking Jul 1991)

DARMSTADTON HUNTING IN THE INTERACTION γ–CRYSTAL

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LYON, IPN – M A Chevallier (Spokesperson), B Farizon-Mazuy, M Farizon, M J Gaillard, R Genre, B Ille, R Kirsch, P Lautesse
TURIN U & INFN, TURIN – G Bologna, E Botta, S Costa, A Feliciello, R Garfagnini, E Rossetta

Accelerator CERN-SPS *Detector* Calorimeter, Microstrip

Reactions

γ crystal → e^+ e^- X	—

Particles studied axion, neutral

Brief description A search for evidence of the 'darmstadton' at 1.8 MeV/c^2 mass in the e^+e^- spectrum. The γ beam is obtained from a 150 GeV electron beam. The angular measurements are performed by a microstrip detector at a large distance ($\simeq$ 80 m) from the target. Energy measurements are done by magnetic analysis and independently with lead glass calorimeters.

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CERN-NA-047

(Proposed Dec 1988, Approved Apr 1989, Began data-taking Aug 1991, In progress)

MEASUREMENT OF THE SPIN-DEPENDENT STRUCTURE FUNCTIONS OF THE NEUTRON AND PROTON

SPIN MUON COLLABORATION (SMC)

NIKHEF, AMSTERDAM & AMSTERDAM, VRIJE U & FOM, AMSTERDAM – N De Groot, T J Ketel, L Klostermann, M Litmaath, J E J Oberski, H Postma, E P Sichtermann, R Van Dantzig, G Van Middelkoop
BIELEFELD U – G Baum, S Bueltmann, D Kraemer
CERN – P Hautle, J Kyynarainen, L Naumann, T O Niinikoski, R Piegaia, S Rock, Y Semertzidis, U Stiegler, R Voss
DUBNA – A Karev, Y Kisselev, V Krivokhijine, V Kukhtin, K Medved, A Nagajcev, D Peshekhonov, D Pose, I Savin, G Smirnov
FREIBURG U – H J Kessler, U Landgraf, A Witzmann
GKSS, GEESTHACHT – H Stuhrmann, R Willumeit, J Zhao
HELSINKI U – P Berglund

HOUSTON U – B Mayes, L Pinsky, J Pyrlik, R Weinstein
BOGAZICI U & CEKMECE NUCL RES CTR & ISTANBUL U & ISTANBUL, TECH U – E Arik, T Cuhadar, E Guelmez, C Ozben, I Reyhancan
UCLA – C Dulya, M Grosse-Perdekamp, G Igo, C Whitten
MAINZ U, INST KERNPHYS – D von Harrach, E M Kabuss, G K Mallot, J Pretz, A Steinmetz
MONS U – R Windmolders
MUNICH U – L Betev, A Staude, J Vogt
NAGOYA U – T Hasegawa, N Hayashi, N Horikawa, S Ishimoto, T Iwata, A Kishi, T Matsuda, K Mori, S Okumi
NORTHEASTERN U – J Moromisato, E von Goeler
NORTHWESTERN U – D Fasching, D Miller, R Segel, P Shanahan, M Velasco
RICE U – B E Bonner, J Cranshaw, S Eichblatt, T Gaussiran, M Lowe, J B Roberts
SACLAY – G Bardin, C Cavata, N de Botton, A de Lesquen, F Feinstein, B Frois, J M Le Goff, F Lehar, A Magnon, F Marie, J Martino, F Perrot-Kunne, S Platchkov, T Pussieux
UC, SANTA CRUZ – C A Heusch, W Kroeger
SANTIAGO DE COMPOSTELA U – B Adeva, C Fernandez, J A Garzon, A Gomez, G Gracia, S Lopez-Ponte, C A Perez, M Plo, M Rodriquez, J Saborido
SOLTAN INST, SWIERK – B Badelek, J Nassalski, E Rondio, A Sandacz, M Szleper, W Wislicki
TEL AVIV U – J Lichtenstadt, I Sabo
TRIESTE U & INFN, TRIESTE – R Birsa, F Bradamante, A Bressan, M Clocchiatti, S Dalla Torre, M Giorgi, M Lamanna, A Martin, A Penzo, P Schiavon, F Tessarotto, A Zanetti
UPPSALA U – A Arvidson, P Bjorkholm, A Dyring
VIRGINIA U – D Crabb, J McCarthy
YALE U – S Dhawan, V W Hughes (√ Spokesperson)

Accelerator CERN-SPS *Detector* EMC

Reactions Polarized beam and target

muon $p \rightarrow$ muon X	100 – 200 GeV (E_{lab})
muon deut $\rightarrow$ muon X	"

Brief description Measures the spin-dependent asymmetries A_1 and A_2 in deep inelastic scattering of longitudinally polarized muons by longitudinally and transversely polarized protons and deuterons. It is similar to the EMC polarization experiment. Tests the nucleon spin structure and Ellis-Jaffe and Bjorken sum rules. Taking data (May 94).

Journal papers PL B302 (1993) 533, NIM A343 (1994) 400, PL B320 (1994) 400, and PL B329 (1994) 399.

Related experiments CERN-NA-002, CERN-NA-009, CERN-NA-028, CERN-NA-037

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WWW Home-page http://na47sun05.cern.ch/welcome.html

CERN-NA-048

(Proposed Jul 1990, Approved Nov 1991, In preparation)

A PRECISION MEASUREMENT OF ϵ'/ϵ IN CP-VIOLATING $K^0 \rightarrow 2\pi$ DECAYS

CAGLIARI U & INFN, CAGLIARI – V Fanti, A Lai, L Musa, A Nappi, P Randaccio, M G Setzu
CAMBRIDGE U – P A Elcombe, A Iwi, S Katvars, M Mandelkeen, R Moore, D J Munday, A Parker, T O White
CERN – G D Barr, P Buchholz, D Cundy, N Doble, G Dubail, F Formenti, W Funk, L Gatignon, A Gonidec, P Grafstroem, B Hallgren, P Kapusta, G Kesseler, A Lacourt, G Laverriere, G Linser, M Martini, M Mast, A Norton, P Ponting, D Schinzel, W Seidl, H Taureg, P Vande Vyvre, O Vossnack, H Wahl, P Wertelaers, J Weterings, M Ziolkowski
DUBNA – A M Kalinin, M N Kapishin, V D Kekelidze, D A Kirillov, I A Kojevnikov, N A Kuz'min, Y K Potrebenikov
EDINBURGH U – L Bertolotto, O Boyle, B Hay, N McKay, K J Peach, E Veitch, L L J Vick, A Walker
FERRARA U & INFN, FERRARA – D Bettoni, R Calabrese, B Camanzi, P Dalpiaz, J Duclos, P Ferretti-Dalpiaz, P Frabetti, A Gianoli, V Guidi, E Luppi, F Petrucci, L Piemontese, F Rossi, M Savrie
MAINZ U – T Beier, H Bluemer, D Coward, C Ebersberger, K Kleinknecht, U Koch, F Leber, S Luiz, B Renk, J Schmidt, F Sheerer, J Staeck, A Wagner, O Zeitnitz
PERUGIA U & INFN, PERUGIA – F Bordacchini, M Calvetti (√ Spokesperson), P Cenci, A Del Rosso, P Lariccia, P Lubrano, M Pepe, M Punturo, C Talamonti
PISA U & INFN, PISA – L Bertanza, A Bigi, P Calafiura, R Carosi, C Cerri, F Costantini, R Fantechi, F Fidecaro, B Gorini, F Laico, I Mannelli, V Marzulli, G M Pierazzini, D Schiuma
SACLAY – S Anvar, D Bederede, F Bugeon, J B Cheze, M De Beer, P Debu, J L Fallou, A Givernaud, H Le Provost, F Louis, E Mazzucato, M Mur, B Peyaud (√ Spokesperson), S Schanne, G Tarte, R Turlay, B Vallage
SIEGEN U – I Augustin, M Bender, G Gillessen, M Holder, W Otto, M Roschangar, C Schmitz, B Schofer, R Werthenbach, S Winkler
TURIN U & INFN, TURIN – C Biino, A Ceccuci, R Cester, P Maas, F Marchetto, E Menichetti, R Mussa, S Palestini, N Pastrone, M Sozzi
VIENNA, OAW – H Dibon, M Markytan, I Mikulec, G Neuhofer, M Pernicka, A Taurok, C E Wulz

Accelerator CERN-SPS *Detector* Calorimeter, Spectrometer

Particles studied K_S, K_L

Brief description The goal is to measure $\mathrm{Re}(\epsilon'/\epsilon)$ with an accuracy of 2×10^{-4}. The experiment uses two nearly collinear K_S and K_L beams produced concurrently which are distinguished by tagging the protons generating the K_S component. The detector is optimized for the detection of $\pi^+\pi^-$ and $\pi^0\pi^0$ final states from neutral kaons with momenta between 70 and 170 GeV/c. Charged decays are measured in a magnetic spectrometer with a central dipole magnet and two sets of large and high-precision drift chambers on each side. Neutral decays are recorded in a homogeneous liquid krypton calorimeter designed for high rate capability, good energy and space resolution, and sub-nanosecond time resolution. This configuration permits collecting simultaneously all four modes with minimal systematic error. Other components of apparatus include a proton tagger, a hadron calorimeter, and muon veto counters. Uses the 450 GeV/c proton beam. In preparation. Scheduled to run in 1995/96.

Journal papers NIM A316 (1992) 1, and NIM A323 (1992) 393.

Related experiments CERN-PS-195, FNAL-832

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WWW Home-page http://www1.cern.ch/NA48/Welcome.html

CERN-NA-049

(Approved Sep 1991, In preparation)

LARGE ACCEPTANCE HADRON DETECTOR FOR AN INVESTIGATION OF Pb-INDUCED REACTIONS AT THE CERN SPS

ATHENS U – A Panagiotou, A Petridis, M Vassiliou
BIRMINGHAM U – S Clewer, J M Nelson, R Zybert
BUDAPEST, CRIP – L Boroczky, S Hegyi, I Szentpetery, J Sziklai, G Vesztergombi, J Zimanyi
CERN – H G Fischer, A Kuehmichel
CRACOW – J Bartke, E Gladysz, M Kowalski, P Stefanski
DARMSTADT, GSI – H Appelshaeuser, R Bock, R Brockmann, A Sandoval, D Vranić, M Wensveen
UC, DAVIS – P F Brady, D Cebra, J Draper, J Dunn, I Huang, J Mitchell, J Romero, L Wood
FRANKFURT U – J Baechler, C Bormann, D Brinkmann, J Eschke, D Ferenc, M Fuchs, M Gazdzicki, S Kabana, J Y Lee, R Renfordt, D Roehrich, H Rothard, R Stock (√ Spokesperson), H Stroebele, S Wenig
FREIBURG U – M Bonda, K Runge, E Schmoetten
LBL – F Bieser, M Bloomer, J Harris, P Jacobs, S Margetis, J T Mitchell, R Morse, G Odyniec, A Poskanzer, G Rai, H G Ritter, H Rudolph, J Schambach, C Scott, H Wieman
MARBURG U – F Eckhardt, G Jin, A Piper, F Puehlhofer

MUNICH, MAX PLANCK INST – T Alber, I Derado, V Eckardt, H Fessler, K Kadija, A Mock, W Rauch, N Schmitz, S Schoenfelder, J Seyboth, P Seyboth, J Seyerlein
WARSAW, INST NUCL STUDIES – H Bialkowska
WARSAW U – W Dominik, J Kosiec, W Retyk, E Skrzypczak
WASHINGTON U, SEATTLE – W J Braithwaite, J G Cramer, M A Howe, D J Prindle, R J Seymour, T A Trainor, X Z Zhu
BOSKOVIC INST, ZAGREB – G Paić

Accelerator CERN-SPS *Detector* TPC

Reactions

Pb nucleus —

Brief description A study of the production of charged hadrons $\pi^{\pm}, K^{\pm}, p, \bar{p}$, and neutral strange particles $K^0_S, \Lambda, \bar{\Lambda}$, in a search for the deconfinement transition predicted by lattice QCD. Uses a large volume, fine granularity TPC, and two intermediate size TPC's for vertex tracking of neutral strange particle decays. In preparation (May 94).

Journal papers IEEE TNS 41 (1994) 30.

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WWW Home-page http://hpna49-1.cern.ch/na49.html

CERN-NA-050

(Proposed Nov 1991, Approved Feb 1992, In preparation)

STUDY OF MUON PAIRS AND VECTOR MESONS PRODUCED IN HIGH ENERGY Pb Pb INTERACTIONS

DIMUONS COLLABORATION
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CAGLIARI U & INFN, CAGLIARI – A de Falco, C Cicalo, P Macciotta, A Masoni, G Puddu, S Serci, P Temnikov, G Usai
CERN – P Sonderegger (√ Spokesperson)
CLERMONT-FERRAND U – A Baldit, J Castor, T Chambon, A Devaux, B Espagnon, J Fargeix, P Force, G Landaud, L Luquin, P Saturnini
LISBON, LIFEP – M C Abreu, P Bordalo, J Gago, C Lourenco, S Ramos, S Silva, J Varela
LYON, IPN – M Bedjidian, B Cheynis, D Contardo, O Drapier, J Y Grossiord, A Guichard, R Haroutunian, F Malek, J R Pizzi
MOSCOW, INR – A Baldin, S N Filippov, Y K Gavrilov, M G Golubeva, F F Guber, T L Karavicheva, A B Kurepin, V D Laptev, A Nikitski, Y V Perepechkin, V Rasin, A I Reshetin, N S Topilskaya, A B Zhuravlev
ORSAY, IPN – C Gerschel, D Jouan, X Tarrago
ECOLE POLYTECHNIQUE – B Chaurand, L Kluberg (√ Spokesperson), R Mazini, A Romana
STRASBOURG, CRN – P Gorodetzky, C Racca
TURIN U & INFN, TURIN – B Alessandro, V Bisi, E Chiavassa, W Dabrowski, G Dellacasa, M Gallio, P Giubellino, P Guaita, A Marzari-Chieza, M Masera, A Musso, L Ramello, L Riccati, S Sartori, E Scomparin, E Vercellin

Accelerator CERN-SPS *Detector* Calorimeter, Spectrometer

Reactions

Pb nucleus → $\mu^+ \mu^-$ X 160 GeV (T_{lab}/N)

Particles studied muon

Brief description Studies dimuons produced in Pb–Pb and Pb–S collisions at the nucleon–nucleon $E_{c.m.}$ of 18 GeV. The setup is optimized for a mass range which includes signals probing QGP (Quark and Gluon Plasma), namely ϕ, J/ψ, ψ', and (unseparated) ρ and ω vector mesons. It also covers Drell-Yan dimuons which serve as a normalization. The detector is an improved version of the CERN-NA-038 setup, with neutral energy and multiplicity detectors following the target, the Zero Degrees quartz fiber hadron calorimeter (ZDC) embedded in the hadron dump, and a muon spectrometer following the dump. The first run is expected in November 94.

Related experiments CERN-NA-038

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WWW Home-page http://lyoinfo.in2p3.fr/eiexp/na50.html

CERN-NA-051

(Proposed Apr 1992, Approved Apr 1992, Began data-taking Jun 1992, Completed data-taking Jul 1992)

DRELL-YAN STUDY OF SEA ISOSPIN SYMMETRY

CERN – P Sonderegger
CLERMONT-FERRAND U – A Baldit, C Barriere, J Castor, T Chambon, A Devaux, B Espagnon, J Fargeix, P Force, G Landaud, P Saturnini, F Vazeille
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ORSAY, IPN – C Gerschel, D Jouan, X Tarrago
ECOLE POLYTECHNIQUE – B Chaurand, L Kluberg (√ Spokesperson), A Romana
STRASBOURG, CRN – P Gorodetzky, D Lazic, R Mazini, C Racca
TURIN U & INFN, TURIN – B Alessandro, E Chiavassa, G Dellacasa, M Gallio, P Giubellino, P Guaita, A Marzari-Chiesa, M Masera, M Monteno, A Musso, L Ramello, L Fe[illegible]ti, E Scomparin, E Vercellin
LYON, IPN – M Bedjidian, D Contardo, E Descroix, O Dra[illegible]er, J Y Grossiord, A Guichard, R Haroutunian, F Malek, R Mandry, J R Pizzi

Accelerator CERN-SPS *Detector* Spectrometer

Reactions

$p\,p \rightarrow \mu^+ \mu^-$ X 450 GeV/c (P_{lab})
p deut → $\mu^+ \mu^-$ X "

Brief description The purpose of the experiment is to study the isospin symmetry in the light-quark sea of the proton. Its violation is one possible explanation of recent unexpected muon deep inelastic scattering experimental results which disagree with the Gottfried sum rule. The experiment makes use of the large acceptance muon spectrometer used previously by CERN-NA-010 and CERN-NA-038. It detects muon pairs produced by the Drell–Yan mechanism in pp and pd reactions. A beam of 450 GeV/c protons impinges on alternating liquid hydrogen and deuterium targets. The aim is to measure the cross section ratio at dimuon masses above 4 GeV/c^2, which is a sensitive probe of the relative content of light antiquarks $\overline{u}$ and $\overline{d}$ in the proton sea.

Journal papers PL B (to be published).

Related experiments FNAL-288, FNAL-711

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WWW Home-page http://lyoinfo.in2p3.fr/eiexp/na51.html

CERN-NA-052

(Proposed Mar 1992, Approved Jun 1992, In preparation)

STRANGELET AND PARTICLE SEARCH IN Pb Pb COLLISIONS

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CERN – K Elsener, K D Lohmann
ANNECY – C Baglin, A Bussiere, J P Guillaud
HELSINKI U – T Linden, J Tuominiemi
STOCKHOLM U – G Appelquist, C Bohm, B Hovander, S Nilsson, B Sellden, Q Zhang
STRASBOURG, CRN – P Gorodetzky

Accelerator CERN-SPS *Detector* Spectrometer, Calorimeter

Reactions

Pb Pb 160 GeV/c (P_{lab}/N)

Brief description Searches for long-lived massive strange matter particles, strangelets, in Pb–Pb collisions, focussing particularly on positively and negatively charged massive objects at zero degrees production angle. Uses a beamline as a charged-particle spectrometer. Strangelets are identified by the measurement of their rigidity in the spectrometer, their velocity, and their charge. The velocity is determined from the time-of-flight (TOF) measurements provided by TOF scintillation

counter hodoscopes positioned along the beam spectrometer. A hadron calorimeter is used to complement the momentum measurement with the spectrometer by an independent energy information, thus providing redundancy for effective background rejection. Investigates also the particle production in relativistic heavy ion collisions with emphasis on antibaryon (antiproton, antideuteron) production by measuring their production yields over 2 units of rapidity each and at production angles from 0 to 12 mrad. The particles are identified by means of one differential and two threshold Čerenkov counters, and by TOF measurements. First data taking scheduled for November 94.

Journal papers NIM A311 (1992) 113, NIM A344 (1994) 529, PRL 72 (1994) 1415, and NP A566 (1994) 507c.

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CERN-NA-053

(Proposed Jan 1993, Approved Apr 1993, In preparation)

ELECTROMAGNETIC DISSOCIATION OF TARGET NUCLEI BY ^{208}Pb PROJECTILES

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Accelerator CERN-SPS *Detector* Photon spectrometer

Reactions

Pb ^{197}Au → ^{196}Au X	160 GeV (T_{lab}/N)
Pb ^{197}Au → ^{195}Au X	"
Pb ^{59}Co → ^{58}Co X	"
Pb ^{59}Co → ^{57}Co X	"

Brief description The purpose of this experiment is to study the process of electromagnetic dissociation (ED) that occurs at impact parameters large enough so that there is no nuclear interaction. In these cases strong electromagnetic fields are produced for a short time at a nucleus. For large charges and ultrarelativistic energies, the intense electromagnetic pulse produces cross sections much larger than the total hadronic cross section. These effects place significant constraints on the storage times of heavy ion beams planned for RHIC and LHC. The experiment measures the cross sections for one- and two-neutron removal processes resulting from the interaction of 160 GeV/nucleon ^{208}Pb beams on Au and Co targets. Thin targets are bombarded in the beamline for the dimuon spectrometer. Cross sections for the reactions of interest are then determined by studying the γ decay of the radioactive fragments produced. Cross sections are measured for deep spallation products in order to correct the ED cross section for contributions from nuclear interactions. In preparation (May 94).

Related experiments CERN-NA-040, BNL-862

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CERN-PS-170

(Proposed Aug 1980, Approved Nov 1980, Feb 1987, Completed data-taking Aug 1988)

PRECISION MEASUREMENTS OF THE PROTON ELECTROMAGNETIC FORM FACTORS IN THE TIME-LIKE REGION AND VECTOR MESON SPECTROSCOPY

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PADUA U – R Carlin, U Dosselli, F Gasparini, S Limentani, M Posocco, R Stroili, C Voci
SACLAY – G Bardin, G Burgun, J Derre, J Duclos, J L Faure, M Huet, C Kochowsky, G Marel, N Zekri
FRASCATI – G Capon
TURIN U – L Tecchio
CERN – E Mazzucato

Accelerator CERN-LEAR *Detector* Wire chamber

Reactions

$\bar{p}\,p \to e^+\,e^-$	0–2 GeV/c
$\bar{p}\,p \to e^+\,e^-$ neutrals	0 GeV/c

Particles studied vmeson^0

Brief description The first reaction is used to study the form factors, the second is used to measure the mass spectrum between 1.0 and 1.7 GeV/c^2 of a vector meson decaying into an e^+e^- pair.

Journal papers NIM A259 (1987) 376, PL B192 (1987) 471, PL B195 (1987) 292, NP (PROC SUPPL) B8 (1989) 203, and PL B257 (1991) 514.

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CERN-PS-175

(Proposed 1980, Approved Dec 1980, Jun 1987, Completed data-taking Oct 1988)

MEASUREMENT OF THE ANTIPROTONIC LYMAN AND BALMER X-RAYS OF $\bar{p}$ H AND $\bar{p}$ d ATOMS AT VERY LOW TARGET PRESSURES

CERN – K Elsener
KERNFORSCHUNGSANLAGE, JULICH – D Gotta
KERNFORSCHUNGSZENTRUM, KARLSRUHE & KARLSRUHE U – P Bluem, K Heitlinger
PSI, VILLIGEN – R Bacher, A Badertscher, J Egger, E Morenzoni, L M Simons (Spokesperson)

Accelerator CERN-LEAR *Detector* Photon spectrometer

Reactions

$\bar{p}\,p \to \bar{p}\,p\,X$-ray	0 GeV/c
$\bar{p}$ deut → $\bar{p}$ deut X-ray	"
$\bar{p}$ ^{3}He → $\bar{p}$ ^{3}He X-ray	"
$\bar{p}$ He → $\bar{p}$ He X-ray	"

Brief description The 5 MeV antiprotons from LEAR are stopped in the cyclotron trap. X-rays are detected in Si(Li) crystals.

Journal papers PS T22 (1988) 90, ZPHY A334 (1989) 93, ZPHY A338 (1991) 217, and ZPHY A (accepted). No other papers expected.

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CERN-PS-177

(Proposed Jul 1980, Approved Dec 1980, Jun 1987, Completed data-taking Nov 1988)

STUDY OF THE FISSION DECAY OF HEAVY HYPERNUCLEI

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DARMSTADT, GSI – S M Polikanov
GRENOBLE, CEN – M Maurel, E Monnand, P Perrin, C Ristori
GRENOBLE U – J P Bocquet, H Nifenecker, M Rey-Campagnolle (Spokesperson)
PENN STATE U – T A Armstrong, R A Lewis, J Passaneau, G A Smith
UPPSALA U – G Ericsson, T Johansson, G Tibell
WARSAW U, IEP – T Krogulski

Accelerator CERN-LEAR *Detector* Wire chamber

Reactions

$\bar{p}$ nucleus	0 GeV/c

Particles studied hypernuc

Brief description Searches for heavy hypernuclei and measures their yields and lifetimes by using the fission mode as a decay signature. The reaction chain is as follows: $\bar{p}$'s stopping in heavy-element targets annihilate and occasionally produce kaons, and a K^- then occasionally interacts to produce a Λ which sticks to the nucleus, forming a hypernucleus. The heavy hypernucleus can then fission either promptly, producing a

hypernucleus of fission fragment, or later, the delayed fission being induced by the Λ decay. This is an extension of the original PS-177, running to disentangle the two fission processes described above and thus to increase the accuracy of the lifetime measurements and add a strangeness signature.

Journal papers PL B182 (1986) 146, PL B192 (1987) 312, NC 102A (1989) 653, NP A531 (1991) 539, and ZPHY A342 (1992) 183.

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CERN-PS-185

(Proposed Aug 1981, Approved Oct 1981, Feb 1987, Began data-taking 1984, Completed data-taking Dec 1991)

STUDY OF THRESHOLD PRODUCTION OF $\bar{p}p \rightarrow \bar{Y}Y$ AT LEAR

CARNEGIE MELLON U – P D Barnes, G Diebold, G Franklin, C Maher, B Quinn, R Schumacher, J Seydoux, V Zeps
CERN – N Hamann, S Ohlsson
ERLANGEN U – W Eyrich, A Hofmann, M Kirsch, R Kraft, F Stinzing, R von Frankenberg
FREIBURG U – P Birien, W Dutty, H Fischer, J Franz, P Hoffmann, E Roessle, H Schledermann, H Schmitt, R Todenhagen
ILLINOIS U, URBANA – R A Eisenstein, P Harris, D Hertzog, R Tayloe
KERNFORSCHUNGSANLAGE, JULICH – R Broeders, K Kilian, W Oelert, K R Roehrich (√ Spokesperson), K Sachs, T Sefzick, G Sehl, M Ziolkowski
UPPSALA U – G Ericsson, T Johansson
VIENNA, INST RADIUMFORSCH, KERNPHYS – W Breunlich, R Geyer, N Naegele

Accelerator CERN-LEAR *Detector* Wire chamber

Reactions

$\bar{p}\,p \rightarrow \bar{\Lambda}\,\Lambda$	1.2–2.0 GeV/c (P_{lab})
$\bar{p}\,p \rightarrow \bar{\Lambda}\,\Sigma^0$	"
$\bar{p}\,p \rightarrow \bar{\Sigma}^-\,\Sigma^+$	"
$\bar{p}\,p \rightarrow \bar{\Sigma}^+\,\Sigma^-$	"
$\bar{p}\,p \rightarrow K_S\,K_S$	"

Particles studied baryonium, $f_4(2220)$

Brief description Measures cross sections, polarizations, and spin correlations. Emphasis is on the $\bar{\Lambda}\Lambda$ channel. Investigates the $Y\bar{Y}$ final-state interaction and decays, and compares Λ and $\bar{\Lambda}$ decay asymmetries and lifetimes.

Journal papers PL B189 (1987) 249, PL B199 (1987) 147, PL B229 (1989) 432, PL B246 (1990) 273, NP A508 (1990) 311c, NP A526 (1991) 575, PL B309 (1993) 469, PS 48 (1993) 149, and NP A558 (1993) 287c.

Related experiments CERN-PS-185-2

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CERN-PS-185-2

(Proposed Jan 1992, Approved Nov 1992, In preparation)

HIGH PRECISION MEASUREMENT OF $\bar{p}p \rightarrow \bar{\Lambda}\Lambda$ CROSS SECTIONS IN THE MASS REGION AROUND 2232 MeV/c^2

CARNEGIE MELLON U – G Franklin, C A Meyer, B Quinn, R Schumacher, V Zeps
CERN – N Hamann
ERLANGEN U – H Dennert, W Eyrich, J Hauffe, R A Kraft, F Stinzing
FREIBURG U – H Fischer, J Franz, E Roessle, H Schmitt, R Todenhagen, H Wirth
JULICH, FORSCHUNGSZENTRUM – R Broeders, R Geyer, K Kilian (√ Spokesperson), W Oelert, K R Roehrich (√ Spokesperson), K Sachs, T Sefzick
LOS ALAMOS – P D Barnes
UPPSALA U – T Johansson, E Tranens
ILLINOIS U, URBANA – R A Eisenstein, D Hertzog, T Jones, R Tayloe
VIENNA, OAW – W H Breunlich

Accelerator CERN-LEAR *Detector* Wire chamber

Reactions

$\bar{p}\,p \rightarrow \bar{\Lambda}\,\Lambda$	1.435 – 1.450 GeV/c (P_{lab})

Brief description The aim of the experiment is to verify a possible structure in the excitation function of the reaction $\bar{p}p \rightarrow \bar{\Lambda}\Lambda$ indicated by the recent threshold data of the CERN-PS-185 collaboration at an invariant mass of about 2232 MeV/c^2. Studies the total and differential cross sections as well as polarizations and spin correlations, within a few MeV around the reaction threshold. Uses an upgraded version of the PS-185 detector. The full $\bar{\Lambda}\Lambda$ kinematics is reconstructed from tracks in a 30 cm long stack of MWPC's and drift chambers. The production vertex is reconstructed by making use of four planes of μ-strip counters upstream the CH_2 sandwich target. Hyperon and antihyperon are distinguished by means of a magnetic solenoid with three drift chambers inside. The setup provides a large acceptance, a high efficiency, and a low annihilation background. In preparation (May 94).

Related experiments CERN-PS-185

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CERN-PS-189

(Proposed Nov 1981, Approved Feb 1983, Completed data-taking Sep 1993)

HIGH PRECISION MASS MEASUREMENTS WITH A RADIOFREQUENCY MASS SPECTROMETER – APPLICATION TO THE MEASUREMENT OF THE $p\,\bar{p}$ MASS DIFFERENCE

CERN – E Haebel, H Herr, R Klapisch, G Lebee, G Petrucci, G Stefanini, F Touchard
ORSAY, CSNSM – A Coc, M de Saint-Simon, R Le Gac, C Thibault (Spokesperson)

Accelerator CERN-LEAR *Detector* Spectrometer

Reactions

$\bar{p}$	20 MeV/c

Particles studied $\bar{p}$

Brief description Uses a radiofrequency spectrometer. The resolving power of the spectrometer is around 5×10^5. The $\bar{p}$ mass is compared with that of the H^- ion in order to check the CPT theorem.

Journal papers NIM A271 (1988) 512, NP (PROC SUPPL) B8 (1989) 454, NIM A305 (1991) 143, and NP A558 (1993) 691c.

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CERN-PS-194-2

(Proposed 1986, Approved Feb 1987, Began data-taking 1988, Completed data-taking Sep 1990)

NEW MEASUREMENTS OF $\bar{p}$ ATOM COLLISIONS: IONIZATION, dE/dx, X-RAYS, AND CHANNELLING

AARHUS U – L H Andersen, P Hvelplund, H Knudsen, S P Moller, J O P Pedersen, E Uggerhoj (Spokesperson)
CERN – K Elsener
PSI, VILLIGEN – E Morenzoni

Accelerator CERN-LEAR *Detector* Counter

Reactions

$\bar{p}$ He	10, 200 MeV/c
$\bar{p}$ crystal	30, 200 MeV/c

Brief description Investigates (1) the double ionization of helium by antiprotons, (2) the Barkas effect (different dE/dx

for particle and antiparticle with the same speed), (3) K-shell excitation by antiprotons, (4) channeling of MeV antiprotons by crystals, and (5) single ionization of hydrogen by antiprotons.

Journal papers PRL 57 (1986) 2147, PR A36 (1987) 3612, PRL 62 (1989) 1731, PR A40 (1989) 7366, PR A41 (1990) 6536, JPHY B23 (1990) L395, NIM B58 (1991) 1, PL A155 (1991) 155, and JPHY B27 (1994) 925.

Related experiments CERN-PS-194, CERN-PS-194-3

CERN-PS-194-3

(Approved Jun 1991, Began data-taking 1992, In progress)

MEASUREMENT OF STOPPING POWERS AND SINGLE IONIZATION CROSS SECTIONS FOR ANTIPROTONS AT LOW ENERGIES

AARHUS U – P Hvelplund, H Knudsen, R Medenwaldt, S P Moller, E Uggerhoj (Spokesperson), T Worm
PSI, VILLIGEN – E Morenzoni

Accelerator CERN-LEAR *Detector* Counter

Reactions

$\overline{p}$ nucleus	0.2–4 MeV/c
$\overline{p}$ He	0.01–0.1 MeV/c

Brief description Continues the investigation of new phenomena in collisions of antiprotons with atoms. Taking data (May 94).

Journal papers For papers see CERN-PS-194-2.

Related experiments CERN-PS-194, CERN-PS-194-2

CERN-PS-195

(Proposed Jan 1985, Approved Sep 1985, Began data-taking 1991)

TESTS OF CP VIOLATION WITH $\overline{K}^0$ AND K^0 AT LEAR

CPLEAR COLLABORATION
ATHENS U – A Angelopoulos, A Apostolakis, E Rozaki, L Sakeliou, K Sarigiannis
BASEL U – R Adler, T Alhalel, G Backenstoss, B Eckart, C Felder, F Leimgruber, P Pavlopoulos (√ Spokesperson), G Polivka, R Rickenbach, C Santoni, L Tauscher
BOSTON U – M B Chertok, D Francis, A Go, J P Miller, B L Roberts, D Zimmerman
CERN – C P Bee, P Bloch, M Dejardin, M Fidecaro, T Ruf, A Schopper, F Touchard
COIMBRA U – J Carvalho, R Ferreira-Marques, E Machado, A Onofre, J Pinto da Cunha, A Policarpo, E Van Beveren
DELFT UNIV TECH – R W Hollander, R Kreuger, C W E Van Eijk
FRIBOURG U – F Blanc, L A Schaller
IOANNINA U – I Evangelou, P Kokkas, N Manthos, F Triantis
LIVERPOOL U – M Caroll, E Cawley, A Cody, J R Fry, E Gabathuler, R Gamet, A Haselden, P J Hayman, P M Sanders, C Touramanis, S Vlachos
LJUBLJANA U & STEFAN INST, LJUBLJANA – A Filipcic, I Mandic, M Mikuz, D Zavrtanik
MARSEILLE, CPPM – E Aslanides, A Ealet, L Faravel, P Fassnacht, F Henry-Couannier, E Hubert, R Le Gac, F Montanet
ORSAY, CSNSM – C Thibault
PSI, VILLIGEN – P R Kettle, T Nakada, O Wigger
DAPNIA, SACLAY – G Chardin, J Derre, D Garreta, C Guyot, C Kochowski, G Marel, P Schune, A Soares, C Yeche
STOCKHOLM, RES INST ATOMIC PHYS – P Carlson, M Danielsson, K Jon-And
THESSALONIKI U – S Charalambous, M Chardalas, S Dedoussis, C Eleftheriadis, A Liolios
ZURICH, ETH – O Behnke, W Fetscher, H J Gerber, B Pagels, M Schaefer, P Weber, M Wolter

Accelerator CERN-LEAR *Detector* Spectrometer, Calorimeter

Reactions

$\overline{p}\,p \rightarrow K^0$ X	0 GeV/c
$\overline{p}\,p \rightarrow \overline{K}^0$ X	"

Particles studied K^0, $\overline{K}^0$

Brief description Measures time-dependent K^0–$\overline{K^0}$ decay rate asymmetries for nonleptonic and semileptonic decays. They are sensitive to CP and T violation in different and complementary ways, and also provide sensitive tests of CPT. A beam of 10^6 $\overline{p}$/sec provided by LEAR is brought to rest in a hydrogen gas target, producing K^0 and $\overline{K}^0$ through the reaction $\overline{p}p \rightarrow K^{\pm}\pi^{\mp}K^0(\overline{K}^0)$. Decays of the K^0 and $\overline{K}^0$ are recorded under the same operating conditions, inside a magnetic field and using tracking chambers and a gas sampling electromagnetic calorimeter. The strangeness of the neutral kaon is tagged by detecting the sign of accompanying charged kaon identified by Čerenkovs and scintillators. Hardware processors are used to reconstruct and select different decay topologies on-line in less than 25 microseconds. Taking data (June 94). Expected to run till 1996.

Journal papers NIM A279 (1989) 285, NIM A279 (1989) 305, NIM A279 (1989) 317, NC 102A (1989) 127, NIM A297 (1990) 126, PL B267 (1991) 154, NIM A311 (1992) 78, NIM A321 (1992) 458, NIM A323 (1992) 511, PW 3 (1992) 40, and PL B286 (1992) 180.

Related experiments CERN-NA-048, FNAL-621, FNAL-832

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WWW Home-page http://www1.cern.ch/cplear/Welcome.html

CERN-PS-196

(Proposed Mar 1985, Approved Nov 1985, In progress)

PRECISION COMPARISON OF $\overline{p}$ AND p MASSES IN A PENNING TRAP

HARVARD U – G Gabrielse (√ Spokesperson), A Khabbaz, D Phillips
MAINZ U, INST PHYS – H Kalinowsky
SEOUL NATIONAL U – W Jhe

Accelerator CERN-LEAR *Detector* Other

Reactions

$\overline{p}$	3.E-9 MeV (T_{lab})

Particles studied $\overline{p}$, p

Brief description Compares p and $\overline{p}$ masses to an accuracy of one part in 10^9 within the small volume of an ion trap, and develops trapping and cooling techniques to allow the production and study of low energy antiprotons and antihydrogen. Antiprotons have been trapped below 3 KeV. Electron cooling from KeV to $< 10^{-3}$ eV has been observed in the trap. Also measures the antiproton storage lifetime. Taking data (May 94).

Journal papers PRL 57 (1986) 2504, RSI 58 (1987) 2197, PL A129 (1988) 38, PRL 63 (1989) 1360, and PRL 65 (1990) 1317.

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CERN-PS-197

(Proposed Oct 1985, Approved Apr 1986, Began data-taking 1989, In progress)

THE CRYSTAL BARREL: MESON SPECTROSCOPY AT LEAR WITH A 4π NEUTRAL AND CHARGED DETECTOR

CRYSTAL BARREL COLLABORATION
LBL – D Armstrong, P Birien, T Case, K M Crowe, F H Heinsius, M Lakata
RUHR U, BOCHUM – K Beuchert, T Degener, H Koch, M Kunze, J Luedemann, H Matthaey, K Peters, D Walther
BONN U – E Klempt, C Strassburger
BUDAPEST, CRIP – P Hidas, G Pinter

RUTHERFORD – C A Baker, C J Batty, C Pinder
CERN – M Doser, N Hessey, R Landua, L Montanet, J Zoll
HAMBURG U – B Kaemmle, P Schmidt, U Strohbusch, U Wiedner
KARLSRUHE U – P Bluem (√ Spokesperson), D Engelhardt, T Kiel
QUEEN MARY - WESTFIELD COLL – D V Bugg, A Cooper, B Zou
UCLA – R P Haddock
MAINZ U, INST PHYS – B Barnett, J Brose, R Hackmann, H Kalinowsky, E Schaefer, S Spanier, F Walter
MUNICH U, EXP PHYS – K Braune, H P Dietz, W Duennweber, M Englert, M A Faessler, D Jamnik, C Voelcker, C Zupancic
CARNEGIE MELLON U – R McCrady, C A Meyer
STRASBOURG, CRN – M Suffert
ZURICH U – C Amsler, T Noble, F Ould-Saada, D Urner, S von Dombrowski

Accelerator CERN-LEAR *Detector* CRYSTAL-BARREL

Reactions

$\overline{p}\,p \rightarrow$ annihil	0–2000 MeV/c
$\overline{p}\,n \rightarrow$ annihil	"

Particles studied glueball, meson

Brief description High detection efficiency for both neutral and charged particles at nearly all angles means nearly all annihilation channels are accessible. Uses liquid H_2 and D_2 targets. Taking data (May 94).

Journal papers NP (PROC SUPPL) B8 (1989) 65, PL B260 (1991) 249, NP A527 (1991) 491c, IEEE TNS 39 (1992) 826, NIM A321 (1992) 69, PL B291 (1992) 347, PL B294 (1992) 451, PL B297 (1992) 214, SJNP 55 (1992) 767, PL B311 (1993) 362, PL B311 (1993) 371, PL B319 (1993) 373, ZPHY C58 (1993) 175, PL B322 (1994) 431, and PL B323 (1994) 233.

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CERN-PS-198

(Proposed Oct 1985, Approved Apr 1986, Completed data-taking May 1988)

MEASUREMENT OF SPIN-DEPENDENT OBSERVABLES IN $\overline{p}N$ ELASTIC SCATTERING FROM 300 TO 700 MeV/c

KERNFORSCHUNGSZENTRUM, KARLSRUHE & KARLSRUHE U – E Boschitz, W Gyles, W List, R Olszewski, C R Ottermann, T Tacik, M Wessler
LYON, IPN – E Descroix, J Y Grossiord, A Guichard
PSI, VILLIGEN – D R Gill, J Konter, S Mango, B van den Brandt, G D Wait
SACLAY – J Arvieux, H Catz, A Chaumeaux, J C Faivre, Y Terrien, E Vercellin, J Yonnet
CERN – R Bertini (Spokesperson), F Perrot

Accelerator CERN-LEAR *Detector* Spectrometer, SPES-II

Reactions Polarized target

$\overline{p}\,p \rightarrow \overline{p}\,p$	300–700 MeV/c
$\overline{p}$ deut $\rightarrow \overline{p}$ deut	"

Journal papers NP (PROC SUPPL) B8 (1989) 149, NP (PROC SUPPL) B8 (1989) 156, PL B228 (1989) 531, and PL B261 (1991) 188.

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CERN-PS-199

(Proposed Nov 1985, Approved Apr 1986, Began data-taking May 1989, Completed data-taking Dec 1990)

STUDY OF THE SPIN STRUCTURE OF THE $\overline{p}p \rightarrow \overline{n}n$ CHANNEL AT LEAR

POLCEX COLLABORATION
CAGLIARI U & INFN, CAGLIARI – M P Macciotta, A Masoni, G Puddu, S Serci
GENEVA U – A Ahmidouch, E Heer, R Hess, C Lechanoine-LeLuc, C Mascarini, D Rapin
SACLAY – J Arvieux, R Bertini, H Catz, J C Faivre, R A Kunne, F Perrot
TRIESTE U & INFN, TRIESTE – R Birsa, F Bradamante (√ Spokesperson), A Bressan, S Dalla-Torre, M Giorgi, M Lamanna, A Martin, A Penzo, P Schiavon, F Tessarotto, A Villari
TURIN POLYTECHNIC & INFN, TURIN – M Agnello, F Iazzi, B Minetti
TURIN U & INFN, TURIN – T Bressani, E Chiavassa, N De Marco, A Musso, A Piccotti
CERN – T Nijnikoski, A Rijllart

Accelerator CERN-LEAR *Detector* Counter

Reactions Polarized target

$\overline{p}\,p \rightarrow \overline{n}\,n$	500–1300 MeV/c

Particles studied $\overline{n}$, $\overline{p}$

Brief description Measures over the whole angular range the polarization parameter P in 100 MeV/c steps, and the polarization transfer parameter D. Investigates the OBE structure of the $N\overline{N}$ scattering. Searches for resonances in the s channel. Uses a frozen-spin polarized target and plastic streamer tubes.

Journal papers PL B246 (1990) 267, NIM A300 (1991) 43, PL B273 (1991) 533, NIM A317 (1992) 303, NIM A326 (1993) 538, PL B302 (1993) 517, and NP B403 (1993) 25.

Related experiments CERN-PS-172, CERN-PS-173, CERN-PS-198, CERN-PS-206

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CERN-PS-200

(Proposed Jan 1986, Approved Apr 1986, In preparation)

A MEASUREMENT OF THE GRAVITATIONAL ACCELERATION OF THE ANTIPROTON

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COLORADO U – S P Parry, R Ristinen
LOS ALAMOS – R E Brown, T W Darling, P L Dyer, T Goldman, M H Holzscheiter (√ Spokesperson), N S P King, G L Morgan, M M Nieto, M M Schauer
PENN STATE U – R A Lewis, T Otto, J Rochet, G A Smith
TEXAS A AND M – K Hosea, R A Kenefick
CERN – D Hajdukovic

Accelerator CERN-LEAR *Detector* Other

Reactions

$\overline{p}$	105 MeV/c (P_{lab})

Particles studied $\overline{p}$

Brief description Measures time-of-flight of ultra-low-velocity $\overline{p}$'s up a vertical drift tube. First results are expected in Summer 95. In preparation (May 94).

Journal papers HFI 81 (1993) 71, and NP A558 (1993) 709c.

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CERN-PS-201

(Proposed Jan 1986, Approved Sep 1986, Began data-taking Aug 1990, In progress)

STUDY OF ANTINUCLEON ANNIHILATIONS AT LEAR WITH OBELIX, A LARGE-ACCEPTANCE AND HIGH RESOLUTION DETECTOR BASED ON THE OPEN AXIAL FIELD SPECTROMETER

OBELIX COLLABORATION
BOLOGNA U & INFN, BOLOGNA – A Bertin, M Bruschi, M Capponi, B Cereda, I D'Antone, S De Castro, D Ferretti, D Galli, B Giacobbe, V Marconi, I Massa, M Piccinini, M Poli, N Semprini-Cesari, R Spighi, S Vecchi, A Vezzani, M Villa, A Vitale, A Zoccoli

BRESCIA U & INFN, BRESCIA – G Belli, M Corradini, A Donzella, E Lodi-Rizzini, L Venturelli, A Zenoni
CAGLIARI U & INFN, CAGLIARI – A Adamo, C Cicalo, A Lai, A Masoni, L Musa, G Puddu, S Serci, P Temnikov, G L Usai
DUBNA – V G Ableev, O Y Denisov, I V Falomkin, O E Gorchakov, G B Pontecorvo, S N Prakhov, A M Rozhdestvensky, M G Sapozhnikov
FRASCATI – C De Leo, P Gianotti, C Guaraldo (Spokesperson), A Lanaro, V Lucherini, F Nichitiu
LEGNARO – P Boccaccio, U Gastaldi, L Lombardi, G Maron, R A Ricci, L Vannucci, G Vedovato
PADUA U & INFN, PADUA – A Andrighetto, M Morando
PAVIA U & INFN, PAVIA – G Bendiscioli, V Filippini, A Fontana, C Marciano, P Montagna, A Rotondi, A Saino, P Salvini, V Tretyak
TRIESTE U & INFN, TRIESTE – G Margagliotti, G Pauli, C Rizzo, S Tessaro, E Zavattini
TURIN U & INFN, TURIN – F Balestra, G C Bonazzola, E Botta, T Bressani (Spokesperson), M P Bussa, L Busso, D Calvo, P Cerello, S Costa, D D'Isep, L Fava, A Feliciello, L Ferrero, A Filippi, R Garfagnini, P Gianotti, A Grasso, A Maggiora, S Marcello, D Panzieri, D Parena, G Piragino, E Rossetto, F Tosello, G Zosi
TURIN POLYTECHNIC & INFN, TURIN – M Agnello, F Iazzi, B Minetti
UDINE U & INFN, UDINE – L Santi

Accelerator CERN-LEAR *Detector* Spectrometer

Reactions

$\overline{p}\ p \rightarrow$ annihil	0–1.8 GeV/c
$\overline{p}$ deut $\rightarrow$ annihil	"
$\overline{p}$ nucleus $\rightarrow$ annihil	"
$\overline{n}\ p \rightarrow$ annihil	0–0.3 GeV/c
$\overline{n}$ nucleus $\rightarrow$ annihil	"

Brief description Studies (1) spectroscopy of $q\overline{q}$, exotic, glueball, and hybrid mesons, (2) dynamics of $N\overline{N}$ interactions, (3) atomic physics with $\overline{p}$'s, and (4) $\overline{p}$ annihilations onto more than one nucleon. Taking data (May 94).

Journal papers IEEE TNS 38 (1991) 331, IEEE TNS 38 (1991) 337, IEEE TNS 38 (1991) 393, NIM A306 (1991) 305, PL B256 (1991) 349, SJNP 55 (1992) 806, NIM A323 (1992) 523, NIM A325 (1993) 417, NIM A334 (1993) 391, NP A553 (1993) 651c, NP A558 (1993) 13c, NP A558 (1993) 137c, NP A558 (1993) 665c, NP A562 (1993) 617, and PL B329 (1994) 407.

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CERN-PS-202

(Proposed 1986, Approved Feb 1987, Began data-taking Jul 1991, In progress)

JETSET: PHYSICS AT LEAR WITH AN INTERNAL GAS JET TARGET AND AN ADVANCED GENERAL PURPOSE DETECTOR

BARI U & INFN, BARI – C Evangelista, A Palano
CERN – D Drijard, M Ferro-Luzzi, R Jones, B Mouellic, J M Perreau, M J Price
ERLANGEN U – W Eyrich, R Geyer, S Pomp, F Stinzing
FREIBURG U – H Fischer, J Franz, E Roessle, H Schmitt, M Tscheulin, H J Urban, H Wirth
GENOA U & INFN, GENOA – A Buzzo, M Lovetere, M Macri (√ Spokesperson), M Marinelli, S Passaggio, M G Pia, A Pozzo, E Robutti, A Santroni
ILLINOIS U, URBANA – P Debevec, R A Eisenstein, P Harris, D Hertzog, S Hughes, P Reimer, J Ritter, R Tayloe
KERNFORSCHUNGSANLAGE, JULICH – K Kilian, W Oelert, K Roehrich, M Rook, O Steinkamp
OSLO U – H Korsmo
UPPSALA U – A Johansson, T Johansson

Accelerator CERN-LEAR *Detector* JETSET

Reactions

$\overline{p}\ p \rightarrow \phi\ \phi$	0.6–1.9 GeV/c
$\overline{p}\ p \rightarrow K^+\ K^-\ K^+\ K^-$	"
$\overline{p}\ p \rightarrow K_S\ K_S$	"

Particles studied glueball

Brief description Uses an internal gas jet target surrounded by an advanced, compact, nonmagnetic detector. Initial aim is a search for glueballs (gg or ggg) and hybrids ($gq\overline{q}$) over the mass range 2.04 to 2.4 GeV/c^2. Next run is scheduled for August 94.

Journal papers NP (PROC SUPPL) B8 (1989) 69, and NP A558 (1993) 27.

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CERN-PS-203

(Proposed Jan 1988, Approved Apr 1988, Began data-taking 1988, In progress)

ANTIPROTON INDUCED FISSION AND FRAGMENTATION OF NUCLEI

HAHN-MEITNER INST – W Bohne, D Hilscher, U Jahnke, H Morgenstern, D Polster, H Rossner
CERN – J Eades, S Neumaier
FLORIDA STATE U – H S Plendl
KERNFORSCHUNGSANLAGE, JULICH – H Machner
MOSCOW, INR – A S Botvina, Y Golubeva, A S Iljinov, D I Ivanov, M Mebel, V G Nedorezov, A S Sudov
MUNICH, TECH U – H Daniel, F J Hartmann, S Schmid, W Schmid, T von Egidy (√ Spokesperson),
WARSAW U – A Grabowska, J Jastrzebski, W Kurcewicz, P Lubinski, A Stolarz, A Trczinska, S Wycech

Accelerator CERN-LEAR *Detector* Semiconductor, Wire chamber

Reactions

$\overline{p}$ nucleus	0 GeV/c

Brief description Studies fission and fragmentation processes induced by a large, highly localized deposition of energy when an antiproton annihilates with a nucleus. Measures energy, mass, and folding angle of coincident fission fragments from Bi, Th, Au, Ho, Ag, Nb, Cu, U, and other targets. Light fragments (K, n, p, d, ...) are measured for a series of targets with semiconductor detectors and TOF techniques. Distribution of residual nuclei after antiproton annihilation is determined. A new method to study the neutron halo of heavy nuclei is developed. Absolute fission probabilities for various targets are measured. Taking data (May 94).

Journal papers NIM A329 (1993) 403, PL B300 (1993) 317, APP 24 (1993) 1823, PS 48 (1993) 160, NP A554 (1993) 223, NP A558 (1993) 383c, NP A558 (1993) 405c, NP A561 (1993) 607, PR C47 (1993) 216, NP A569 (1994) 689, and PR C49 (1994) 2555.

Related experiments CERN-PS-205, CERN-PS-208

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CERN-PS-204

(Proposed Nov 1987, Approved Jun 1989, Began data-taking Aug 1990, Completed data-taking Aug 1990)

MEASUREMENTS OF WAKE-RIDING ELECTRONS IN ANTIPROTON–CARBON-FOIL COLLISIONS

AARHUS U – L H Andersen, K Elsener, P Hvelplund, H Knudsen, S P Moller, E Uggerhoj
TOKYO U – K Kuroki, Y Yamazaki (√ Spokesperson)

Accelerator CERN-LEAR *Detector* Counter

Reactions

$\overline{p}$ C	100 MeV/c

Brief description The target is a carbon foil. A charged particle passing through a dielectric produces an oscillating wake. The experiment searches for electrons riding the moving wake. It also measures the number distribution of multiply-emitted secondary electrons.

Journal papers JPSJ 59 (1990) 2643.

Related experiments CERN-PS-194

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CERN-PS-205

(Proposed Jan 1991, Approved Apr 1991, Began data-taking Sep 1991, In progress)

STUDY OF EXOTIC TRAPPING OF ANTIPROTONS IN LIQUID/GAS HELIUM

PS205 COLLABORATION

BUDAPEST, CRIP – D Horvath
CERN – J Eades, E Widmann
MUNICH, TECH U – H Daniel, F J Hartmann, B Ketzer, W Schmid, T von Egidy
AICHI, INST MOLECULAR SCI – M Kumakura, N Morita
TOKYO U, INS – H Masuda, H Outa, I Sugai, T Yamazaki (√ Spokesperson)
TOKYO U – R S Hayano, T M Ito, M Iwasaki, A Kawachi, F Maas, S N Nakamura, H Tamura, H Torii
TOKYO U, RES CTR NUCL SCI TECH – Y Ito
TOKYO INST TECH – W Higemoto, N Nishida

Accelerator CERN-LEAR *Detector* Plastic

Reactions

$\overline{p}$ He 100, 200 MeV/c (P_{lab})

Brief description Studies the exotic atom trapping of antiproton by measuring the delayed annihilation time spectrum. The long-lived $\bar{p}$ trapping in liquid helium was first observed by KEK-215 collaboration. The experiment aims to study this effect in great detail using the improved beam intensity and emittance available at LEAR. The first phase of the program included investigations of trapping in solid, liquid, and gaseous phases of ^{3}He and ^{4}He. In 1993, a new technique of forced annihilation of antiprotons was introduced. A high-power dye laser pulse is used to stimulate resonant transitions between metastable and short-lived pairs of states differing by one unit of ℓ. The laser spectroscopy will be used to clarify the formation, structure, and dynamics of the metastable antiprotonic helium atoms. Taking data (May 94).

Journal papers NATURE 361 (1993) 238, NIM A330 (1993) 439, NP A558 (1993) 679c, and PRL 72 (1994) 1180.

Related experiments KEK-215

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CERN-PS-206

(Proposed Mar 1992, Approved Jun 1992, Began data-taking Apr 1993, Completed data-taking Sep 1993)

MEASUREMENT OF THE $\overline{p}p \rightarrow \overline{n}n$ CHARGE-EXCHANGE DIFFERENTIAL CROSS SECTION

CCX COLLABORATION

CAGLIARI U & INFN, CAGLIARI – M P Macciotta, A Masoni, G Puddu, S Serci
GENEVA U – A Ahmidouch, E Heer, C Mascarini, D Rapin
DAPNIA, SACLAY – J C Faivre
SACLAY – J Arvieux, R Bertini, R A Kunne
TRIESTE U & INFN, TRIESTE – R Birsa, F Bradamante (√ Spokesperson), A Bressan, S Dalla Torre, M Giorgi, M Lamanna, A Martin, A Penzo, P Schiavon, F Tessarotto, A M Zanetti
TURIN U & INFN, TURIN – M Agnello, E Chiavassa, N De Marco, A Musso, A Piccotti

Accelerator CERN-LEAR *Detector* ?

Reactions

$\overline{p}\,p \rightarrow \overline{n}\,n$ 600 MeV/c (P_{lab})

Brief description The aim is a measurement of the differential cross section of the $\overline{p}p \rightarrow \overline{n}n$ charge exchange reaction with a point-to-point precision of 1% in the forward direction, and an absolute normalization error of 3%. Studies the πNN coupling constant. Uses the neutron and antineutron detectors built for experiment CERN-PS-199, and liquid H target.

Related experiments CERN-PS-199

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CERN-PS-207

(Approved Sep 1993, In preparation)

PRECISION MEASUREMENT OF THE ENERGIES AND LINE SHAPES OF ANTIPROTONIC LYMAN AND BALMER TRANSITIONS FROM HYDROGEN AND HELIUM ISOTOPES

ARGONNE – P Cowan, T Mooney
BUDAPEST, CRIP – D Horvath
NIST, WASH, DC – R D Deslattes
IOANNINA U – D F Anagnostopoulos
JULICH, FORSCHUNGSZENTRUM – G L Borchert, M Elble, D Gotta (Spokesperson), O W B Schult
PSI, VILLIGEN – L M Simons
PARIS, CURIE UNIV VI – P Indelicato
NEUCHATEL U – E D Bovet, D Chatellard, J P Egger, E Jeannet
QUAID-I-AZAM U – K Rashid

Accelerator CERN-LEAR *Detector* Spectrometer

Brief description Studies the antiproton–proton and antiproton–nucleus spin-spin and spin-orbital interactions at threshold by measuring line shapes and energy shifts of antiprotonic $K\alpha$ and $L\alpha$ transitions of hydrogen and helium isotopes. The intense LEAR beam, stopped in the cyclotron trap at low gas pressure, provides a unique X-ray source with sufficient brightness. Charge coupled devices with their excellent background rejection and energy resolution allow a precise determination of strong shifts and widths of the $1s$ hyperfine states of protonium, and the detection of the $\overline{p}d$ $K\alpha$ transition. Uses a focussing crystal spectrometer with a resolution $\Delta E/E$ of about 10^{-4} to measure the energies of the $L\alpha$ transitions. In preparation (May 94).

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CERN-PS-208

(Proposed Apr 1993, Approved Nov 1993, Began data-taking Jun 1994)

DECAY OF HOT NUCLEI AT LOW SPINS PRODUCED BY ANTIPROTON ANNIHILATION IN HEAVY NUCLEI

HAHN-MEITNER INST – W Bohne, B Drescher, P Figuera, F Goldenbaum, D Hilscher (√ Spokesperson), U Jahnke, H Morgenstern, D Polster, H Rossner, P Ziem
GANIL – J Galin, B Lott, M Morjean, A Peghaire, B Quednau
CERN – J Eades, S Neumaier
MUNICH, TECH U – F J Hartmann, S Schmid, W Schmid, T von Egidy
WARSAW U – J Jastrzebski, W Kurcewicz, L Pienkowski
ROSSENDORF, FORSCHUNGSZENTRUM – G Pausch
MOSCOW, INR – D Ivanov, V Nedorezov, A Sudov

Accelerator CERN-LEAR *Detector* Counter

Reactions

$\overline{p}$ nucleus 200 MeV/c (P_{lab})

Brief description Uses the Berlin 4π neutron counter which measures event-by-event the total neutron multiplicity, and for charged particles a 4π silicon detector (162 elements) positioned inside the neutron detector. Measures (i) the thermal excitation energy distribution of antiproton induced reactions in heavy nuclei and (ii) the decay properties of hot nuclei at low spins as a function of excitation energy. Targets are Ho, U, and other heavy nuclei. Taking data (June 94).

Journal papers NIM A337 (1994) 573, and NP A568 (1994) 169.

Related experiments CERN-PS-203, SATURNE-243

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CERN-UA-001

(Proposed Jan 1978, Approved Jun 1978, Jun 1983, Sep 1983, Feb 1984, Nov 1984, Completed data-taking Feb 1990)

A 4π SOLID ANGLE DETECTOR FOR THE SPS USED AS A $\bar{p}p$ COLLIDER AT A C.M. ENERGY OF 630 GeV

AACHEN, TECH HOCHSCH, III PHYS INST – A Bohrer, H Faissner, A Geiser, S Lammel, H Moser, A Moulin, H Reithler, H Teykal, H Tuchscherer, K Wacker, H Wagner
NIKHEF, AMSTERDAM – K Bos, J P Dorenbosch, D Holthuizen, M Schroeder, I Ten Have, W Van de Guchte, A Van Dijk, I Zacharov
ANNECY – B Aubert, F Cavanna, J Colas, D Linglin, J P Vialle, M Yvert
BIRMINGHAM U – G F Cox, J D Dowell, N Ellis, I Fensome, J Garvey, J Gregory, I R Kenyon, M Nikitas
BOSTON U – G Bauer, M Felcini, K Morgan, S Otwinowski, J Rohlf
CERN – A Bezaguet, G Bocquet, R Bonino, M Botlo, P Cennini, S Cittolin, M Della Negra, M Demoulin, F Diez Hedo, D Drijard, K Eggert, A Givernaud, A Gonidec, W Jank, F Lacava, M Marguina, G Maurin, T Meyer, T Muller, R Munoz, L Naumann, A Norton (Spokesperson), F Pauss, A Placci, J P Porte, E Radermacher, J P Revol, T Rodrigo Amoro, C Rubbia, D Samyn, D Schinzel, T P Shah, P Sphicas, O Ullaland, T S Virdee, V Vuillemin, I Zacharov
HELSINKI U – V Karimaki, R Kinnunen, E Pietarinen, M Pimia, J Tuominiemi
KIEL U – O C Allkofer, S Bartha, H G Boerst, H Bohn, D Brockhausen, D Dau, S Levegrun, A Morsch, R Prosi, M Rauschkolb
IMPERIAL COLL – E Clayton, A Khan, C Markou, S McMahon, C Seez, I Siotis, L Taylor
QUEEN MARY COLL – P Biddulph, E Eisenhandler, P Kalmus, M Landon, S Robins, D Robinson, G Thompson, C Topping, W Von Schlippe
MADRID, JEN – A Ferrando, I Josa, J Salicio Diez, E Torrente
MIT – T Fuess, G Pancheri, S Pavlon, K C T O Sumorok, Q Tan, S Tether, X Wu
PADUA U – A Bettini, G Busetto, A Caner, P Casoli, S Centro, R Conte, M De Giorgi, R Martinelli, A Meneguzzo, M Nicoletto, Y Zolnirowski, P Zotto
COLLEGE DE FRANCE – B Andrieu, L Dobrzynski, D Kryn, D Marchand, J P Mendiburu, P Nedelec, G Sajot, J Vrana
ROME U – U Aglietti, C Bacci, V Cecconi, F Ceradini, G Ciapetti, A Di Ciaccio, M Moricca, A Nisati, E Petrolo, G Piano-Mortari, G Salvini, M Torelli, A Tusi, S Veneziano, L Zanello
RUTHERFORD – M G Albrow, R Apsimon, J Coughlan, V O'Dell
SACLAY – D Denegri, Y Lemoigne, J P Merlo
UCLA – K Ankoviak, C Buchanan, D Cline, H Evans, L Fortson, J Gronberg, T Kubic, M Mohammadi, J Rhoades, D Stork, M Vargas
VIENNA, OAW – B Buschbeck, H Dibon, M Krammer, P Lipa, M Markytan, F Szoncso, A Taurok, C Wulz
MADRID, AUTONOMA U – C Albajar

Accelerator CERN-PBAR/P *Detector* UA1

Reactions

$\bar{p}\,p$	540, 630 GeV (E_{cm})

Particles studied W^+, W^-, Z^0, higgs, s-particle

Brief description In the first phase of operation has discovered the W and Z bosons and found limits on the top quark, heavy lepton, and supersymmetric particle masses. Also studied $B\overline{B}$ mixing, b-quark production, QCD (via jets), and intermediate bosons and photon production. For the second phase of operation (1988/89 collider runs) the following items were upgraded: the muon detection system, the data acquisition system, and the central detector.

Journal papers NIM 176 (1980) 175, NIM 176 (1980) 217, NIM 176 (1980) 223, NIM 176 (1980) 233, NIM 176 (1980) 255, NIM 186 (1980) 533, PL B107 (1981) 320, PL B118 (1982) 167, PL B118 (1982) 173, IEEE TNS 30 (1983) 71, LNC 37 (1983) 255, PL B121 (1983) 77, PL B122 (1983) 103, PL B122 (1983) 189, PL B123 (1983) 108, PL B123 (1983) 115, PL B126 (1983) 398, PL B128 (1983) 336, PL B129 (1983) 273, PL B132 (1983) 214, PL B132 (1983) 223, NP B224 (1983) 523, NIM 224 (1984) 153, PL B134 (1984) 469, PL B135 (1984) 250, PL B136 (1984) 294, PL B139 (1984) 115, PL B147 (1984) 222, PL B147 (1984) 241, PL B147 (1984) 493, ZPHY C25 (1984) 167, IEEE TNS 32 (1985) 1463, RMP 57 (1985) 699, LNC 44 (1985) 1, PL B150 (1985) 223, PL B155 (1985) 442, PL B158 (1985) 494, ZPHY C27 (1985) 155, IEEE TNS 33 (1986) 163, NIM A243 (1986) 45, NIM A252 (1986) 387, EPL 1 (1986) 327, PL B166 (1986) 484, PL B172 (1986) 461, PL B177 (1986) 244, NP B276 (1986) 253, NIM A253 (1987) 179, NIM A253 (1987) 189, NIM A256 (1987) 23, NIM A257 (1987) 552, PL B185 (1987) 233, PL B185 (1987) 241, PL B186 (1987) 237, PL B186 (1987) 247, PL B193 (1987) 389, PL B198 (1987) 261, PL B198 (1987) 271, ZPHY C36 (1987) 33, NIM A263 (1988) 26, NIM A263 (1988) 174, NIM A265 (1988) 303, NIM A272 (1988) 669, PL B200 (1988) 380, PL B209 (1988) 127, PL B209 (1988) 385, PL B209 (1988) 397, PL B213 (1988) 405, ZPHY C37 (1988) 489, ZPHY C37 (1988) 505, ZPHY C40 (1988) 527, PR D38 (1988) 1616, NP B309 (1988) 405, IEEE TNS 36 (1989) 364, NIM A279 (1989) 114, NIM A279 (1989) 169, NIM A279 (1989) 297, FORT 37 (1989) 339, PL B226 (1989) 410 [erratum: PL B229 (1989) 439], ZPHY C44 (1989) 15, NIM A289 (1990) 482, NIM A292 (1990) 113, NIM A292 (1990) 401, NIM A291 (1990) 587, APP B21 (1990) 327, PL B241 (1990) 283, PL B244 (1990) 566, ZPHY C48 (1990) 1, NP B335 (1990) 261, NP B345 (1990) 1, NIM A301 (1991) 445, NIM A302 (1991) 331, NIM A305 (1991) 331 [erratum: NIM A311 (1992) 395], PL B253 (1991) 503, PL B256 (1991) 112, PL B256 (1991) 121 [erratum: PL B262 (1991) 497], PL B257 (1991) 459, PL B262 (1991) 163, PL B262 (1991) 171, PL B273 (1991) 540, and PL B275 (1992) 186.

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CERN-UA-002

(Proposed Jan 1978, Approved Dec 1978, Sep 1984, Feb 1985, Jun 1987, Began data-taking Nov 1981, Completed data-taking Dec 1990)

STUDY OF $\bar{p}p$ INTERACTIONS AT 630 GeV C.M. ENERGY

BERN U – K Borer, E Hugentobler, L Mueller, T Pal, K P Pretzl, J Schacher
CALABRIA U – L Malgeri, M Primavera, M Valdata-Nappi
CAMBRIDGE U – R S DeWolf, D J Munday, M A Parker, T O White
CERN – M Borghini, A Dell'Acqua, L Di Lella (√ Spokesperson), D Froidevaux, J M Gaillard, O Gildemeister, S Hellman, J Hrivnac, K Jakobs, P Jenni, L Linssen, L Mapelli, F Nessi-Tedaldi, M Nessi, C Onions, M Pentney, M S Pepe, H Plothow-Besch, A Poppleton, V Simak, S Stapnes
DORTMUND U – C Goessling, H Hufnagel, D Pollmann, B Schmidt, V Sondermann, R Spiwoks, E Tsesmelis
HEIDELBERG U, IHEP – S Gruenendahl, E E Kluge, N Kurz
MELBOURNE U – I Bertram, S N Tovey
MILAN U & INFN, MILAN – D Cavalli, G Costa, L Cozzi, F Gianotti, L Mandelli, M Mazzanti, L Perini
ORSAY, LAL – R Ansari, J C Chollet, L Fayard, B Merkel, M Moniez, G Parrour, P Petroff, J P Repellin, G Unal, D Wood
PAVIA U & INFN, PAVIA – G Ambrosini, C Conta, R Ferrari, M Fraternali, G Fumagalli, V Goggi, M Livan, F Pastore, E Pennacchio, G Polesello, A Rimoldi, M Sacchi, V Vercesi
PERUGIA U & INFN, PERUGIA – P Cenci, P Lariccia, P Lubrano, M Punturo, P Scampoli, C Talamonti, F Tondini
PISA U & INFN, PISA – D Autiero, G Carboni, V Cavasinni, M Curatolo, T Del Prete, B Esposito, E Iacopini, S Lami, M Morganti, C Petridou
SACLAY – J Alitti, P Bareyre, P Bonamy, M Bourliaud, Y Ducros, C Magneville, J P Meyer, H Zaccone, A Zylberstejn

Accelerator CERN-PBAR/P *Detector* UA2

Reactions

$\bar{p}\,p \rightarrow e^{\pm}$ X	630 GeV (E_{cm})
$\bar{p}\,p \rightarrow$ jet(s) X	"
$\bar{p}\,p \rightarrow \gamma$ X	"

Particles studied W^+, W^-, Z^0, top, γ, lepton – quark, higgs$^{\pm}$

Brief description The main aims are a study of the W and Z bosons and a search for the top quark. Other topics include the production of direct photons at high $p_\perp$, establishing new bounds on leptoquark masses, and a search for the charged Higgs from the top decay. The apparatus has complete calorimetry, both electromagnetic and hadronic, down to about 5° to the beams. Electron identification is achieved by means of calorimetry, preshower, and transition radiation detectors. A total of 6096 independent silicon counters give a precise dE/dx measurement. Scintillating fibers are used to measure charged particle tracks. The detector includes a lead converter to detect photons. Note (May 94): data analysis has been completed and all the results published.

Journal papers PL B115 (1982) 59, PL B118 (1982) 203, PL B121 (1983) 187, PL B122 (1983) 322, PL B122 (1983) 476, PL B129 (1983) 130, ZPHY C20 (1983) 117, NIM 224 (1984) 65, NIM 224 (1984) 360, NIM 227 (1984) 29, PL B138 (1984) 430, PL B139 (1984) 105, PL B144 (1984) 283, PL B144 (1984) 291, ZPHY C24 (1984) 1, PL B154 (1985) 338, PL B156 (1985) 129, PL B160 (1985) 349, PL B165 (1985) 441, ZPHY C25 (1985) 329, ZPHY C27 (1985) 329, NIM A252 (1986) 590, PL B176 (1986) 239, ZPHY C30 (1986) 1, ZPHY C30 (1986) 341, NIM A253 (1987) 548, PL B186 (1987) 440, PL B186 (1987) 452, PL B194 (1987) 158, PL B195 (1987) 613, ZPHY C36 (1987) 175, NIM A263 (1988) 31, NIM A265 (1988) 33, NIM A273 (1988) 605, NIM A273 (1988) 826, PL B215 (1988) 175, ZPHY C40 (1988) 527, ZPHY C41 (1988) 395, IEEE TNS 36 (1989) 29, NIM A283 (1989) 646, NIM A286 (1990) 128, NIM A287 (1990) 417, PL B235 (1990) 363, PL B236 (1990) 488, PL B238 (1990) 442, PL B241 (1990) 150, ZPHY C46 (1990) 179, ZPHY C47 (1990) 11, ZPHY C47 (1990) 523, PL B257 (1991) 232, PL B263 (1991) 544, PL B263 (1991) 563, PL B268 (1991) 145, ZPHY C49 (1991) 17, ZPHY C52 (1991) 209, PL B274 (1991) 507, PL B275 (1992) 202, PL B276 (1992) 354, PL B276 (1992) 365, PL B277 (1992) 194, PL B277 (1992) 203, PL B280 (1992) 137, PL B288 (1992) 386, PL B299 (1993) 174, and NP B400 (1993) 3. No other papers expected.

Related experiments CERN-UA-008

CERN-UA-004-2

(Approved Jul 1990, In progress)

A PRECISE MEASUREMENT OF THE REAL PART OF THE ELASTIC SCATTERING AMPLITUDE AT THE S$\overline{p}p$S

GENOA U & INFN, GENOA – M Bozzo, G Sette, M Zito
ECOLE POLYTECHNIQUE – C Augier, D Bernard, J Bourotte, M Haguenauer (Spokesperson)
PRAGUE, INST PHYS – V Kundrat, S Nemecek, M Novak, M Smizanska
ROME U, TORVERGATA & INFN, ROME – R Cardarelli, L Cerrito, G Matthiae, F Natali
VALENCIA U – F Alted, R Cases, E Sanchis, J Velasco

Accelerator CERN-PBAR/P *Detector* Wire chamber

Reactions

$\overline{p}\ p \rightarrow \overline{p}\ p$	630 GeV (E_{cm})

Brief description Measures the total cross section and the ratio ρ of the real to the imaginary part of the forward elastic scattering amplitude. The setup is composed of two pairs of Roman Pots placed symmetrically at 45 m from the crossing point. The horizontal scattering angle is measured by drift chambers and the vertical coordinate is obtained by using an hodoscope. Taking data (May 94).

Journal papers PL B315 (1993) 503, and PL B316 (1993) 448.

Related experiments CERN-UA-004

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CERN-UA-006

(Proposed Aug 1980, Approved Apr 1981, Feb 1987, Completed data-taking Dec 1990)

AN INTERNAL HYDROGEN JET TARGET IN THE SPS TO STUDY INCLUSIVE ELECTROMAGNETIC FINAL STATES AT LARGE TRANSVERSE MOMENTUM IN $\overline{p}p$ AND pp INTERACTIONS AT $\sqrt{s}$ = 24.3 GeV

BOLOGNA U & INFN, BOLOGNA – G Valenti
CERN – G Ballocchi, L Camilleri (√ Spokesperson), P Giacomelli, W Kubischta
LAUSANNE U – C Comtat, A Ebongue, F Gaille, C Joseph, J F Loude, C Morel, P Oberson, J Pages, J P Perroud, D Ruegger, G Sozzi, L Studer, M T Tran, M Werlen
MICHIGAN U – T Dershem, E C Dukes, D B Hubbard, O E Overseth, G R Snow
ROCKEFELLER U – P T Cox, R W Rusack, A Vacchi
LUND U – G Von Dardel
MILAN U & INFN, MILAN – L Dick
YALE U – P Cushman, V Singh

Accelerator CERN-PBAR/P *Detector* Double-arm spectrometer

Reactions

$\overline{p}\ p \rightarrow e^+\ e^-$ X	24.3 GeV (E_{cm})
$\overline{p}\ p \rightarrow \pi^0$ X	"
$\overline{p}\ p \rightarrow \gamma$ X	"
$\overline{p}\ p \rightarrow \overline{p}\ p$	"
$\overline{p}\ p \rightarrow$ X	"
$p\ p \rightarrow e^+\ e^-$ X	"
$p\ p \rightarrow \pi^0$ X	"
$p\ p \rightarrow \gamma$ X	"
$p\ p \rightarrow p\ p$	"
$p\ p \rightarrow$ X	"

Particles studied $J/\psi(1S)$

Brief description The $\overline{p}$ and p beams in the collider are in turn incident upon a gas jet target. In the reactions above, the emphasis is on large-mass electron pair production, the π^0 and γ inclusive cross sections at high $p_\perp$, and the elastic and inelastic cross sections at low t.

Journal papers NIM A252 (1986) 498, HPA 59 (1986) 584, PL B194 (1987) 568, NIM A273 (1988) 865, PL B206 (1988) 163, PL B216 (1989) 459, NIM A286 (1990) 49, PL B252 (1990) 505, PL B317 (1993) 243, and PL B317 (1993) 250.

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CERN-UA-008

(Proposed Oct 1984, Approved Apr 1985, Began data-taking Oct 1985, Completed data-taking Jun 1989)

STUDY OF JET STRUCTURE IN $\overline{p}p$ EVENTS TAGGED WITH LARGE-x PROTONS

UA8 COLLABORATION
UCLA – A Brandt, J B Cheze, S Erhan, A Kuzucu, M Medinnis, N Ozdes, P Schlein (√ Spokesperson), M Zeyrek, J Zsembery, J Zweizig

Accelerator CERN-PBAR/P *Detector* Calorimeter, Spectrometer

Reactions

$\overline{p}\ p \rightarrow \overline{p}\ p$ jet(s) X	630 GeV (E_{cm})
$\overline{p}\ p \rightarrow \overline{p}\ p$ X	"
$\overline{p}\ p \rightarrow p$ X	"
$\overline{p}\ p \rightarrow \overline{\Lambda}$ X	"

Particles studied pomeron, p

Brief description Studies large-x protons and antiprotons in the UA2 calorimeter system and the jet structure in high-mass diffraction to investigate the pomeron and its possible parton contents. Looks for evidences of both resolved and direct pomeron interactions. Uses four Roman Pot spectrometers and

a fast (400 ns) data driven trigger processor. Interfaced to the CERN-UA-002 experiment. Data analysis in progress (May 94).

Journal papers PL B211 (1988) 239, PL B297 (1992) 417, and NIM A327 (1993) 412.

Related experiments CERN-UA-002

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CERN-WA-079

(Proposed Apr 1983, Approved Jun 1983, Began data-taking Aug 1986, Completed data-taking Aug 1991)

STUDY OF NEUTRINO–ELECTRON SCATTERING AT THE SPS

CHARM-II COLLABORATION

MIDDLE EAST TECH U, ANKARA – B Akkus, E Arik, M Serin-Zeyrek, R Sever, P Tolun, M T Zeyrek
BRUSSELS U, IIHE – P Vilain, G Wilquet
CERN – W Flegel, H Grote, H Overas, J Panman, A Rozanov, K Winter (√ Spokesperson), G Zacek, V Zacek
FERRARA U & INFN, FERRARA – E Di Capua, S Ricciardi, B Saitta
HAMBURG U – R Beyer, F W Buesser, L Gerland, T Layda, F Niebergall, G Raedel, P Staehelin, T Voss
LOUVAIN U – D Favart, G Gregoire, E Knoops, V Lemaitre, T Mouthuy
MOSCOW, ITEP – P Gorbunov, E A Grigoriev, V D Khovansky, A Maslennikov
MUNICH U, EXP PHYS – A Nathaniel, A Staude
NAPLES U, IFS & INFN, NAPLES – V Cocco, A Ereditato, G Fiorillo, V Palladino, P Strolin
INFN, ROME – A Capone, D De Pedis, U Dore, P F Loverre, D Macina, G Piredda, A Rambaldi-Frenkel, R Santacesaria
BERLIN-ZEUTHEN ADW – K Hiller, R Nahnhauer, H E Roloff

Accelerator CERN-SPS *Detector* CHARM-II

Reactions

$\nu_\mu\ e^-$	5–100 GeV/c
$\overline{\nu}_\mu\ e^-$	"

Brief description The experiment aims at determining the electroweak mixing angle θ_W and the ratio g_A/g_V from the ratio of νe^- and $\overline{\nu} e^-$ scattering cross sections. The obtained values are to be compared to those determined with 10^6 times larger Q^2 at LEP. The CHARM-II neutrino detector consists of a massive, fine-grained, and low-density electronic calorimeter, followed by a muon spectrometer made of magnetized iron, with scintillators and drift chambers as active elements. The measurements are performed in the horn-focused wide-band neutrino beam.

Journal papers NIM A252 (1986) 443, NIM A260 (1987) 368, NIM A263 (1988) 109, PL B213 (1988) 554, NIM A277 (1989) 83, NIM A277 (1989) 170, NIM A278 (1989) 670, PL B231 (1989) 317, PL B232 (1989) 539, PL B245 (1990) 271, PL B247 (1990) 131, NP (PROC SUPPL) B19 (1991) 306, PL B259 (1991) 499, PL B281 (1992) 159, PL B302 (1993) 351, PL B309 (1993) 463, PL B313 (1993) 267, and PL B320 (1993) 203.

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CERN-WA-080

(Proposed 1982, Approved Feb 1983, Nov 1984, Began data-taking 1986, Completed data-taking Aug 1991)

STUDY OF RELATIVISTIC NUCLEUS–NUCLEUS COLLISIONS AT THE CERN SPS

WA80 COLLABORATION

BROOKHAVEN – C Chasman, R Debbe, O Hansen, B Moskowitz, H Wegner
CERN – A Franz
DARMSTADT, GSI – R Albrecht, R Bock, H H Gutbrod, B Kolb, M Purschke, B Roters, H R Schmidt, P Steinhaeuser
GRONINGEN U – H Loehner, I Lund
LBL – M Bloomer, P Jacobs, A Poskanzer
LUND U – G Claesson, A Eklund, S Garpmann, H A Gustafsson, J Idh, A Oskarsson, I Otterlund, K Soederstrom, E Stenlund
KURCHATOV INST, MOSCOW – V Antonenko, S Fokin, M Ippolitov, K Karadjev, A Lebedev, V Manko, S Nikolaev, A Vinogradov
MUNSTER U – C Barlag, F Berger, C Blume, D Bock, E M Bohne, D Bucher, A Claussen, G Clewing, L Dragon, R Glasow, G Hoelker, K H Kampert, T Peitzmann, R Santo (√ Spokesperson), K Steffens, D Stueken
OAK RIDGE – T Awes, F Obenshain, F Plasil, S Saini, M Tincknell, G Young
TENNESSEE U – S Sorensen

Accelerator CERN-SPS *Detector* Calorimeter, Spectrometer, PLASTIC-BALL

Reactions

^{16}O nucleus	60, 200 GeV (T_{lab}/N)
^{32}S nucleus	200 GeV (T_{lab}/N)
p nucleus	"

Brief description Forward and transverse energies are determined in calorimeters. Photons, π^0's, and η's are measured in the finely granulated lead glass spectrometer at midrapidity. Multiplicity distributions and fluctuations are studied in streamer tube arrays and the target rapidity is investigated using the Plastic Ball detector.

Journal papers PL B199 (1987) 297, NP A461 (1987) 487c, PL B201 (1988) 390, PL B202 (1988) 596, NP A488 (1988) 651c, APP B19 (1988) 399, ZPHY C38 (1988) 3, ZPHY C38 (1988) 51, ZPHY C38 (1988) 97, ZPHY C38 (1988) 109, NIM A276 (1989) 131, NIM A279 (1989) 479, NIM A279 (1989) 503, PL B221 (1989) 427, NP A498 (1989) 53c, NP A498 (1989) 391c, NP A498 (1989) 397c, ZPHY C45 (1989) 31, NIM A292 (1990) 81, PS T32 (1990) 118, PS T32 (1990) 147, NP A519 (1990) 449c, NP (PROC SUPPL) B16 (1990) 420, ZPHY C45 (1990) 529, ZPHY C47 (1990) 367, NP A525 (1991) 305c, NP A525 (1991) 333c, NP A525 (1991) 657c, PR C44 (1991) 2736, ZPHY C51 (1991) 1, NIM A321 (1992) 152, NP A544 (1992) 183c, NP A544 (1992) 449c, NP A544 (1992) 543c, ZPHY C53 (1992) 225, ZPHY C55 (1992) 539, PPNP 30 (1993) 171, PPNP 30 (1993) 353, PL B307 (1993) 269, ZPHY C57 (1993) 37, NP A566 (1994) 61c, NP A566 (1994) 355c, NP A566 (1994) 519c, NIM (to be published), and PR C (to be published).

Related experiments CERN-WA-093, CERN-WA-098

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CERN-WA-082

(Proposed Oct 1985, Approved Feb 1986, Began data-taking Jul 1987, Completed data-taking Sep 1989)

HIGH STATISTICS STUDY OF CHARM HADROPRODUCTION USING AN IMPACT PARAMETER TRIGGER

BOLOGNA U & INFN, BOLOGNA – A Forino, R Gessaroli, P Mazzanti, A Quareni-Vignudelli, F Viaggi
CERN – D Barberis, W Beusch, M Davenport, J P Dufey, B R French, A Jacholkowski, K Knudson, J C Lassalle, F Muller
GENOA U & INFN, GENOA – M Dameri, R Hurst, B Osculati, L Rossi (√ Spokesperson), G Tomasini
INFN, MILAN & MILAN U – C Meroni, N Redaelli, D Torretta
MONS U – J L Bailly, A Buys, F Grard, P Legros
LEBEDEV INST – M I Adamovich, Y A Alexandrov, S G Gerassimov, S P Kharlamov, L V Malinina, M V Zavertyaev

Accelerator CERN-SPS *Detector* OMEGA

Reactions

π^- nucleus → charm X	340 GeV/c (P_{lab})
p nucleus → charm X	370 GeV/c (P_{lab})

Particles studied charm, D^+, D^0, D_s^+, Λ_c^+

Brief description Triggers on charm decays by measuring the impact parameter. Uses silicon-strip counters as a microvertex detector. Targets are W, Cu, and Si.

Journal papers NP (PROC SUPPL) B1 (1988) 303, IEEE TNS 37 (1990) 236, NIM A288 (1990) 82, NP (PROC SUPPL) B16 (1990) 302, NIM A309 (1991) 401, PL B268 (1991) 142, NP (PROC SUPPL) B27 (1992) 212, PL B280 (1992) 163, PL B284 (1992) 453, PL B305 (1993) 177, and PL B305 (1993) 402.

Related experiments CERN-WA-092, FNAL-769

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CERN-WA-084

(Proposed Jan 1987, Approved Apr 1987, Completed data-taking Sep 1991)

STUDY OF THE PRODUCTION AND DECAY PROPERTIES OF BEAUTY FLAVORED HADRONS

BRUSSELS U, IIHE – G Wilquet
CERN – F Antinori, W Beusch, J P Fabre, D R O Morrison
IMPERIAL COLL – A Duane, K Harrison, D M Websdale
PISA U & INFN, PISA – M Adinolfi, C Angelini, A Cardini, V Flaminio, D Lucchesi, C Roda
ROME U & INFN, ROME – M Di Vincenzi, A Frenkel, E Lamanna, G Martellotti (✓ Spokesperson), G Penso, S Petrera, A Sciubba
RUTHERFORD – D J Crennell
SOUTHAMPTON U – J G McEwen

Accelerator CERN-SPS *Detector* OMEGA

Reactions

π^- nucleus $\rightarrow B\,\overline{B}$ X	350 GeV/c

Brief description Developing an active target composed of 30-μm-diameter scintillating plastic optical fibers. Aims are to measure the $B^{\pm}$ and B^0 lifetimes separately, the ratio $(b \rightarrow u)/(b \rightarrow c)$, and to search for $B^0\overline{B^0}$ mixing. Completed and no longer active (May 94).

Journal papers NIM A277 (1989) 132, NIM A289 (1990) 342, NIM A289 (1990) 356, NIM A295 (1990) 299, and NIM A311 (1992) 91. No further publications expected.

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CERN-WA-085

(Proposed Oct 1984, Mar 1987, Approved Apr 1987, Began data-taking Oct 1987, Completed data-taking Sep 1991)

STUDY OF HIGH ENERGY NUCLEUS–NUCLEUS INTERACTIONS USING THE Ω' SPECTROMETER EQUIPPED WITH A MULTIPARTICLE HIGH $p_\perp$ DETECTOR

WA85 COLLABORATION

ATHENS U – S Abatzis, G Vassiliadis
BARI U – N Di Bari, D Elia, R Fini, B Ghidini, A Jacholkowski, V Lenti, V Manzari, F Navach
BERGEN U – A K Holme
BIRMINGHAM U – R Barnes, A C Bayes, J N Carney, J P Davies, D Evans (✓ Spokesperson), J B Kinson, O Villalobos-Baillie, M F Votruba
CERN – A Andrighetto, F Antinori, W Beusch, J P Dufey, B R French, H Helstrup, A Kirk, K Knudson, J C Lassalle, E Quercigh, L Rossi, K Safarik
MADRID, CIEMAT – B de la Cruz
COLLEGE DE FRANCE – M Benayoun, J Kahane, P Leruste, J L Narjoux, M Sene, R Sene, A Volte
TRIESTE U & INFN, TRIESTE – A Bravar, A Penzo

Accelerator CERN-SPS *Detector* OMEGA-PRIME

Reactions

^{32}S Wt	200 GeV (T_{lab}/N)

Particles studied K^0, Λ, $\overline{\Lambda}$, Ξ^-, $\overline{\Xi}^+$, Ω^-, $\overline{\Omega}^+$

Brief description An exploratory experiment to look for new physics, and particularly for evidence of a quark–gluon plasma, through an increase in strange particle and antiparticle production. Some of the goals are a study of the Ξ and anti-Ξ production, and the full reconstruction of Ω and anti-Ω hyperons.

Journal papers NP A498 (1989) 369c, PL B244 (1990) 130, NP (PROC SUPPL) B16 (1990) 409, PL B259 (1991) 508, PL B270 (1991) 123, NP A525 (1991) 441c, NP A525 (1991) 445c, NP A544 (1992) 321c, PL B316 (1993) 615, NP A566 (1994) 225c, and NP A566 (1994) 491c.

Related experiments CERN-WA-094

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CERN-WA-086

(Proposed Mar 1987, Approved Jun 1987, Began data-taking 1989, Completed data-taking Sep 1991)

EXPOSURE OF CR39 STACKS TO OXYGEN AND/OR SULPHUR BEAMS AT THE CERN-SPS

BOLOGNA U & INFN, BOLOGNA – G Giacomelli (✓ Spokesperson), G Mandrioli, A Margiotta-Neri, L Patrizii, E Scapparone, P Serra-Lugaresi, G Sini, M Spurio, V Togo, G Vanderhaeghe

Accelerator CERN-SPS *Detector* Plastic

Reactions

^{16}O nucleus	50, 200 GeV (T_{lab}/N)
^{32}S nucleus	"

Brief description The main purpose is to calibrate CR39 sheets to be used in a large-area search for magnetic monopoles (see UNDERGROUND-MACRO) at the Gran Sasso Laboratory. Studies nuclear fragments from Z=6 to Z=16. Additionally, searches for nuclear fragments with an attached fractional charge. Oxygen data taken in 1989 and sulphur beam used in 1990/91.

Journal papers ASPP 1 (1993) 369.

Related experiments UNDERGROUND-MACRO

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CERN-WA-089

(Proposed Aug 1987, Aug 1987, Approved Feb 1988, Began data-taking 1990, In progress)

NEW HYPERON BEAM EXPERIMENT AT THE CERN-SPS USING THE OMEGA FACILITY

BRISTOL U – D Newbold, V Smith
CERN – W Beusch, W Klempt
GENOA U & INFN, GENOA – D Barberis, L Rossi
GRENOBLE U – C Berat, M Buenerd, F Charignon, J Chauvin, A Fournier, P Martin, M Rey-Campagnolle, E Vesin
HEIDELBERG, MAX PLANCK INST – E Albertson, M Beck, S Brons, W Brueckner, C Buescher, U Dersch, F Dropmann, S G Gerassimov, M Godbersen, T Haller, M Heidrich, K Koenigsmann, I Konorov, D Maier, S Masciocci, R Michaels, C Newsom, S Paul (✓ Spokesperson), B Povh, Z Ren, L Schmitt, A Trombini, K Vorwalter, R Werding, E Wittmann, M Zizelsberger
HEIDELBERG U – M Boss, P Lennert, K Martens, H Rieseberg, H W Siebert, A Simon, O Thilmann, G Waelder
MAINZ U, INST KERNPHYS – E Chudakov, U Mueller, G Rosner, H Rudolph, B Volkemer, T Walcher
LEBEDEV INST – M I Adamovich, Y A Alexandrov, M V Zavertyaev
RUTGERS U – R Ransome

Accelerator CERN-SPS *Detector* OMEGA

Reactions

Σ^- Cu	330 GeV/c (P_{lab})
Σ^- C	"
Ξ^- Cu	270 GeV/c (P_{lab})
Ξ^- C	"

Ω^- Cu	"
Ω^- C	"

Particles studied Λ_c^+, $\Sigma_c(2455)$, Ξ_c^0, Ξ_c^+, Ω_c^0, Ω^-, Ω^*(unspec), Ξ^*(unspec), dibaryon($S=-2$), $U(3100)$

Brief description The aims are (1) to study charmed strange baryons, (2) to see if the $U(3100)$ actually exists, (3) to study Ω decays and Ξ and Ω resonances, (4) to look for H, the doubly strange dibaryon, (5) to measure semileptonic decays of charmed particles, (6) to study hyperon polarization phenomena, and (7) to study $\Sigma^- e^-$ elastic scattering. Uses the upgraded OMEGA facility and a hyperon beam installed at the end of the H1 beamline. Taking data (May 94).

Journal papers NIM A313 (1992) 203, NIM A313 (1992) 345, NIM A313 (1992) 425, NIM A323 (1992) 373, NIM A343 (1994) 60, NIM A343 (1994) 258, and NIM A343 (1994) 279.

Related experiments CERN-WA-062

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WWW Home-page http://vsnhd1.cern.ch/

CERN-WA-090

(Approved Apr 1990, Completed data-taking Oct 1991)

MEASUREMENTS OF PAIR PRODUCTION AND ELECTRON CAPTURE FROM THE CONTINUUM IN HEAVY PARTICLE COLLISIONS

SIEGBAHN INST PHYS, STOCKHOLM – H Gao, R H Schuch
LUND U – R Hutton
OAK RIDGE – C Bottcher, S Datz (Spokesperson), P F Dittner, H F Krause, C R Vane

Accelerator CERN-SPS *Detector* ?

Reactions

^{32}S nucleus	200 GeV (T_{lab}/N)

Brief description Runs parasitic to WA-093. Studies the electron capture from pair production. This is the only electron capture process which increases with energy, and as such, dominates all others in the ultrarelativistic energy regime. Thin Au, Pd, and Al targets are placed in a beamline dipole magnet: e^+e^- pairs created in the forward direction are split and bent into the detector planes on either side of the target.

Related experiments CERN-WA-099

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CERN-WA-091

(Proposed Jan 1990, Approved Apr 1990, Began data-taking Jun 1991, In progress)

SEARCH FOR CENTRALLY PRODUCED NON-$q\bar{q}$ MESONS IN PROTON–PROTON INTERACTIONS AT 450 GeV/c BY USING THE CERN Ω SPECTROMETER

ATHENS U – S Abatzis, G Vassiliadis
BARI U & INFN, BARI – N Di Bari, R Fini, B Ghidini, V Lenti, A Loconsole, V Manzari, F Navach
BIRMINGHAM U – A C Bayes, J N Carney, S Clewer, J P Davies, C J Dodenhoff, J B Kinson, K Norman, O Villalobos-Baillie, M F Votruba
CERN – F Antinori, D Barberis, W Beusch, D Evans, B R French, A Jacholkowski, A Kirk (√ Spokesperson), K Knudson, J C Lassalle, E Quercigh
DUBNA – Y Kulchitsky, S Maljukov, I Minashvili, V Romanovsky, N Russakovich, A Semenov, A Solovjev, G Tchlatchidze
COLLEGE DE FRANCE – M Sene, R Sene

Accelerator CERN-SPS *Detector* OMEGA

Reactions

$p\,p \rightarrow p\,p\,X$	450 GeV/c

Brief description A search for new, non-$q\bar{q}$ states in the central region, with at least 10 times the statistics of the CERN-WA-076 experiment. Uses a liquid hydrogen target. Taking data (May 94).

Journal papers PL B324 (1994) 509, and NC (to be published).

Related experiments CERN-WA-076

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CERN-WA-092

(Approved Jul 1990, Completed data-taking)

MEASUREMENT OF BEAUTY PARTICLE LIFETIMES AND HADROPRODUCTION CROSS SECTIONS

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CERN – F Antinori, W Beusch, J P Dufey, P Farthouat, B R French, A Kirk, J C Lassalle, M Passaseo, V Ryzhov, G Schuler
DUBNA – S Maljukov, I Minashvili, N Russakovic, A Semenov, A Soloviev
GENOA U & INFN, GENOA – M Adinolfi, D Barberis, M Dameri, G Darbo, R Hurst, P Martinengo, B Osculati, L Rossi (√ Spokesperson), C Salvo
IMPERIAL COLL – A Duane, D M Websdale
LEBEDEV INST – M Adamovich, Y Alexandrov, S Kharlamov, P Nechaeva, M Zavertyaev
PISA U & INFN, PISA – C Angelini, A Cardini, V Flaminio, C Lazzeroni, C Roda
ROME U & INFN, ROME – C Bacci, F Ceradini, G Ciapetti, A Frenkel, K Harrison, F Lacava, G Martellotti, A Nisati, D Orestano, G Penso, E Petrolo, L Pontecorvo, M Torelli, S Veneziano, M Verzocchi, L Zanello
ROME U, TORVERGATA & INFN, ROME – R Cardarelli, A Di Ciaccio, R Santonico
SOUTHAMPTON U – J G McEwen

Accelerator CERN-SPS *Detector* ?

Brief description An experimental search for beauty particles produced in fixed target hadronic interactions. Uses a high precision 'decay detector' and a fast secondary vertex trigger processor. Data analysis in progress (May 94).

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CERN-WA-093

(Approved Nov 1990, Completed data-taking May 1992)

A LIGHT UNIVERSAL DETECTOR FOR THE STUDY OF CORRELATIONS BETWEEN PHOTONS AND CHARGED PARTICLES

CALCUTTA, VECC – S Chattopadhyaya, A C Das, M R Dutta-Majumdar, T K Ghosh, G S N Murthy, B C Sinha, Y P Viyogi
PANJAB U – M M Aggarwal, V S Bhatia, B S Garcha, I S Mittra
DARMSTADT, GSI – R Bock, H H Gutbrod (Spokesperson), B W Kolb, M Purschke, B Roters, H R Schmidt, P Steinhaeuser
GENEVA U – A L S Angelis, P Doenni, E Durieux, M Izycki, M Martin, H P Naef, L Rosselet, J Rubio, N Solomey
GRONINGEN U – H Loehner, I Lund, R Siemssen
RAJASTHAN U – K B Bhalla, S K Gupta, V Kumar, S Lokanathan, S Mookerjee, S Raniwala
JAMMU U – S K Badyal, B P V K S Devanand, S Kumar, N K Rao, S Sambyal
LUND U – G Claesson, A Eklund, S Garpman, H A Gustafsson, J Idh, A Oskarsson, I Otterlund, K Soederstrom, E Stenlund, H J Whitlow
KURCHATOV INST, MOSCOW – V Antonenko, S Fokin, M Ippolitov, K Karadjev, A Lebedev, V Manko, S Nikolaev, A Vinogradov
MUNSTER U – F Berger, D Bock, G Clewing, L Dragon, R Glasow, M Hartig, G Hoelker, K H Kampert, T Peitzmann, R Santo, K Steffens, D Stueken, A Twyhues
OAK RIDGE – T C Awes, R L Ferguson, F E Obenshain, F Plasil, S Saini, M L Tincknell, G R Young

TENNESSEE U – X C He, S P Sorensen
UTRECHT U – R Kamermans, N van Eijndhoven
WARSAW, INST NUCL STUDIES – T Siemiarczuk, G Stefanek

Accelerator CERN-SPS *Detector* ?

Reactions

Su nucleus	200 GeV (T_{lab}/N)

Brief description The experiment combines two essential means of quark matter diagnosis: the measurement of photon production rates relative to charged particles, and the measurement of transverse momenta of charged and neutral particles and their correlations. The setup consists of highly segmented lead glass arrays, a preshower detector that can be operated in a hadron-blind mode, and a set of multistep avalanche chambers readout by CCD cameras downstream of the GOLIATH vertex magnet.

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CERN-WA-094

(Proposed Jan 1991, Approved Apr 1991, Began data-taking Oct 1991, Completed data-taking Nov 1993)

STUDY OF BARYON AND ANTIBARYON SPECTRA IN SULPHUR–SULPHUR INTERACTIONS AT 200 GeV/c PER NUCLEON

WA94 COLLABORATION

ATHENS U – S Abatzis, G Vassiliadis
BARI U – D Di Bari, D Elia, R Fini, B Ghidini, A Jacholkowski, V Lenti, R A Loconsole, V Manzari, F Navach
BERGEN U – E Andersen, K Fanebust, A K Holme, G Lovhoiden, T F Thorsteinsen, G Undheim
BIRMINGHAM U – A C Bayes, J N Carney, S Clewer, J P Davies, J B Kinson (√ Spokesperson), R Lietava, K Norman, O Villalobos-Baillie, M F Votruba
CERN – F Antinori, W Beusch, J P Dufey, D Evans, B R French, H Helstrup, A Kirk, K Knudson, J C Lassalle, M Passaseo, E Quercigh, K Safarik
KOSICE, IEF – J Boehm, I Kralik, K Piska, L Sandor, J Urban, P Zavada
LEGNARO – R A Ricci
MADRID, CIEMAT – B de la Cruz, P Ladron de Guevara
PADUA U & INFN, PADUA – A Andrighetto, M Morando, F Pellegrini, G Segato
COLLEGE DE FRANCE – M Benayoun, J Kahane, P Leruste, J L Narjoux, R Sene, S Szafran, A Volte
SERPUKHOV – V A Kachanov, A V Singovsky
STRASBOURG, CRN – R Blaes, J M Brom, R Fang, W Geist, T Kachelhoffer, M E Michalon-Mentzer, A Michalon, J L Riester, C Voltolini
TRIESTE U & INFN, TRIESTE – A Bravar, A Penzo

Accelerator CERN-SPS *Detector* OMEGA

Reactions

Su Su	200 GeV (T_{lab}/N)
p Su	200 GeV (T_{lab})

Particles studied strange

Brief description Extends analysis of CERN-WA-085 from S W to S S interactions. For the 1992 run the apparatus has been modified to measure charged particle spectra (in particular p and $\bar{p}$) with particle identification using an array of silicon microstrip detectors and a newly upgraded ring-imaging Čerenkov detector.

Journal papers NP A566 (1994) 499.

Related experiments CERN-WA-085, CERN-WA-085, CERN-WA-097

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CERN-WA-095

(Proposed Dec 1990, Approved Sep 1991, Began data-taking May 1994)

A NEW SEARCH FOR $\nu_\mu \leftrightarrow \nu_\tau$ OSCILLATIONS

CHORUS COLLABORATION

NIKHEF, AMSTERDAM – M De Jong, J Konijn, C A F J Van Der Poel, J L Visschers
MIDDLE EAST TECH U, ANKARA – E Arik, E Eskut, A A Mailov, G Onenguet, E Pesen, M Serin-Zeyrek, R Sever, P Tolun, M T Zeyrek
BARI U – N Armenise, M G Catanesi, M T Muciaccia, S Simone
HUMBOLDT U, BERLIN – K Hoepfner, P Lendermann, T Patzak
BRUSSELS U, IIHE – M Gruwe, C Mommaert, P Vilain, G Wilquet
CERN – J Brunner, J P Fabre, R Ferreira, W Flegel, D Macina, R Meijer-Drees, H Overas, J Panman, A Rozanov, G Stefanini, K Winter (√ Spokesperson), H Wong
FERRARA U & INFN, FERRARA – E Di Capua, C Luppi, S Ricciardi, B Saitta, P Zucchelli
LOUVAIN U – D Favart, G Gregoire, X Lauwerys, V Lemaitre, L Michel
MOSCOW, ITEP – A Artamonov, P Gorbunov, V Khovansky, V Shamanov, V Smirnitsky
MUNSTER U – D Bonekaemper, D Frekers, H Heynitz
NAPLES U, IFS & INFN, NAPLES – S Buontempo, A Cocco, A Ereditato, G Fiorillo, F Marchetti-Stasi, V Palladino, F Riccardi, P Strolin
ROME U & INFN, ROME – G Baroni, A Capone, D De Pedis, S Di Liberto, U Dore, P F Loverre, M A Mazzoni, F Meddi, G Piredda, R Santacesaria
SALERNO U & INFN, SALERNO – G Grella, G Romano, G Rosa
AICHI U OF EDUCATION – K Kodama, N Ushida
GIFU U – K Nakazawa
KOBE U – S Aoki, T Hara
KINKI U, IIZUKA – H Chikawa
NAGOYA U – K Hoshino, M Kobayashi, M Nakamura, Y Nakamura, T Nakano, K Niu, K Niwa, O Sato
OSAKA CITY U – K Nakamura, T Okusawa, M Teranaka
TOHO U – M Kazuno, H Shibuya
UTSUNOMIYA U – Y Sato, I Tezuka
KANGWEON NATIONAL U – C H Hahn
CHONNAM NATIONAL U – J Y Kim, I T Lim
GYEONGSANG NATIONAL U – K S Chung, I G Park, J S Song

Accelerator CERN-SPS *Detector* Spectrometer, Calorimeter

Reactions

ν_τ nucleon $\rightarrow \tau^-$ X	25 GeV (E_{lab})

Brief description The setup consists of a target region, an aircore magnet, a high-precision calorimeter, and a muon spectrometer. Nuclear emulsion stacks form the 800-kg mass of the fiducial target volume. Decays of short-lived particles, such as the τ, are visualized with high efficiency. Tracks are located in the emulsion with high-precision scintillating fiber trackers, and readout with optoelectronic image intensifiers coupled to CCD cameras, thus permitting computer-assisted scanning. The hexagonal aircore magnet provides the measurement of the charge-sign of low energy hadrons and muons. The high-precision calorimeter, which is based on spaghetti technology, tags the τ^- decay by its transverse momentum imbalance. The spectrometer identifies muons and measures their momentum and charge. Taking data (May 94).

Journal papers NIM A344 (1994) 143.

Related experiments CERN-WA-096, FNAL-803

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WWW Home-page http://chorusinfo.cern.ch/chorus-default.html

CERN-WA-096

(Proposed Mar 1991, Approved Sep 1991, Began data-taking Apr 1994)

SEARCH FOR THE OSCILLATION $\nu_\mu \leftrightarrow \nu_\tau$

ANNECY – G Bassompierre, T Fazio, J M Gaillard, M Gouanere, E Manola, J P Mendiburu, P Nedelec, H Pessard, D Sillou, D Verkindt
MASSACHUSETTS U, AMHERST – G Ballocchi, J J Gomez-Cadenas
CALABRIA U – L La Rotonda, M Valdata
CERN – I Bird, L Camilleri, L Di Lella, P Farthouat, A Geiser, A Grant, W Huta, B Khomenko, L Linssen, A Placci, A Rubbia, C Sobczynski, E Tsesmelis
DORTMUND U – J Andrle, C Goessling, B Lisowski, H Plothow-Besch, D Pollmann, B Schmidt, A Voullieme, T Weisse
DUBNA – S A Bunyatov, O L Klinov, Y A Nefedov, B Popov, S Tereshchenko, S Valuev
FLORENCE U & INFN, FLORENCE – G Conforto, E Iacopini, F Martelli, M Veltri
HARVARD U – T Dignan, G Feldman, D Hubbard, P Hurst, S Mishra
JOHNS HOPKINS U – B Blumenfeld, J Long, D M Steele
LAUSANNE U – P Galumian, Y Giomataris, C Joseph, J F Loude, J P Perroud, M Steininger, T M Tran, J M Vieira, M Werlen
MELBOURNE U – G Moorhead, G Taylor, S Tovey
MOSCOW, INR – S Gninenko, A Kovzelev, S Volkov
PADUA U & INFN, PADUA – M Baldo-Ceolin, F Bobisut, D Gibin, A Guglielmi, M Laveder, M Mezzetto, G Puglierin
PARIS, CURIE UNIV VI & PARIS, UNIV VII, LPNHE – P Astier, M Banner, A Castera, J Dumarchez, A Letessier-Selvon, J M Levy, A M Touchard, V Uros, F Vannucci (√ Spokesperson)
PAVIA U & INFN, PAVIA – G Ambrosini, P Cattaneo, C Conta, R Ferrari, M Fraternali, G Fumagalli, G V Goggi, F Pastore, E Pennacchio, G Polesello, A Rimoldi
PISA U & INFN, PISA – D Autiero, P Camarri, A Cardini, V Cavasinni, A De Santo, N DelPrete, V Flaminio, G Renzoni, C Roda
SACLAY – A Baldisseri, J Bouchez, D Garretta, J Gosset, J P Meyer, T Stolarczyk, M Vo, H Zaccone
SYDNEY, ANSTO – I J Donnelly, K Varvell
SYDNEY U – L Peak
UCLA – M Cardini, R Cousins
BOSKOVIC INST, ZAGREB – D Kekez, A Ljubičić, T Tustonić

Accelerator CERN-SPS *Detector* Spectrometer

Reactions

ν	10–200 GeV (T_{lab})
ν_τ nucleon $\rightarrow \tau$ X	—

Brief description Searches for the oscillation $\nu_\mu \leftrightarrow \nu_\tau$ in a wide-band, 10–200 GeV neutrino beam. Aims at detecting ν_τ charged current interactions by observing the production of the τ through its various decay modes by means of kinematical criteria. The detector reconstructs the event kinematics. It uses the CERN-UA-001 magnet. The target consists of 147 drift chamber planes with a total mass of 2.9 tons. It is followed by transition radiation detectors and an electromagnetic calorimeter which includes a preshower detector. Running (May 94).

Related experiments CERN-WA-095, FNAL-803

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WWW Home-page http://nomadinfo.cern.ch/

CERN-WA-097

(Proposed May 1991, Approved Sep 1991, In preparation)

STUDY OF BARYON AND ANTIBARYON SPECTRA IN Pb Pb INTERACTIONS AT 160 GeV/c PER NUCLEON

ATHENS U – G Vassiliadis
BARI U & INFN, BARI – N Armenise, M G Catanesi, D Di Bari, A Di Mauro, D Elia, R A Fini, B Ghidini, A Jacholkowski, V Lenti, V Manzari, M T Muciaccia, E Nappi, F Navach, F Posa, T Scognetti, S Simone
BERGEN U – E Andersen, L P Csernai, A K Holme, E F Staubo, T F Thorsteinsen
BIRMINGHAM U – A C Bayes, J N Carney, S Clewer, J P Davies, P Jovanovic, J B Kinson, R Lietava, O Villalobos-Baille, M F Votruba
CERN – F Antinori, W Beusch, E Chesi, J P Dufey, D Evans, B R French, H Helstrup, A Kirk, W Klempt, K Knudson, J C Lassalle, P Martinengo, E Quercigh (√ Spokesperson), K Safarik
COLLEGE DE FRANCE – M Benayoun, A Diaczek, J Kahane, P Leruste, J L Narjoux, M Pairat, S Selmane, M Sene, R Sene, S Szafran, A Volte
GENOA U & INFN, GENOA – M Dameri, G Darbo, B Osculati, L Rossi, C Salvo
KOSICE, IEF – J Ban, I Kralik, M Luptak, L Sandor, J Urban
LEGNARO – R A Ricci
OSLO U – G Lovhoiden
PADUA U & INFN, PADUA – M Morando, F Pellegrini, G Segato
PRAGUE, INST PHYS – J Bohm, K Piska, P Zavada
PRAGUE, TECH U – I Macha, B Sopko, M Vanickova
ROME U & INFN, ROME – H Beker, S Di Liberto, M A Mazzoni, F Meddi, G Rosa, T Virgili
SALERNO U & INFN, SALERNO – G Grella, M Guida, G Romano
SERPUKHOV – G Alexeev, A Inyakin, V A Kachanov, V Khodyrev, P Shagin, A Singovski
STRASBOURG, CRN – R Blaes, J M Brom, R Fang, W Geist, T Kachelhoffer, M E Michalon-Mentzer, A Michalon, A Pallares, J L Riester, H Vettunen, C Voltolini

Accelerator CERN-SPS *Detector* OMEGA

Reactions

Pb Pb	160 GeV (T_{lab}/N)
p Pb	160 GeV (T_{lab})

Particles studied K_S, Λ, Ξ^-, Ω^-

Brief description The experiment aims to measure spectra of strange particles, in particular of hyperons and antihyperons, produced in ultrarelativistic lead–lead interactions. The setup consists of: (a) an array of multiplicity counters, (b) a silicon based decay detector made of microstrips, pads and pixels, located within the OMEGA spectrometer, (c) an array of pad cathode MWPC's used as lever arm detectors, (d) the OMEGA Ring Imaging Čerenkov detector, and (e) a zero degree hadron calorimeter. In preparation (May 94).

Related experiments CERN-WA-085, CERN-WA-094

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CERN-WA-098

(Approved Apr 1992, In preparation)

LARGE ACCEPTANCE MEASUREMENT OF PHOTONS AND CHARGED PARTICLES IN HEAVY ION REACTIONS

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CALCUTTA, VECC – S Chattopadhyay, A C Das, M D Dutta Mazumdar, T K Ghosh, G S N Murthy, B C Sinha, M D Trivedi, Y P Viyogi
MIT, LNS – G Roland, P Steinberg, B Wyslouch
CERN – S Neumaier
PANJAB U – M M Aggarwal, V S Bhatia, I S Mittra, P Saxena, K Singh
DARMSTADT, GSI – H H Gutbrod (√ Spokesperson), B W Kolb, I Langbein, Y Y Lee, T K Nayak, M Purschke, B Roters, H R Schmidt, P Steinhaeuser
DUBNA – V Arefiev, V Astakhov, V Datsko, R Eremeev, V Frolov, O Gavrishchuk, V Genchev, B Guskov, I Kosarev, N Kuzmin, K Kuznetsov, A Maximov, R Mehdiyev,

P Nomokonov, A Parfenov, S Pavliouk, V Senchishin, G Shabratova, A Vodopiarov, I Zalubovsky
GENEVA U – A L S Angelis, P Doenni, M Izycki, H Kalechofsky, M Martin, H P Naef, L Rosselet, J Rubio, A Ster, S Tambouti
GRONINGEN U – J Dalstra, J R Fransens, H Loehner, R Siemssen, S Slegt, G J Van Nieuwenhuizen
RAJASTHAN U – A Agnihotri, K B Bhalla, S K Gupta, V Kumar, S Lokanathan, S Mookerjee, S Raniwala
JAMMU U – S K Badyal, Devanand, S Kumar, N K Rao, S Sambyal
LUND U – L Carlen, S Garpman, H A Gustafsson, J Nystrand, A Oskarsson, I Otterlund, K Soederstrom, E Stenlund, T Svensson
KURCHATOV INST, MOSCOW – V Antonenko, Y Dubovik, S Fokin, M Ippolitov, K Karadjev, A Lebedev, V Manko, A Nianine, S Nikolaev, R Scherbatchev, A Tsvetkov, A Vinogradov
MUNSTER U – C Barlag, C Blume, D Bock, E M Bohne, D Bucher, A Claussen, G Clewing, U Denningmann, R Glasow, G Hoelker, K H Kampert, J Langheinrich, J Mantaj, T Peitzmann, R Santo, G Schepers, H Schlagheck, M Schnittker, K Steffens, D Stueken
OAK RIDGE – T C Awes, H Kim, J Kreke, F E Obenshain, F Plasil, S Saini, P Stankus, G Young
REZ, NUCL PHYS INST – A Kugler, M Pachr, J Rak, M Sumbera
TENNESSEE U – X C He, S P Sorensen
UTRECHT U – F Geurts, R Kamermans, P Kuijer, C Twenhoefel, N Van Eijndhoven, E Van Heeringen
WARSAW, INST NUCL STUDIES – T Siemiarczuk, G Stefanek, L Tykarski

Accelerator CERN-SPS *Detector* Calorimeter, Spectrometer

Reactions

Pb Pb	160 GeV/c (P_{lab}/N)

Particles studied pion, η, chgd-hadron(s)

Brief description This is an extension of CERN-WA-093. The aim is a high statistics study of photons and neutral hadrons, as well as of charged particles, and their correlations in Pb–Pb collisions. Photons are measured by (a) the 10,000 module Leadglass Spectrometer yielding high precision data on π^0 and η at midrapidity (with transverse momenta 0.3 GeV/c $< p <$ 4.5 GeV/c for π^0, and 1.5 GeV/c $< p <$ 4.0 GeV/c for η, covering the thermal as well as the hard scattering regime beyond 3 GeV/c) and determination of the thermal and direct photon to π^0 ratio, and (b) the pad preshower Photon Multiplicity Detector which, by comparing with the charged particle multiplicity measurement, allows a determination of the photon enrichment in an event or event-class. The charged particle setup consists of (i) the Multistep Avalanche Chamber Tracking System with Silicon Drift Chambers to measure the multiplicities and the momenta, and (ii) a time-of-flight system for particle identification. In preparation (May 94).

Related experiments CERN-WA-080, CERN-WA-093

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CERN-WA-099

(Approved Apr 1993, In preparation)

MEASUREMENTS OF PAIR PRODUCTION AND ELECTRON CAPTURE FROM THE CONTINUUM IN HEAVY PARTICLE COLLISIONS

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LUND U – R Hutton
SIEGBAHN INST PHYS, STOCKHOLM – R H Schuch
OAK RIDGE – S Datz (Spokesperson), P F Dittner, H F Krause, C R Vane (Spokesperson)

Accelerator CERN-SPS *Detector* ?

Brief description Large transient Coulomb fields, which are generated in collisions of high-Z systems at sufficiently high energies, lead to copious production of electron–positron pairs. For very heavy ions and high energies, multiple pairs are expected to be formed even in single peripheral collisions. Some of the electrons produced may be captured into bound states of the ion, thereby reducing its charge state by one unit. This process, which has been termed Electron Capture from Pair Production, represents the only electron capture process which increases with energy, and as such, will dominate all others in the ultrarelativistic energy regime. The aim of the experiment is to extend the study of the process into regions of collision strength where perturbation theory is expected to fail, by using 160 GeV/nucleon Pb ions. Momentum and angular differential cross sections are measured for single and multiple electron–positron pairs formed in peripheral collisions. In a separate measurement, atomic charge changing of the Pb ions is studied in a variety of targets and thicknesses using a beamline as a projectile charge-state analyzer. Cross sections for electron capture of the pair-produced electrons to atomic bound states, as well as cross sections for projectile ionization, are also measured. In preparation (May 94).

Related experiments CERN-WA-090

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CERN-WA-101

(Proposed Apr 1993, Approved Nov 1993, In preparation)

MEASUREMENT OF CROSS SECTIONS FOR ELECTRON CAPTURE AND STRIPPING, NUCLEAR CHARGE PICKUP, ELECTROMAGNETIC DISSOCIATION, AND SECONDARY INTERACTIONS USING THE 160 GeV/c PER NUCLEON Pb BEAM AT CERN-SPS

UC, BERKELEY – Y He, P B Price, A J Westphal
BOLOGNA U & INFN, BOLOGNA – G Giacomelli (√ Spokesperson), A Margiotta, L Patrizii, P Serra, M Spurio

Accelerator CERN-SPS *Detector* ?

Reactions

Pb nucleus	160 GeV/c (P_{lab}/N)

Brief description Studies several interesting interactions in heavy-ion collisions using the 160 GeV/c per nucleon Pb beam at SPS. Measures cross sections of nuclear charge pickup, nuclear and electromagnetic spallation, fragmentation of secondary beams, and capture and stripping. Uses 10 stacks of BP-1 phosphate glass detectors, as well as lexan and CR39, and a variety of targets. The BP-1 can measure ionic charges with a good resolution in a very small sampling distance, and its sensitivity can be tuned after irradiation. The measuring process makes use of automated optical microscope scanning systems available at Berkeley and at Bologna and atomic force microscopes. In preparation (May 94). Exposures planned for the end of 1994 or beginning of 1995.

Related experiments NONE

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CESR Experiments

CESR-CLEO

(Began data-taking Oct 1979, In progress)

THE CLEO EXPERIMENT AT CESR

CLEO COLLABORATION

CAL TECH – B Barish, M Chadha, S Chan, D F Cowen, G Eigen, J S Miller, C O'Grady, J Urheim, A J Weinstein
UC, SAN DIEGO – M Athanas, W Brower, G Masek, H Paar, M Sivertz
UC, SANTA BARBARA – J Gronberg, R Kutschke, S Menary, R J Morrison, S Nakanishi, H N Nelson, T K Nelson, C Qiao, J D Richman, A Ryd, H Tajima, M Witherell
CARLETON U – K W Edwards, M Ogg
MCGILL U – A Bellerive, D I Britton, E R F Hyatt, D B MacFarlane, P M Patel, B Spaan
COLORADO U – R Balest, K Cho, W T Ford, K Lingel, M Lohner, P Rankin, J G Smith
CORNELL U – J Alexander, C Bebek, K Berkelman, K Bloom, T Browder, D G Cassel, H A Cho, D M Coffman, D S Crowcroft, P S Drell, D Dumas, R Ehrlich, R Elia, P Gaiderev, R S Galik, M Garcia-Sciveres, B Geiser, B Gittelman, S W Gray, D L Hartill, B K Heltsley, S Henderson, C D Jones, S L Jones, J Kandaswamy, N Katayama, P C Kim, D L Kreinick, G S Ludwig, J Masui, J Mevissen, N B Mistry, C R Ng, E Nordberg, J R Patterson, D Peterson, D Riley, S Salman, A Soffer, F Wuerthwein
FLORIDA U – P Avery, A Freyberger, J Rodriguez, S Yang, J Yelton
HARVARD U – G Brandenburg, D Cinabro, T Liu, M Saulnier, R Wilson, H Yamamoto
ILLINOIS U, URBANA – T Bergfeld, B I Eisenstein, G Gollin, B Ong, M Palmer, M Selen, J J Thaler
ITHACA COLL – A J Sadoff
KANSAS U – R Ammar, P Baringer, A Bean, D Besson, D Coppage, N Copty, R Davis, N Hancock, M Kelly, S Kotov, I Kravchenko, N Kwak, H Lam
MINNESOTA U – Y Kubota, M Lattery, M Momayezi, J K Nelson, S Patton, R Poling, V Savinov, S Schrenk, R Wang
SUNY, ALBANY – M S Alam, I J Kim, Z Ling, A H Mahmood, J J O'Neill, H Severini, C R Sun, F Wappler
OHIO STATE U – G Crawford, C M Daubenmier, D Fujino, R Fulton, K K Gan, K Honscheid, H Kagan, R Kass, J Lee, R Malchow, M K Sung, C White, A Wolf, M M Zoeller
OKLAHOMA U – F Butler, X Fu, B Nemati, W R Ross, P Skubic, M Wood
PURDUE U – M Bishai, J Fast, E Gerndt, R L McIlwain, T Miao, D H Miller (✓ Spokesperson), M Modesitt, D Payne, E I Shibata, I P J Shipsey, P N Wang
ROCHESTER U – J Ernst, L Gibbons, Y Kwon, S Roberts, E H Thorndike, C H Wang
SOUTHERN METHODIST U – J Dominick, M Lambrecht, S Sanghera, V Shelkov, T Skwarnicki, R Stroynowski, I Volobouev, G Wei, P Zadorozhny
SYRACUSE U – M Artuso, M Gao, M Goldberg, D He, N Horwitz, G C Moneti, R Mountain, F Muheim, Y Mukhin, S Playfer, S Stone, X Xing, G Zhu
VANDERBILT U – J Bartelt, S E Csorna, V Jain
VIRGINIA TECH – D Gibaut, K Kinoshita, P Pomianowski

Accelerator CESR *Detector* CLEO

Reactions

$e^+ e^- \rightarrow$ hadrons	9.0–12.0 GeV (E_{cm})
$e^+ e^- \rightarrow e^+ e^-$	"
$e^+ e^- \rightarrow \mu^+ \mu^-$	"
$e^+ e^- \rightarrow e^+ e^-$ hadrons	"
$e^+ e^- \rightarrow \tau^+ \tau^-$	"

Particles studied $\Upsilon(1S)$, $\Upsilon(2S)$, $\Upsilon(3S)$, $\Upsilon(4S)$, B, τ, D^+, D^0, D_s^+, charmed-baryon

Brief description Studies e^+e^- interactions in the energy range of the Υ resonances. Topics include $b\bar{b}$ spectroscopy, b-quark decays, decays of the Υ's, τ decays, charm spectroscopy and decays, and two-photon physics. The CLEO-II detector (operational since 1989) consists of drift chambers for tracking charged particles and measuring dE/dx, time-of-flight counters, a 7800-element CsI electromagnetic calorimeter, a 1.5-tesla superconducting solenoid, iron for flux return and muon identification, and muon chambers. Taking data (May 94). A major improvement, CLEO-III detector, was proposed in February 94.

Journal papers PRL 44 (1980) 1108, PRL 45 (1980) 219, PRL 46 (1981) 84, PRL 46 (1981) 88, PRL 46 (1981) 1181, PRL 48 (1982) 1070, PRL 49 (1982) 357, PRL 49 (1982) 610, PRL 49 (1982) 617, NIM 211 (1983) 47, PL B122 (1983) 317, PRL 50 (1983) 807, PRL 50 (1983) 877, PRL 50 (1983) 881, PRL 51 (1983) 347, PRL 51 (1983) 634, PRL 51 (1983) 1139, PRL 51 (1983) 1143, PR D27 (1983) 475, PR D27 (1983) 1665, PL B137 (1984) 277, PRL 52 (1984) 799, PRL 52 (1984) 1084, PRL 53 (1984) 24, PRL 53 (1984) 1309, PR D29 (1984) 1285, PR D30 (1984) 1433, PR D30 (1984) 1996, PR D30 (1984) 2279, PRL 54 (1985) 381, PRL 54 (1985) 1894, PRL 55 (1985) 923, PRL 55 (1985) 1248, PR D31 (1985) 2161, PR D31 (1985) 2386, PR D32 (1985) 2294, PR D32 (1985) 2468, PRL 56 (1986) 800, PRL 56 (1986) 1222, PRL 56 (1986) 1893, PRL 56 (1986) 2676, PRL 56 (1986) 2781, PR D33 (1986) 300, PR D34 (1986) 905, PR D34 (1986) 3279, PL B183 (1987) 429, PL B191 (1987) 319, PRL 58 (1987) 183, PRL 58 (1987) 307, PRL 58 (1987) 1814, PRL 59 (1987) 22, PRL 59 (1987) 407, PRL 59 (1987) 1993, PR D35 (1987) 19, PR D35 (1987) 1081, PR D35 (1987) 2747, PR D35 (1987) 3533, PR D36 (1987) 690, PR D36 (1987) 1289, PRL 60 (1988) 1614, PR D37 (1988) 1719 [erratum: PR D39 (1989) 1471], PR D38 (1988) 2679 [erratum: PR D40 (1989) 1701], PL B223 (1989) 470, PL B224 (1989) 445, PL B226 (1989) 192, PL B226 (1989) 401, PRL 62 (1989) 8, PRL 62 (1989) 863, PRL 62 (1989) 1240, PRL 62 (1989) 2233, PRL 62 (1989) 2436, PRL 63 (1989) 1667, PR D39 (1989) 3528, PR D40 (1989) 263, PR D40 (1989) 712 [erratum: PR D40 (1989) 3790], PL B243 (1990) 169, PL B251 (1990) 223, PRL 64 (1990) 16, PRL 64 (1990) 2117, PRL 64 (1990) 2226, PRL 65 (1990) 1184, PRL 65 (1990) 1531, PRL 65 (1990) 2842, PR D41 (1990) 805, PR D41 (1990) 774, PR D41 (1990) 1401, NIM A302 (1991) 261, PRL 67 (1991) 1692, PRL 67 (1991) 1696, PR D43 (1991) 651, PR D43 (1991) 1448, PR D43 (1991) 2836, PR D43 (1991) 3599, PR D44 (1991) 593, PR D44 (1991) 3383, PR D44 (1991) 3394, NIM A320 (1992) 66, PL B283 (1992) 161, PL B291 (1992) 488, PL B294 (1992) 139, PRL 68 (1992) 1275, PRL 68 (1992) 1279, PRL 69 (1992) 2041, PRL 69 (1992) 2046, PRL 69 (1992) 3278, PRL 69 (1992) 3610 [erratum: PRL 71 (1993) 3395], PR D45 (1992) 1, PR D45 (1992) 21, PR D45 (1992) 752, PR D45 (1992) 2212, PR D45 (1992) 3965, PR D45 (1992) 3976, PR D46 (1992) 4822, MPL A8 (1993) 869, PL B303 (1993) 377, PL B317 (1993) 647, PL B319 (1993) 365, PRL 70 (1993) 138, PRL 70 (1993) 1207, PRL 70 (1993) 2681, PRL 70 (1993) 3700, PRL 71 (1993) 674, PRL 71 (1993) 1311, PRL 71 (1993) 1680, PRL 71 (1993) 1791, PRL 71 (1993) 2391, PRL 71 (1993) 3070, PRL 71 (1993) 3255, PR D47 (1993) 791, PR D48 (1993) 4007, PRL 72 (1994) 3762, PR D49 (1994) 40, and PR D50 (1994) 43.

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CESR-CUSB-II

(Proposed 1978, Approved Jun 1984, Began data-taking Dec 1985, Completed data-taking May 1991)

CUSB-II — HIGH RESOLUTION BGO CALORIMETER TO STUDY Υ SPECTROSCOPY AND B PHYSICS

COLUMBIA U – P Franzini (Spokesperson), S Kanekal, P M Tuts (Spokesperson), Q W Wu
SUNY, STONY BROOK – U Heintz, T M Kaarsberg, J Lee-Franzini (Spokesperson), D M J Lovelock, M Narain, R D Schamberger, Jr , J Willins, C Yanagisawa

Accelerator CESR *Detector* CUSB-II

Reactions

$e^+ e^- \rightarrow$ hadrons	9.4–11.6 GeV (E_{cm})
$e^+ e^- \rightarrow e^+ e^-$	"
$e^+ e^- \rightarrow \mu^+ \mu^-$	"
$e^+ e^- \rightarrow \gamma$ X	"

Particles studied $\Upsilon(1S)$, $\Upsilon(2S)$, $\Upsilon(3S)$, $\Upsilon(4S)$, $\Upsilon(10860)$, $\Upsilon(11020)$, $\chi_{b0}(1P)$, $\chi_{b1}(1P)$, $\chi_{b2}(1P)$, $\chi_{b0}(2P)$, $\chi_{b1}(2P)$, $\chi_{b2}(2P)$, B, B^*, higgs, axion, $\zeta(8300)$, η_b, s-quark

Brief description Continues the CESR-CUSB-I experiment with an upgraded detector. The detector consists of a bismuth germanate (BGO) electromagnetic calorimeter inserted in the CUSB-I NaI and Pb-glass array. Covers a solid angle of about 2/3 of 4π. A drift chamber between the beam pipe and the BGO cylinder provides charged-particle tracking.

Journal papers Includes CESR-CUSB-I papers: PRL 44 (1980) 1111, PRL 45 (1980) 222, PRL 46 (1981) 1115, PRL 47 (1981) 771, PRL 48 (1982) 906, PR D26 (1982) 717, PR D26 (1982) 720, PL B114 (1982) 277, NP B206 (1982) 1, PRL 49 (1982) 1612, PRL 49 (1982) 1616, PL B118 (1982) 453, PRL 51 (1983) 160, PL B130 (1983) 439, PL B130 (1983) 444, PR D29 (1984) 2483, NP B242 (1984) 31, PL B138 (1984) 225, PL B139 (1984) 332, PL B141 (1984) 271, PR D30 (1984) 1985, PRL 54 (1985) 377, PRL 55 (1985) 36, PRL 56 (1986) 2672, PL B186 (1987) 233, PR D35 (1987) 2265, PR D35 (1987) 2883, NIM A263 (1988) 35, NIM A265 (1988) 243, PRL 62 (1989) 2077, PRL 65 (1990) 2749, PRL 65 (1990) 2947, NIM A309 (1991) 450, PL B273 (1991) 177, PRL 66 (1991) 1563, PRL 66 (1991) 2436, and PRL 66 (1991) 3113.

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DESY Experiments

DESY-DORIS-ARGUS

(Proposed 1978, Approved 1979, Began data-taking Sep 1982, Completed data-taking Oct 1992)

ARGUS — A NEW DETECTOR FOR DORIS

ARGUS COLLABORATION

DESY – H Albrecht, T Hamacher, R P Hofmann, T Kirchhoff, R Mankel, A Nau, S Nowak, D Ressing, H Schroeder (√ Spokesperson), H D Schulz, M Walter, R Wurth
DORTMUND U – C Hast, H Kapitza, H Kolanoski, A Kosche, A Lange, A Lindner, M Schieber, T Siegmund, B Spaan, H Thurn, D Toepfer, D Wegener
DRESDEN, TECH U – P Eckstein, M Schmidtler, M Schramm, K R Schubert, R Schwierz, R Waldi
ERLANGEN U – K Reim, H Wegener
HAMBURG U – R Eckmann, H Kuipers, O Mai, R Mundt, T Oest, R Reiner, W Schmidt-Parzefall
HEIDELBERG U, IHEP – J Stiewe, S Werner
HEIDELBERG, MAX PLANCK INST – K Ehret, W Hofmann, A Huepper, K T Knoepfle, J Spengler
IPP, CANADA & MCGILL U & TORONTO U – P Krieger, D B MacFarlane, J D Prentice, P R B Saull, K Tzamariudaki, R Van de Water, T S Yoon
KARLSRUHE U – C Frankl, M Schneider, S Weseler
STEFAN INST, LJUBLJANA & LJUBLJANA U – G Kernel, P Krizan, E Kriznic, T Podobnik, T Zivko
MOSCOW, ITEP – V Balagura, S Barsuk, I Belyaev, R Chistov, M Danilov, E Gershtein, Y Gershtein, A Golutvin, I Korolko, G Kostina, D Litvintsev, P Pakhlov, S Semenov, A Snizhko, I Tikhomirov, Y Zaitsev

Accelerator DESY-DORIS-III *Detector* ARGUS

Reactions

$e^+ e^-$	9.3–10.6 GeV (E_{cm})
$e^+ e^- \rightarrow$ charm X	"
$e^+ e^- \rightarrow$ bottom X	"
$e^+ e^- \rightarrow \Upsilon$(unspec)	"
$e^+ e^- \rightarrow$ hvy-lepton X	"

Particles studied charm, bottom, Υ(unspec), hvy-lepton, ν_τ

Brief description Studies b-quarks, τ, and ν_τ. The detector consists of a silicon strip detector and a microvertex drift chamber surrounding the beam pipe, a tracking chamber, shower and TOF counters, solenoid coils, and a large iron yoke. Upgraded in 1990/91.

Journal papers NIM 163 (1979) 77, NIM 195 (1982) 475, NIM 205 (1983) 125, NIM 216 (1983) 35, NIM 217 (1983) 153, PL B134 (1984) 137, PL B135 (1984) 498, PL B146 (1984) 111, NIM A235 (1985) 26, NIM A237 (1985) 464, PL B150 (1985) 235, PL B153 (1985) 343, PL B154 (1985) 452, PL B156 (1985) 134, ZPHY C28 (1985) 45, PL B157 (1985) 326, PL B158 (1985) 525, PL B160 (1985) 331, PL B162 (1985) 395, PL B163 (1985) 404, ZPHY C29 (1985) 167, NIM A249 (1986) 277, NIM A252 (1986) 384, PTE 2 (1986) 66, PRL 56 (1986) 549, PL B167 (1986) 360, ZPHY C31 (1986) 181, PL B179 (1986) 398, PL B179 (1986) 403, PL B182 (1986) 95, ZPHY C33 (1986) 7, ZPHY C33 (1987) 359, PL B185 (1987) 218, PL B185 (1987) 223, PL B185 (1987) 228, PL B187 (1987) 425, PL B192 (1987) 245, PL B195 (1987) 102, PL B195 (1987) 307, PL B196 (1987) 101, PL B197 (1987) 452, PL B198 (1987) 255, PL B198 (1987) 577, ZPHY C35 (1987) 283, PL B199 (1987) 291, PL B199 (1987) 447, PL B199 (1987) 451, PL B199 (1987) 457, PL B199 (1987) 580, PL B202 (1988) 149, ZPHY C39 (1988) 177, PL B207 (1988) 109, PL B207 (1988) 349, PL B209 (1988) 119, PL B209 (1988) 380, PL B210 (1988) 258, PL B210 (1988) 263, PL B210 (1988) 267, PL B210 (1988) 273, PL B211 (1988) 489, PL B212 (1988) 528, PL B215 (1988) 424, PL B215 (1988) 429, ZPHY C41 (1988) 1, ZPHY C41 (1988) 405, NIM A274 (1989) 189, NIM A275 (1989) 1, NIM A283 (1989) 544, NAT WISS 76 (1989) 52, ZPHY C41 (1989) 557, PL B217 (1989) 205, PL B219 (1989) 121, PL B221 (1989) 422, ZPHY C42 (1989) 349, ZPHY C42 (1989) 519, ZPHY C42 (1989) 543, ZPHY C43 (1989) 45, ZPHY C43 (1989) 181, ZPHY C44 (1989) 547, PL B229 (1989) 175, PL B229 (1989) 304, PL B230 (1989) 162, PL B230 (1989) 169, PL B231 (1989) 208, PL B232 (1989) 398, PL B232 (1989) 554, MPL A5 (1990) 73, ZPHY A335 (1990) 231, ZPHY C46 (1990) 9, ZPHY C46 (1990) 15, ZPHY C48 (1990) 183, ZPHY C48 (1990) 543, PL B234 (1990) 409, PL B236 (1990) 102, PL B241 (1990) 278, PL B245 (1990) 315, PL B246 (1990) 278, PL B247 (1990) 121, PL B249 (1990) 359, PL B250 (1990) 164, ZPHY C49 (1991) 349, ZPHY C50 (1991) 1, ZPHY C52 (1991) 353, PL B254 (1991) 288, PL B255 (1991) 297, PL B255 (1991) 634, PL B260 (1991) 259, PL B262 (1991) 148, PL B267 (1991) 535, PL B269 (1991) 234, ZPHY C53 (1992) 361, ZPHY C53 (1992) 367, ZPHY C54 (1992) 1, ZPHY C54 (1992) 13, ZPHY C55 (1992) 25, ZPHY C55 (1992) 179, ZPHY C55 (1992) 357, ZPHY C56 (1992) 1, ZPHY C56 (1992) 7, ZPHY C56 (1992) 339, PL B274 (1992) 239, PL B275 (1992) 195, PL B277 (1992) 209, PL B278 (1992) 202, PL B288 (1992) 367, PL B292 (1992) 221, ZPHY C57 (1993) 533, ZPHY C58 (1993) 61, ZPHY C58 (1993) 191, ZPHY C58 (1993) 199, ZPHY C60 (1993) 11, PL B303 (1993) 368, PL B308 (1993) 435, PL B316 (1993) 608, PL B317 (1993) 227, PL B318 (1993) 397, PL B324 (1994) 249, PL B326 (1994) 320, and ZPHY C61 (1994) 1.

Related experiments CESR-CLEO-II

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http://www.physik.uni-dortmund.de/ARGUS/argus.html

DESY-HERA-H1

(Proposed Jun 1985, Approved Jul 1986, Began data-taking May 1992, In progress)

H1: A DETECTOR FOR HERA

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Accelerator DESY-HERA *Detector* H1

Reactions

$e^- p$ —

Brief description Measures energy and direction of electrons, photons, and particle jets. Identifies leptons by the shower shape and neutrinos by precise missing energy measurements. The detector consists of a large superconducting solenoid with tracking chambers and a liquid argon calorimeter inside. An additional iron absorber instrumented with streamer tubes is outside the solenoidal coil. Taking data (May 94).

Journal papers NIM A240 (1985) 63, NIM A253 (1987) 467, NIM A257 (1987) 479, NIM A265 (1988) 419, NIM A269 (1988) 560, NIM A270 (1988) 334, IEEE TNS 36 (1989) 331, NIM A275 (1989) 197, NIM A275 (1989) 246, NIM A277 (1989) 368, NIM A279 (1989) 57, NIM A279 (1989) 217, NIM A283 (1989) 375, NIM A283 (1989) 467, NIM A283 (1989) 471, NIM A283 (1989) 487, NIM A283 (1989) 537, NIM A283 (1989) 622, NP (PROC SUPPL) B16 (1989) 518, NIM A289 (1990) 446, NIM A302 (1991) 277, NIM A310 (1991) 535, NIM A312 (1992) 457, NIM A323 (1992) 184, NIM A323 (1992) 401, NIM A323 (1992) 532, NIM A323 (1992) 537, NIM A336 (1993) 460, NIM A336 (1993) 499, PL B297 (1992) 205, PL B298 (1993) 469, PL B299 (1993) 374, PL B299 (1993) 385, PL B314 (1993) 436, NP B396 (1993) 3, NP B407 (1993) 515, PL B321 (1994) 161, PL B324 (1994) 241, PL B328 (1994) 176, and ZPHY C61 (1994) 59.

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DESY-HERA-ZEUS

(Proposed Jun 1985, Mar 1986, Approved Nov 1986, Began data-taking May 1992, In progress)

ZEUS: A DETECTOR FOR HERA

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TURIN U, ALESSANDRIA & INFN, TURIN – M Dardo
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WISCONSIN U – I Ali, B Behrens, S Dasu, C Fordham, C Foudas, A Goussiou, R J Loveless, D D Reeder, S Silverstein, W H Smith
YORK U, CANADA – W R Frisken, K M Furutani, Y Iga

Accelerator DESY-HERA *Detector* ZEUS

Reactions

$e^- p$ —

Particles studied leptons, K^0, Λ, ρ^0, $J/\psi(1S)$

Brief description Measures neutral and charged current processes in ep interactions (26.72 GeV electrons, 820 GeV protons) and searches for new processes. Emphasis is on accurate identification and measurement of jets and leptons. The main detector component is a high-resolution compensating uranium-scintillator calorimeter surrounding a superconducting coil equipped with drift chambers. An instrumented iron absorber catches the tail of hadronic showers and identifies muons. Bending magnets of the machine are used as a spectrometer for forward scattered protons. An additional calorimeter at zero degrees measures neutron production. Taking data (May 94).

Journal papers IEEE TNS 36 (1989) 465, NIM A274 (1989) 134, NIM A289 (1990) 115, NIM A290 (1990) 95, NIM A292 (1990) 259, NIM A300 (1991) 480, NIM A306 (1991) 485, NIM A309 (1991) 101, NIM A313 (1992) 126, NIM A321 (1992) 356, PL B297 (1992) 404, PL B293 (1992) 465, ZPHY C59 (1993) 231, PL B303 (1993) 183, PL B306 (1993) 158, PL B306 (1993) 173, PL B315 (1993) 481, PL B316 (1993) 207, PL B316 (1993) 412, and PL B322 (1994) 287.

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DESY-HERA-HERMES

(Proposed Jan 1990, Approved Oct 1992, In preparation)

MEASUREMENT OF SPIN DEPENDENT STRUCTURE FUNCTIONS OF NUCLEONS

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Accelerator DESY-HERA *Detector* Spectrometer

Reactions Polarized target

e^- nucleon $\rightarrow e^-$ X 35 GeV/c (P_{lab})

Particles studied p, n

Brief description An internal target experiment in the HERA electron storage ring. Measures the spin-dependent structure functions of p and n, and tests the Bjorken sum rule. Employs polarized internal gas targets of H, D, and ^{3}He. Internal targets have advantage of being pure atomic species with no dilution factor. The angle and the energy of a scattered electron is determined by a spectrometer. Data taking to begin in 1995.

Related experiments CERN-NA-047, SLAC-E-142, SLAC-E-143

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FNAL Experiments

FNAL-581-704

(Proposed Jan 1978, Sep 1981, Approved Nov 1979, Dec 1981, Dec 1983, Completed data-taking Aug 1990)

EXPERIMENTS WITH THE POLARIZED BEAM FACILITY

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FERMILAB – D C Carey, R Coleman, J D Cossairt, A L Read
HIROSHIMA U – K Iwatani
IOWA U – N Akchurin, A Nuval, Y Onel
KEK – S Ishimoto
KYOTO SANGYO U – F Takeutchi
KYOTO U – H Enyo, T Iijima, K Imai, S Makino, A Masaike, K Miyake, T Nagamine, N Tamura, T Yoshida
KYOTO U OF EDUCATION – R Takashima
ANNECY – K I Kuroda, A Michalowicz
LOS ALAMOS – N Tanaka
NORTHWESTERN U – F Luehring, D H Miller, P N Shanahan
KITAKYUSHU, UNIV OCCUP ENVIR HEALTH – T Maki
RICE U – D Adams, B Bonner, M D Corcoran, B Mayes, H E Miettinen, G S Mutchler, M Nessi, C T Nguyen, G C Phillips, J B Roberts, F Tedaldi-Nessi, J L White
SERPUKHOV – V Apokin, A A Derevchtchikov, N Galyaev, Y A Matulenko, A P Meshchanin, N Mikhalin, K Myznikov, S B Nurushev, D I Patalakha, V L Rykov, R A Rzayev, A Saraykin, A Shkuratov, V L Solovianov, V Solovyev, A N Vasiliev
TRIESTE U – F Bradamante, S Dalla Torre Collautti, M Giorgi, A Martin, A Penzo, P P Schiavon, A Villari, A Zanetti
UDINE U – C Boneschi, G Pauletta, C Santini

Accelerator FNAL-TEV *Detector* Spectrometer, Calorimeter, Wire chamber

Reactions Polarized beam and target

$p\,p \rightarrow$ X	200 GeV/c
$p\,p \rightarrow$ pion X	"
$p\,p \rightarrow \Lambda$ X	"
$p\,p \rightarrow \Sigma^0$ X	"
$\overline{p}\,p \rightarrow$ X	"
$\overline{p}\,p \rightarrow$ pion X	"

Brief description The experiments measure (1) the helicity asymmetry in total pp and $\overline{p}p$ cross sections, (2) the spin dependence of inclusive π^0 production, (3) the production of charged mesons at high x, and (4) the production of Λ's at large x. FNAL-581 ran for 400 hours and FNAL-704 ran for 1200 hours.

Journal papers PRL 61 (1988) 1918, IJMP A3 (1988) 2753, PL B229 (1989) 299, PRL 64 (1990) 357, NIM A290 (1990) 269, PL B261 (1991) 197, PL B261 (1991) 201, PL B264 (1991) 462, and PL B276 (1992) 531.

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FNAL-632

(Proposed May 1980, Approved Jun 1982, Began data-taking May 1985, Completed data-taking Feb 1988)

AN EXPOSURE OF THE 15-FOOT BUBBLE CHAMBER WITH A NEON–HYDROGEN MIXTURE TO A WIDE-BAND NEUTRINO BEAM FROM THE TEVATRON

E632 COLLABORATION

BIRMINGHAM U – P J W Faulkner, G T Jones, K E Varvell
UC, BERKELEY – H C Ballagh, H H Bingham, W B Fretter, J E Lys, G P Yost
SACLAY – J P Baton, C Coutures, M A Jabiol, P Kasper, M Neveu
CERN – H Foeth, G G Harigel, D R O Morrison (√ Spokesperson), H W Wachsmuth
FERMILAB – J E Hanlon, W M Smart
HAWAII U – R J Cence, F A Harris, V Jain, M D Jones, M W Peters (√ Spokesperson), V Z Peterson
ILLINOIS TECH – R A Burnstein, R Naon, H A Rubin
SERPUKHOV – V V Ammossov, G S Gapienko, A A Ivanilov, V A Korablev
IMPERIAL COLL – E F Clayton, M M Mobayyen, P R Nailor, S Wainstein
MOSCOW, ITEP – A Andryakov, A E Asratyan, V S Kaftanov, M A Kubantsev, V Moskalev
JAMMU U – S K Badyal, Devanand, V K Gupta, N K Rao, S S Sambyal
BRUSSELS U, IIHE – E A de Wolf, M Barth, P Marage, J Moreels, J Sacton, L Verluyten
MUNICH, MAX PLANCK INST – M Aderholz, N Schmitz
MOSCOW STATE U – P Ermolov, I Erofeeva, V Kobrin, O Lukina, S Lyutov, V Murzin, S Ryasakov, S Sivoklolov, L Smirnova
OXFORD U – P P Allport, G Corrigan, G Myatt
PANJAB U – T K Chaterjee, J Kohli, I S Mitra, J B Singh, S Singh
RUTGERS U – D F Deprospo, P Jacques, M S Kalelkar, M A Lauko, R J Plano, P E Stamer
STEVENS TECH – E B Brucker, E L Koller
TUFTS U – H Akbari, T Kafka, R H Milburn, A Napier, D Passmore, J Schneps, S Y Willocq

Accelerator FNAL-TEV *Detector* HLBC-15FT

Reactions

ν_μ nucleus $\rightarrow \mu^-$ X	10–600 GeV/c
ν_μ nucleus $\rightarrow \nu_\mu$ X	"
$\overline{\nu}_\mu$ nucleus $\rightarrow \mu^+$ X	"
$\overline{\nu}_\mu$ nucleus $\rightarrow \overline{\nu}_\mu$ X	"

Particles studied hadron, strange, charm, $e^{\pm}$, muon

Brief description The main aim is an exploratory search for new particles and effects in a new energy range. Also studies like-sign dileptons and neutral current interactions using the Internal Picket Fence to identify such events. Other topics include coherent effects, strange particle production, *etc.* Uses three conventional cameras with 500-micron resolution and a high resolution holographic optical system with 100-micron resolution in the central part of the chamber.

Journal papers NIM 220 (1984) 300, AOPT 25 (1986) 4102, NIM A257 (1987) 614, NIM A279 (1989) 249, NIM A283 (1989) 24, NIM A284 (1989) 311, PRL 63 (1989) 2349, PR D41 (1990) 2057, NIM A290 (1990) 264, NIM A292 (1990) 313, NIM A292 (1990) 571, NIM A297 (1990) 364, PR D45 (1992) 2232, and PR D47 (1993) 2661.

Related experiments FNAL-744, FNAL-745, FNAL-770

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FNAL-653

(Proposed May 1980, Approved Jul 1981, Began data-taking 1985, Completed data-taking Feb 1988)

STUDY OF CHARM AND BEAUTY USING HADRONIC PRODUCTION IN A HYBRID EMULSION SPECTROMETER

E653 COLLABORATION

AICHI U OF EDUCATION – K Kodama, N Ushida
UC, DAVIS – A Moktarani, V Paolone, J T Volk, J O Wilcox, P M Yager
CARNEGIE MELLON U – R M Edelstein, A Freyberger, D B Gibaut, R J Lipton, W R Nichols, D M Potter, J S Russ, C Zhang, Y Zhang
CHONNAM NATIONAL U – H I Janj, J Y Kim, T I Kim, I T Lim, M Y Pac
FERMILAB – B R Baller, R J Stefanski
GIFU U – K Nakazawa

GYEONGSANG NATIONAL U – K S Chung, S H Chung, D C Kim, I G Park, M S Park, J S Song, C S Yoon
KANSAS STATE U – M Aryal, N W Reay (✓ Spokesperson), R A Sidwell, N R Stanton
KINKI U, OSAKA – M Chikawa
KOBE U – T Abe, T Fujii, G Fujioka, K Fujiwara, H Fukushima, T Hara, Y Takahashi, K Taruma, Y Tsuzuki, C Yokoyama
KOREA U – S D Chang, B G Cheon, J H Cho, J S Kang, C O Kim, J Y Kim, T Y Kim, J C Lee, S B Lee, G Y Lim, S W Nam, T S Shim, K S Sim, J K Woo
NAGOYA INST TECH – Y Isokane, Y Tsuneoka
NAGOYA U – S Aoki, A Gauthier, K Hoshino, H Kitamura, M Kobayashi, M Miyanishi, K Nakamura, M Nakamura, Y Nakamura, S Nakanishi, K Niu, K Niwa, M Nomura, H Tajima, S Yoshida
OHIO STATE U – J Dunlea, S G Frederiksen, S Kuramata, B G Lundberg, G A Oleynik, N W Reay, K Reibel
OKAYAMA U – K Moriyama, H Shibata
OKLAHOMA U – G R Kalbfleisch, P L Skubic, J M Snow, S E Willis
OSAKA U – O Kusumoto, K Nakamura, T Okusawa, M Teranaka, T Tominaga, T Yoshida, H Yuuki
OSAKA PREFECTURE U, SCI EDUC INST – H Okabe, J Yokota
TOHO U – M Adachi, M Kazuno, E Niu, H Shibuya, S Watanabe
UTSUNOMIYA U – I Ohtsuka, Y Sato, I Tezuka
WON KWANG U – S Y Bahk, S K Kim

Accelerator FNAL-TEV *Detector* Emulsion, Spectrometer

Reactions

π^- nucleus →	600 GeV/c
p nucleus →	800 GeV/c

Particles studied charm, bottom

Brief description Ran for 1800 hours.

Journal papers PRL 66 (1991) 1819, PL B263 (1991) 573, PL B263 (1991) 579, PL B274 (1992) 246, PL B284 (1992) 461, PL B286 (1992) 187, PTP 89 (1993) 679, PL B303 (1993) 359, PL B309 (1993) 483, PL B313 (1993) 260, PL B316 (1993) 188, and PL B316 (1993) 455.

Related experiments FNAL-791

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FNAL-665

(Proposed Oct 1980, Approved Jul 1981, Jan 1989, Began data-taking 1987, Completed data-taking Jan 1992)

MUON SCATTERING WITH HADRON DETECTION AT THE TEVATRON

FREIBURG U – T Dreyer, M Erdmann, J Haas, M Lenski, W Mohr, G Seigert, H E Stier, M Wilhelm
ARGONNE – D F Geesaman, R Gilman, M C Green, H E Jackson, S Kaufman, T B W Kirk, V Papavassiliou, D Potterveld, S Tentindo-Repond, H J Trost, A Zghiche
UC, SAN DIEGO – R D Kennedy, H G E Kobrak, P Madden, A Salvarani, R A Swanson
COLORADO U – E Kinney
FERMILAB – B R Baller, G B Coutrakon, J E Hanlon, S Krzywdzinski, H Melanson, H E Montgomery, J G Morfin, C Salgado, S A Wolbers
HARVARD U – J M Conrad, G Y Fang, A V Kotwal, D G Michael, R B Nickerson, F M Pipkin, M H Schmitt, R Wilson
ILLINOIS U, CHICAGO – M R Adams, D A Averill, T J Carroll, R S Guo, C Halliwell, D E Jaffe, S R Magill, D W Mcleod, T McKibben
CRACOW – A Eskreys, J Figiel, P Malecki, K Olkiewicz, B Pawlik, P Stopa
CRACOW, INST PHYS NUCL TECH – K Dziunikowska
LIVERMORE – P Anthony, F S Dietrich
MARYLAND U – S Aid, S Kunori, S C O'Day, E J Ramberg, A Skuja, G A Snow, P H Steinberg, R Talaga
MIT – M Baker, W Busza, L S Osborne, J J Ryan
MUNICH, MAX PLANCK INST – M Aderholz, F Botterveck, I Derado, V Eckardt, H J Gebauer, D Hantke, G Jancso, K Kadija, N Koschorz, A S Manz, N Schmitz, H J Seyerlein, S Soldner-Rembold, M Vidal, W Wittek
NORTHWESTERN U – H M Schellman (✓ Spokesperson), P Spentzouris
OHIO U – H L Clark, R W Finlay, K H Hicks
PENN U – A Banerjee, K Griffioen
WASHINGTON U, SEATTLE – A A Bhatti, U Bratzler, R Davisson, W Dougherty, D M Jansen, Z Jin, J J Lord, H J Lubatti, R S Perry, R J Wilkes, T C Zhao
WUPPERTAL U – H M Braun, H Breidung, U Ecker, R Otten, A Roeser
YALE U – S K Dhawan, V W Hughes, K P Schueler, H Venkataramania

Accelerator FNAL-TEV *Detector* CCM

Reactions Polarized beam

$\mu\, e^- \rightarrow \mu\, e^-$	< 750 GeV/c
$\mu\, p \rightarrow \mu$ hadrons	"
$\mu\, p \rightarrow \mu\, \rho\, X$	"
$\mu\, p \rightarrow \mu\, \phi\, X$	"
μ deut → μ hadrons	"
μ deut → $\mu\, \rho\, X$	"
μ deut → $\mu\, \phi\, X$	"
μ nucleus → μ hadrons nucleus	"
μ nucleus → μ hadrons n	"
μ nucleus → $\mu\, \rho\, X$	"
μ nucleus → $\mu\, \phi\, X$	"

Brief description Studies (1) the properties of hadron systems recoiling from deep inelastic muon collisions, (2) the nucleon structure functions, and (3) exclusive vector meson production. Uses the superconducting vertex magnet from CERN. The first run was completed in 1988, the second run, with a number of different targets (H_2, D_2, C, Ca, Xe, and Pb) and an upgrade of the vertex spectrometer tracking system, in 1990/91.

Journal papers IEEE TNS 33 (1986) 205, NIM A291 (1990) 533, PL B272 (1991) 163, PL B287 (1992) 375, PRL 68 (1992) 3266, PRL 69 (1992) 1026, PL B308 (1993) 418, PL B309 (1993) 477, PR D48 (1993) 5057, PRL 72 (1994) 466, ZPHY C61 (1994) 179, and ZPHY C61 (1994) 539.

Related experiments FNAL-098

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WWW Home-page http://fnmux4.fnal.gov/ & http://hpfrs6.physik.uni-freiburg.de/e665/fnal.html

FNAL-667

(Approved Mar 1990, Completed data-taking Aug 1990)

STUDY OF PION–NUCLEUS INTERACTIONS IN PURE EMULSION STACKS AND EMULSION CHAMBERS AT ENERGIES ABOVE 500 GeV

CRACOW – A Dabrowska, R Holynski, A Jurak, M Szarska, W Wolter (✓ Spokesperson), B Wosiek, K Wozniak
LEBEDEV INST – N I Adamovich, M M Chernyavsky, S G Gerassomov, S D Kharlamov, V G Larionova, G I Orlova, N G Peresadko, N A Salmanova, M I Tretyakova
LOUISIANA STATE U – M L Cherry, W V Jones, K Sengupta, J P Wefel
TASHKENT, FTI – E Baklickya, L P Chernova, K G Gulamov, N S Lukicheva, V S Nawotny, N S Saidkhanov, L N Svechnikova, S I Zhochova

Accelerator FNAL-TEV *Detector* Emulsion

Reactions

pion nucleus	>500 GeV (T_{lab})

Brief description The aim is to study global characteristics of pion–nucleus interactions (minimum bias). Data analysis in progress. (May 94).

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FNAL-672A

(Proposed Feb 1981, Approved Jul 1981, Began data-taking 1987, Completed data-taking Jan 1992)

A STUDY OF HADRONIC FINAL STATES PRODUCED IN ASSOCIATION WITH HIGH-MASS DIMUONS

FERMILAB – J C Krider
ILLINOIS U, CHICAGO – H S Goldberg, R L Jesik, S Margulies (√ Spokesperson), H Mendez, J Solomon, F Vaca
INDIANA U – R R Crittenden, A R Dzierba, A Gribushin, S Kartik, R Li, T R Marshall, H J Martin, A Zieminski (√ Spokesperson)
LOUISVILLE U – C L R Davis
MICHIGAN U – L J Dauwe
SERPUKHOV – V V Abramov, Y Antipov, B Baldin, S Denisov, A Dyshkant, V Glebov, Y Gorin, V I Koreshev, A Krinitsyn, A A Petrukhin, V I Sirotenko, R Sulayev

Accelerator FNAL-TEV *Detector* Spectrometer

Reactions

p nucleus $\rightarrow \mu^+ \mu^-$ X	500, 800 GeV/c
π^- nucleus $\rightarrow \mu^+ \mu^-$ X	500 GeV/c

Particles studied $J/\psi(1S)$, $\psi(2S)$, $\chi_{c1}(1P)$, $\chi_{c2}(1P)$, ρ, ω, ϕ, bottom

Brief description Studies particles produced in association with vector mesons (including J/ψ) and high mass dimuons. Ran with H, Be and Cu targets. Collected approximately 2M fully linked dimuon events (over 30K ψ's) with different beams. Uses E672/E706 spectrometer. Data analysis in progress (May 94).

Journal papers NIM A270 (1988) 99, and PR D41 (1990) 1.

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FNAL-683

(Proposed Feb 1981, Approved Dec 1983, Apr 1987, Began data-taking 1990, Completed data-taking Jan 1992)

PHOTOPRODUCTION OF HIGH $p_\perp$ JETS

BALL STATE U – W L Davis, G P Thomas
FERMILAB – C Cihangir, P H Kasper, J M Marraffino
IOWA U – N Akchurin, J M Mcpherson, Y Onel
MARYLAND U – H Breuer, C C Chang, H D Holmgren, D Naples
MICHIGAN U – H R Gustafson, M J Longo
RICE U – D Adams, S Ahmad, J M Clement, M D Corcoran (√ Spokesperson), D Lincoln, H E Miettinen, G P Morrow, G S Mutchler, J D Skeens, M M Traynor, J P Xu, Q Zhu
VANDERBILT U – P J Birmingham, J W Waters, M S Webster

Accelerator FNAL-TEV *Detector* Spectrometer, Calorimeter

Reactions

$\gamma p \rightarrow$ jets X	< 350 GeV/c
$\gamma p \rightarrow \gamma$ jets	"
$\gamma p \rightarrow$ pion X	"

Brief description Studies in particular 3- and 4-jet events and the A dependence of the jet production. Photons are tagged with a momentum uncertainty of about 2%. The apparatus consists of a wide angle magnetic spectrometer, a large solid angle calorimeter, and a forward calorimeter. Data analysis in progress. (May 94).

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FNAL-687

(Proposed Jan 1981, Approved Dec 1983, Began data-taking 1987, Completed data-taking Jan 1992)

HIGH-ENERGY PHOTOPRODUCTION OF STATES CONTAINING HEAVY QUARKS AND OTHER RARE PHENOMENA

BOLOGNA U – P L Frabetti, V Giordano, G Molinari
COLORADO U, BOULDER – C W Bogart, H W K Cheung, J P Cumalat (√ Spokesperson), C Dallapiccola, J Ginkel, V Greene, W E Johns, M Nehring
FERMILAB – J N Butler (√ Spokesperson), S Cihangir, I Gaines, P H Garbincius, L Garren, S A Gourlay, D J Harding, P H Kasper, A E Kreymer, P L G Lebrun, S Shukla
FRASCATI – S Bianco, F Fabbri, M Giardoni, L Passamonti, V Russo, S Sarwar, A Zallo
ILLINOIS U, URBANA – R L Culbertson, R W Gardner, R Greene, J E Wiss
KOREA U – B G Cheon, J S Kang, K Y Kim
MILAN U & INFN, MILAN – G Alimonti, G Bellini, B Caccianiga, W R Cavaletti, L Cinquini, P D'Angelo, M Di Corato, M G Giammarchi, D Hazan, P Inzani, F Leveraro, S Malvezzi, P F Manfredi, D Menasce, E Meroni, L Moroni, D Pedrini, L Perasso, A Sala, S Sala, D Torretta
NORTHWESTERN U – D A Buchholz, C Castoldi, B Gobbi, B O'Reilly
NOTRE DAME U – J M Bishop, J K Busenitz, N M Cason, C J Kennedy, G N Kim, T F Lin, D Puseljic, R C Ruchti, W D Shephard, J A Swiatek, Z Y Wu, M Zanabria
PAVIA U – V Arena, G Boca, S P Ratti, C Riccardi, P Vitulo
UC, DAVIS – G P Grim, V Paolone, P M Yager
PUERTO RICO U, MAYAGUEZ – A Lopez, L Mendez
MEXICO, IPN – H Mendez
NORTH CAROLINA U – T F Davenport
SOUTH CAROLINA U – J R Wilson
TENNESSEE U – G Blackett, W Bugg, K Danyo, T Handler, G Kondo, M Phisharody
VANDERBILT U – P Sheldon

Accelerator FNAL-TEV *Detector* Spectrometer

Reactions

γ nucleus $\rightarrow$ X	< 350 GeV/c
γ nucleus $\rightarrow \mu^+ \mu^-$ X	"

Particles studied ψ(unspec), charm

Brief description Continues studies of FNAL-087 and -401. Uses bremsstrahlung photons from a wideband 350 GeV (±15%) electron beam, a new large-aperture multiparticle spectrometer, a beryllium target, and a silicon microstrip decay-vertex detector. Studies the dynamics of heavy quark photoproduction.

Journal papers IEEE TNS 30 (1983) 3768, NIM 225 (1984) 619, NIM A241 (1985) 107, NIM A251 (1986) 40, NIM A252 (1986) 366, PL B251 (1990) 639, PL B263 (1991) 584, NIM A305 (1991) 48, NP (PROC SUPPL) B27 (1992) 207, PL B300 (1993) 190, PL B307 (1993) 262, PL B308 (1993) 193, PL B313 (1993) 253, PL B314 (1993) 477, PL B315 (1993) 203, PL B316 (1993) 197, PRL 70 (1993) 1381, PRL 70 (1993) 1755, PRL 70 (1993) 2058, PRL 71 (1993) 827, PL B321 (1994) 295, PL B323 (1994) 459, PRL 72 (1994) 324, and PRL 72 (1994) 961.

Related experiments FNAL-791, FNAL-831

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FNAL-690

(Proposed Feb 1981, Approved Jul 1981, Nov 1983, Apr 1987, Began data-taking 1990, Completed data-taking Jan 1992)

STUDY OF HADRONIC PRODUCTION AND SPECTROSCOPY OF STRANGE, CHARM AND BOTTOM PARTICLES AT THE TEVATRON

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FERMILAB – D C Christian, G Gutierrez, S D Holmes, J B Strait, A A Wehmann
GUANAJUATO U – A Antillon, C Avilez, B Hoeneisen, G Lopez, M A Murguia
MASSACHUSETTS U – E P Hartouni, D A Jensen, B Klima, M N Kreisler, S Lee, K Markianos, L M Mayhew, M S Z Rabin, J Uribe
TEXAS A AND M – M Forbush, F R Huson, J T White, J Whiteman, J A Wightman

Accelerator FNAL-TEV *Detector* Spectrometer

Reactions

hadron p	200–2000 GeV/c

Particles studied charm, bottom

Brief description Initial goals include (1) a systematic study of exclusive reactions, particularly diffraction dissociation, (2) cataloging of the remaining stable charmed particles, with details of production and decay, and (3) determining the scale of bottom production. Uses an innovative spectrometer with a hardware processor.

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FNAL-705

(Proposed Oct 1981, Approved Dec 1981, Began data-taking Sep 1987, Completed data-taking Feb 1988)

A STUDY OF CHARMONIUM AND DIRECT PHOTON PRODUCTION BY 300 GeV/c $\bar{p}$, p, π^+, AND π^- BEAMS

ATHENS U – P Ioannou, C Kourkoumelis, A Manousakis-Katsikakis, P Premantiotis, L Resvanis, G Voulgaris
DUKE U – L Fortney, Q Shen, R Tesarek, T Turkington
FERMILAB – L Antoniazzi, S Delchamps, C M Jenkins, P Mazur, C T Murphy, R Rameika, R Smith, L Spiegel, F Turkot, W Yang
MCGILL U – S Conetti, M Haire, J Kuzminski, A Marchionni, M Rosati, A Simard, D Stairs, G Zioulas
NANJING U – T Y Chen, N Yao
NORTHWESTERN U – T LeCompte, J Rosen, Y Tan, S Tzamarias
PRAIRIE VIEW A AND M – K Guffey, D J Judd, L Turnbull, D E Wagoner
SHANDONG U – Z Cao, H Mao, C H Shen, C H Wang, N Zhang, X Zhang, B Zou
VIRGINIA U – M Arenton, B Cox (✓ Spokesperson)

Accelerator FNAL-TEV *Detector* Spectrometer

Reactions

p ^{7}Li → γ(s) X	300 GeV/c
p ^{7}Li → $J/\psi(1S)$ γ X	"
p ^{7}Li → χ_c(unspec) X	"
$\bar{p}$ ^{7}Li → γ(s) X	"
$\bar{p}$ ^{7}Li → $J/\psi(1S)$ γ X	"
$\bar{p}$ ^{7}Li → χ_c(unspec) X	"
π^+ ^{7}Li → γ(s) X	"
π^+ ^{7}Li → $J/\psi(1S)$ γ X	"
π^+ ^{7}Li → χ_c(unspec) X	"
π^- ^{7}Li → γ(s) X	"
π^- ^{7}Li → $J/\psi(1S)$ γ X	"
π^- ^{7}Li → χ_c(unspec) X	"

Particles studied $J/\psi(1S)$, $\chi_{c1}(1P)$, χ_c(unspec)

Brief description Uses the upgraded FNAL-537 spectrometer, a large aperture general purpose detector with a high-resolution scintillating glass electromagnetic calorimeter.

Journal papers NIM 219 (1984) 487, NIM 219 (1984) 491, IEEE TNS 32 (1985) 1318, IEEE TNS 32 (1985) 1326, NIM A236 (1985) 42, NIM A238 (1985) 315, NIM A238 (1985) 321, NIM A242 (1986) 215, IEEE TNS 36 (1989) 86 IEEE TNS 36 (1989) 112, IEEE TNS 36 (1989) 117, IEEE TNS 36 (1989) 375, IEEE TNS 36 (1989) 680, PR D46 (1992) 4828, NIM A332 (1993) 57, PRL 70 (1993) 383, and PR D49 (1994) 543.

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FNAL-706

(Proposed Oct 1981, Approved Dec 1981, Oct 1983, Began data-taking Aug 1987, Completed data-taking Jan 1992)

A COMPREHENSIVE STUDY OF DIRECT PHOTON PRODUCTION IN HADRON INDUCED COLLISIONS

E706 COLLABORATION
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DELHI U – B C Choudhary, V Kapoor, R K Shivpuri, V Zutshi
FERMILAB – W F Baker, C Johnstone, P T Lukens, D D Skow, G H Wu
MICHIGAN STATE U – L Apanasevich, C M Bromberg, D S Brown, J W Huston, A Maul, R J Miller, L Sorrell, C M Yosef
NORTHEASTERN U – G O Alverson, P Chang, W Dlugosz, W Faissler, D Garelick, M J Glaubman, C B Lirakis, E L Pothier, D L Striley, T Yasuda
OKLAHOMA U – P Gutierrez, J Kuehler
PENN STATE U – K W Hartman, B Y Oh, W Toothacker, J Whitmore
PITTSBURGH U – S Blusk, W H Chung, E Engels, Jr , P F Shepard, D Weerasundara
ROCHESTER U – L de Barbaro, M Begel, W E DeSoi, J Dunlea, G K Fanourakis, T Ferbel, J Ftacnik, G Ginther, F Lobkowicz, J P Mansour, G Osborne, E Prebys, R M Roser, P F Slattery (✓ Spokesperson), N Varelas, M Zielinski

Accelerator FNAL-TEV *Detector* Spectrometer, Calorimeter

Reactions

p nucleon → γ X	500, 515, 800 GeV/c
p nucleon → π^0 X	"
p nucleon → η X	"
p nucleon → π^0 π^0 X	"
p nucleon → π^0 hadron$^\pm$ X	"
π^+ nucleon → γ X	515 GeV/c
π^+ nucleon → π^0 X	"
π^+ nucleon → η X	"
π^+ nucleon → π^0 π^0 X	"
π^+ nucleon → π^0 hadron$^\pm$ X	"
π^- nucleon → γ X	500, 515 GeV/c
π^- nucleon → π^0 X	"
π^- nucleon → η X	"
π^- nucleon → ω X	"
π^- nucleon → π^0 π^0 X	"
π^- nucleon → π^0 hadron$^\pm$ X	"

Brief description Triggers on high transverse momentum electromagnetic showers to study the gluon structure functions of hadrons and investigate gluon fragmentation by analyzing the production of direct γ's and their accompanying hadrons in collisions of pions, kaons, and protons on hydrogen, beryllium, and copper. Uses a liquid argon calorimeter and a tracking spectrometer.

Journal papers NIM A235 (1985) 332, APP B17 (1986) 435, NIM A253 (1987) 523, NIM A279 (1989) 272, NIM A307 (1991) 292, PRL 68 (1992) 2584, PR D45 (1992) 3899, PR D48 (1993) 5, and PR D49 (1994) 3106.

Related experiments FNAL-672

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FNAL-710

(Proposed Feb 1982, Approved Jun 1982, Began data-taking 1988, Completed data-taking May 1989)

MEASUREMENTS OF ELASTIC SCATTERING AND TOTAL CROSS SECTIONS AT THE FERMILAB $\bar{p}p$ COLLIDER

BOLOGNA U – M Bertani, G Giacomelli, M R Mondardini, M Spagnoli, I Veronesi, S Zucchelli
CORNELL U – J Orear (✓ Spokesperson)
FERMILAB – N A Amos, C Avila, W F Baker, D P Eartly, B Gomez, A J Lennox, J P Negret, S M Pruss, R Rubinstein (✓ Spokesperson), J C Sanabria, S Shukla
GEORGE MASON U – R W Ellsworth
MARYLAND U – D A Dimitroyannis, J A Goodman
NORTHWESTERN U – M M Block, C M Guss, S Sadr
SAN FRANCISCO DE QUITO U – B Hoeneisen

Accelerator FNAL-COLLIDER *Detector* Counter, Drift chamber

Reactions

$\bar{p}\,p$	300, 546, 1000, 1800 GeV (E_{cm})
$\bar{p}\,p \rightarrow \bar{p}\,p$	"

Brief description The range is $0 < -t < 0.6$ GeV^2. Studies σ_T, B, diffraction dissociation, and ρ for $\bar{p}p$ interactions. Elastic scattering is measured by detectors in Roman Pots, the total rate is determined using a 4π detector.

Journal papers NIM A252 (1986) 263, IJMP A2 (1987) 891, PRL 61 (1988) 525, PRL 63 (1989) 2784, NP (PROC SUPPL) B12 (1990) 9, NP (PROC SUPPL) B16 (1990) 431, PL B243 (1990) 158, PL B247 (1990) 127, NP (PROC SUPPL) B25 (1992) 11, PRL 68 (1992) 2433, NC 106A (1993) 123, and PL B301 (1993) 313.

Related experiments N/A

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FNAL-711

(Proposed Aug 1982, Approved Jul 1983, Began data-taking Feb 1985, Completed data-taking Feb 1988)

A STUDY OF THE ANGULAR AND ENERGY DEPENDENCE OF CONSTITUENT SCATTERING THROUGH MEASUREMENTS OF THE REACTION $pN \rightarrow$ Hadron Hadron X

FERMILAB – M B Crisler, S H Pordes
MICHIGAN U – M A Cummings, H R Gustafson
UC, DAVIS – J T Volk
FLORIDA STATE U – G L Boca, C Georgiopoulos, J H Goldman, S L Hagopian, V Hagopian, K Johnson, D M Kaplan, D A Levinthal (√ Spokesperson), F V Lopez, J Streets, K R Turner, H B White, C J Young

Accelerator FNAL-TEV *Detector* Spectrometer, Calorimeter

Reactions

p nucleus $\rightarrow$ hadron hadron X	800 GeV/c

Brief description Studies the energy, angular, and flavor dependence of the quark–quark scattering cross section. Targets are Be, Al, Fe and W. Ran for 1400 hours.

Journal papers NIM A261 (1987) 493, PRL 66 (1991) 864, ZPHY C49 (1991) 543, and PR D48 (1993) 3996.

Related experiments FNAL-454, FNAL-605, CERN-R-108

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FNAL-713

(Proposed Jan 1982, Approved Jun 1982, Completed data-taking May 1989)

A SEARCH FOR HIGHLY IONIZING PARTICLES FOR THE D0 AREA AT FERMILAB

UC, BERKELEY – D M Lowder, H S Park, P B Price (√ Spokesperson)
HARVARD U – K Kinoshita

Accelerator FNAL-COLLIDER *Detector* Plastic

Reactions

$\bar{p}\,p \rightarrow$ monopole X	300–2000 GeV (E_{cm})

Particles studied monopole

Brief description Uses lexan and CR39 plastic detectors outside and phosphate glass detectors inside the vacuum pipe. Detects any highly ionizing exotic particles, not just monopoles.

Journal papers PRL 59 (1987) 2523, and PRL 65 (1990) 149.

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FNAL-731

(Proposed Feb 1983, Approved Jul 1983, Began data-taking Apr 1985, Completed data-taking Feb 1988)

A PRECISION MEASUREMENT OF THE CP VIOLATION PARAMETER ϵ'/ϵ IN THE K^0 SYSTEM

CHICAGO U – A Barker, R A Briere, L Gibbons, G Makoff, V Papadimitriou, R Patterson, S V Somalwar, Y Wah, B D Winstein (√ Spokesperson), R Winston, H Yamamoto
ELMHURST COLL – E C Swallow
FERMILAB – G Bock, R Coleman, J Enagonio, Y B Hsiung, E Ramberg, K Stanfield, R Stefanski, R Tschirhart, T Yamanaka
SACLAY – P Debu, B Peyaud, R Turlay, B Vallage
PRINCETON U – G Gollin, M Karlsson, J Okamitsu

Accelerator FNAL-TEV *Detector* Spectrometer, Calorimeter

Reactions

$K_L \rightarrow \pi^+\,\pi^-$	30–160 GeV/c
$K_L \rightarrow \pi^0\,\pi^0$	"
$K_L \rightarrow \pi^0\,e^+\,e^-$	"
$K_L \rightarrow \pi^+\,\pi^-\,\gamma$	"
$K_L \rightarrow \pi^0\,\gamma\,\gamma$	"
$K_L \rightarrow \pi^0\,\pi^0\,\pi^0$	"
$K_S \rightarrow \pi^+\,\pi^-$	"
$K_S \rightarrow \pi^0\,\pi^0$	"
$K_S \rightarrow \pi^0\,e^+\,e^-$	"
$K_S \rightarrow \pi^+\,\pi^-\,\gamma$	"
$K_S \rightarrow \pi^0\,\gamma\,\gamma$	"
$K_S \rightarrow \pi^0\,\pi^0\,\pi^0$	"

Particles studied K_L, K_S

Brief description The next-generation experiment, following FNAL-617. A new neutral beam gives six times more flux at the same background rate. The apparatus gives five times greater acceptance for $K_L \rightarrow 2\pi^0$. The K_L and K_S decays are measured simultaneously in a double-beam arrangement. Uses beryllium target. Ran for 3100 hours.

Journal papers PRL 60 (1988) 1695, PRL 61 (1988) 2661, PRL 63 (1989) 28, PRL 64 (1990) 1491, PRL 64 (1990) 2976, PR D41 (1991) 3546, PR D44 (1991) 573, NP (PROC SUPPL) B27 (1992) 275, PL B295 (1992) 169, PRL 68 (1992) 2580, PRL 70 (1993) 1199, PRL 70 (1993) 1203, PRL 70 (1993) 1591, PRL 70 (1993) 2525, and PRL 70 (1993) 2529.

Related experiments FNAL-832

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FNAL-733

(Proposed Feb 1983, Sep 1983, Approved Nov 1983, Completed data-taking Feb 1988)

STUDY OF HIGH ENERGY ν INTERACTIONS WITH THE TEVATRON WIDE BAND TRIPLET BEAM

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MIT – J A Bofill, J I Friedman, S Fuess, H W Kendall, V Kistiakowsky, T Lyons, L Osborne, R Pitt, L Rosenson, B Strongin, F E Taylor, R Verdier
MICHIGAN STATE U – M Abolins, R Brock (Spokesperson), W G Cobau, E Gallas, R W Hatcher, D Owen, G J Perkins, M Tartaglia, H Weerts
FLORIDA STATE U – J K Walker, J Womersley

Accelerator FNAL-TEV *Detector* Calorimeter

Reactions

ν_μ nucleus	0–500 GeV/c
$\bar{\nu}_\mu$ nucleus	"

Brief description The detector is a 200-ton Lab C flash-chamber proportional tube calorimeter. In addition to standard topics, such as scaling, studies the same-sign dimuon production, weak neutral currents, inverse μ decay, and coherent ν scattering. Ran for 4100 hours.

Journal papers NIM A267 (1988) 49, NIM A278 (1989) 447, and PR D43 (1991) 2778.

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SUMMARIES OF FERMILAB EXPERIMENTS

FNAL-735

(Proposed Apr 1983, Sep 1983, Approved Dec 1983, Completed data-taking May 1989)

SEARCH FOR A DECONFINED QUARK-GLUON PHASE OF STRONGLY INTERACTING MATTER IN $\bar{p}p$ INTERACTIONS AT E_{cm} NEAR 2 TeV

DUKE U – T G Carter, A T Goshaw, C A Loomis, S H Oh, W J Robertson, W D Walker, D K Wesson
FERMILAB – V H Areti, P C Bhat, C F Hojvat, C S Lindsey, D F Reeves, F Turkot
IOWA STATE U – E W Anderson, C H Wang
NOTRE DAME U – S Banerjee, P Beery, J M Bishop, N N Biswas, V P Kenney, J M LoSecco, A P Mcmanus, J Piekarz, S Stampke, B V Varadarajalu, Y Zhan
PURDUE U – C C Allen, A T Bujak, D D Carmony, Y I Choi, P L Cole, R J Debonte, L J Gutay (Spokesperson), A S Hirsch, T M Mcmahon, N K Morgan, N T Porile, A Rimai, R P Scharenberg (Spokesperson), B C Stringfellow
WISCONSIN U – T Alexopoulos, A R Erwin, C Findeisen, J R Jennings, K S Nelson, M A Thompson, S L Tufte

Accelerator FNAL-COLLIDER *Detector* Spectrometer

Reactions

$\bar{p}\,p$ 2000 GeV (E_{cm})

Brief description Measures the transverse momentum distributions up to $p_\perp = 1.4$ GeV/c and particle ratios for centrally produced p, $\bar{p}$, K^+, K^-, π^+, π^-, and γ as a function of the charged-particle multiplicity.

Journal papers NIM A254 (1987) 212, NIM A269 (1988) 121, PRL 60 (1988) 1622, PRL 62 (1989) 12, NP A498 (1989) 181c, PRL 64 (1990) 991, NP A525 (1991) 165, NP A544 (1992) 343, PRL 71 (1993) 1490, and PR D48 (1993) 984.

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FNAL-740

(Proposed Sep 1983, Approved Feb 1984, Began data-taking Apr 1992, In progress)

STUDY OF $\bar{p}p$ COLLISIONS USING A LARGE DETECTOR AT D0

D0 COLLABORATION
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ARIZONA U – J Chen, D Fein, G E Forden, E James, K A Johns, L Markosky, B May, A Milder, A Narayanan, J P Rutherfoord, M A Shupe, A Smith, D Vititoe
BROOKHAVEN – S H Aronson, M K Fatyga, J Featherly, B Gibbard, H A Gordon, N Graf, J M Guida, W Guryn, S A Kahn, J Kotcher, S D Protopopescu, P Yamin
BROWN U – J Bantly, D Cullen-Vidal, D Cutts, T Fahland, J S Hoftun, R E Lanou, F Nang, D Nesic, R Partridge, H W Xu
UC, DAVIS – P Bloom, S Glenn, R Lander, S Mani, D E Pellett
UC, IRVINE – J Drinkard, G Griffin, R Hall, A Lankford, D Stoker, J Tarazi
UC, RIVERSIDE – K A Bazizi, A Bischoff, C Boswell, B Choudhary, J Cochran, J A Ellison, A P Heinson, T Huehn, A Kernan, S Wimpenny
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COLUMBIA U – I Adam, P Franzini, U Heintz, P M Tuts, Q Wu
DELHI U – M Bhattacharjee, V Kapoor, R K Shivpuri
FERMILAB – S Abachi, S C Ahn, B Baldin, J F Bartlett, P C Bhat, G Blazey, A Boehnlein, F O Borcherding, A Brandt, A D Bross, J M Butler, J H Christenson, W E Cooper, M Demarteau, K Denisenko, N Denisenko, D Denisov, H T Diehl, M Diesburg, R L Dixon, V D Elvira, H E Fisk, S C Fuess, K Genser, C E Gerber, D R Green, H B Greenlee, N Grossman, W Gu, H F Haggerty, J D Hobbs, T Hu, S Igarashi, A S Ito, M E Johnson, A M Jonckheere, H Jostlein, B Klima, S Krzywdzinski, Q Z Li-Demarteau, R J Lipton, L Lueking, H S Mao, M I Martin, H Melanson, K W Merritt, C S Mishra, H E Montgomery (√ Spokesperson), M Narain, N Oshima, A Para, C H Park, A Peryshkin, P Z Quintas, R Raja, P A Rapidis, A L Read, Y Shao, W Smart, R P Smith, A Taketani, M A Tartaglia, J Womersley, D R Wood, R Yamada, D Zhang, Y Zhang
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INDIANA U – G Alvarez, E Brillhart, T Hu, T R Marshall, C Murphy, D Zieminska, A Zieminski
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PUSAN NATIONAL U – Y M Park
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MICHIGAN STATE U – M A Abolins, R L Brock, D Edmunds, S Fahey, E Flattum, K C Frame, T L Geld, R J Genik, R Hatcher, S A Jerger, F Landry, J T Linnemann, J McKinley, D P Owen, B G Pope, H J Weerts
MOSCOW STATE U – E E Boos, L V Dudko, P F Ermolov, Y V Fisyak, A K Leflat, A M Rusin, E K Shabalina, E G Zverev
NEBRASKA U – G R Snow
NEW YORK U – J Kourlas, A Mincer, M Mudan, P Nemethy, J Sculli, K R T Streets, J Yang, Q Zhu
NORTHEASTERN U – E Amidi, S M Chang, R Demina, M Glaubman, H Johari, J Morimisato, S Reucroft, E von Goeler, J Wilcox, T Yasuda
NORTHERN ILLINOIS U – M R Fortner, J M Green, D R Hedin, R Markeloff, V Sirotenko, S E Willis
NORTHWESTERN U – R E Avery, D A Buchholz, B Gobbi, T Joffe-Minor, S Y Jun, Y K Li, Y C Liu, H M Schellman, R Snihur, T L Taylor
NOTRE DAME U – V Balamurali, N Biswas, J Jaques, R Kehoe, M Kelly, R C Ruchti, J Warchol, M Wayne
OKLAHOMA U – P Gutierrez, G Kalbfleisch, D Kaplan, T McMahon, J Snow
PANJAB U – S Beri, V Bhatnagar, S Chopra, J M Kohli, J B Singh, P M Sood
SERPUKHOV – V A Bezzubov, N I Bojko, V S Burtovoi, S V Chekulaev, S P Denisov, A O Efimov, O V Eroshin, V N Evdokimov, A N Galjaev, P I Goncharov, S N Gurzhiev, Y E Gutnikov, B Klochkov, V I Klyukhin, V I Kochetkov, A V Kostritskii, A V Kozelov, E A Kozlovski, I V Mandrichenko, A A Mayorov, V M Podstavkov, D A Stoianova, A A Volkov, A P Vorobiev
PURDUE U – B Abbott, D S Koltick
RICE U – D Adams, I Bertram, G Eppley, H E Miettinen, R Ou, P Padley, P Yepes
ROCHESTER U – J P Borders, D Casey, C Cretsinger, M K Fatyga, T Ferbel, S Grunendahl, K S Hahn, F Lobkowicz, M Paterno, P Slattery, E Won, J Yu, Z H Zhu, M Zielinski
SACLAY – J Alitti, L Chevalier, J P Cussonneau, Y Ducros, J F Glicenstein, J R Hubbard, J F Lebrat, P Mangeot, B Mansoulie, A Pluquet, J Teiger, A Zylberstejn
SEOUL NATIONAL U – S K Kim, Y S Yu
SUNY, STONY BROOK – R Astur, D Chakraborty, W M Chen, D Claes, R J Engelmann, S Feher, G Finocchiaro, M L Good, P D Grannis (√ Spokesperson), J A Guida, T Hu, J Z Y Jiang, C K Jung, C B Klopfenstein, S Lami, G Landsberg, J Lee-Franzini, H L Li, S Lokos, M D Marx, R L McCarthy, M Mohammadi, S Rajagopalan, L Rasmussen, M Rijssenbeek, P Rubinov, R D Schamberger, S Snyder, C Yanagisawa, Z Zhang

SSCL – M Botlo, P Dingus, H Fenker, S Fredricksen, V Glebov, H Johnstad, K McFarlane, C Milner, T Regan, D Schmid, I Sheer, F Stocker, M Takashima, E Wang
TATA INST – B S Acharya, S R Dugad, M R Krishnaswamy, N K Mondal, V S Narasimham, M V S Rao, H C Shankar, P R Vishwanath
TEXAS U, ARLINGTON – K De, P Draper, E Gallas, J Li, J Perkins, L Sawyer, M Sosebee, R Stephens, A White
TEXAS A AND M – T Goss, F R Huson, J T White, J V D Wirjawan

Accelerator FNAL-COLLIDER *Detector* D0

Reactions

$\bar{p}\,p$ 2000 GeV (E_{cm})

Particles studied W^+, W^-, Z^0, bottom, top

Brief description The experiment studies the properties of 2-TeV $\bar{p}p$ collisions with particular emphasis on measurement and identification of leptons. The detector incorporates three main systems: a central detector, uranium–liquid argon calorimetry over nearly 4π solid angle, and a magnetized iron muon spectrometer. The detector was commissioned in 1991. Taking data (May 94).

Journal papers IEEE TNS 32 (1985) 1473, NIM A244 (1986) 356, NIM A247 (1986) 107, CPC 45 (1987) 245, IEEE TNS 34 (1987) 710, NIM A256 (1987) 305, NIM A257 (1987) 556, NIM A261 (1987) 420, NIM A263 (1988) 78, NIM A265 (1988) 157, NIM A269 (1988) 492 [erratum: NIM A273 (1988) 453], NIM A277 (1989) 401, NIM A279 (1989) 107, NIM A279 (1989) 243, NIM A279 (1989) 310, NIM A279 (1989) 331, NIM A279 (1989) 359, NIM A280 (1989) 36, IEEE TNS 36 (1989) 384, NIM A289 (1990) 438, NIM A289 (1990) 543, NIM A290 (1990) 122, NIM A290 (1990) 346, NIM A293 (1990) 125, NIM A297 (1990) 121, IEEE TNS 38 (1991) 286, IEEE TNS 38 (1991) 398, NP (PROC SUPPL) B23 (1991) 402, NIM A324 (1993) 53, NIM A338 (1994) 185, PRL 72 (1994) 965, PRL 72 (1994) 2138, and PRL 72 (1994) 2332.

Related experiments FNAL-823

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WWW Home-page http://d0sgi0.fnal.gov/

FNAL-741

(Proposed Aug 1981, Approved Apr 1982, Began data-taking 1987, In progress)

STUDY OF $\bar{p}p$ COLLISIONS USING A LARGE DETECTOR AT B0 — THE CDF DETECTOR

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UCLA – C Anway-Weise, J Hauser, F Keyvan, S Lammel, M Lindgren, T Muller, D Neuberger
CHICAGO U – M Contreras, S Eno, H Frisch, C Grosso-Pilcher, S Kopp, M Miller, J Romano, D Saltzberg, M J Shochet (√ Spokesperson), G Sullivan, J Wang, P Wilson
DUKE U – D Cronin-Hennessy, A T Goshaw, H Grassmann, S A Hauger, W Kowald, S H Oh, T J Phillips, W J Robertson, M Yin
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FRASCATI – S Bertolucci, G Chiarelli, M Cordelli, P Giromini, S Miscetti, A Sansoni
HARVARD U – T Baumann, G Brandenburg, J F de Troconiz, M Franklin, A Gordon, R Hamilton, P Hurst, J Huth, C P Jessop, D Kestenbaum, J Konigsberg, G Michail, F Ptohos, P Schlabach
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IPP, CANADA & MCGILL U & TORONTO U – K Biery, A Holscher, H S Kim, K Kordas, P Musgrave, K Ragan, G Sganos, P Sinervo, K Strahl, W Taylor, A Warburton, Y Ye
JOHNS HOPKINS U – B A Barnett, C Boswell, J Cammerata, D Glenzinski, J Skarha, F D Snider, A Spies, J Tseng
KEK – F Abe, Y Fukui, S Mikamo, M Mishina, Y Morita
LBL – A Barbaro-Galtieri, T Boulos, W C Carithers (√ Spokesperson), R B Drucker, K Einsweiler, R Ely, C Haber, R W Kadel, P Kesten, Y K Kim, M Paulini, M D Peters, N Produit, A Schindler, O Schneider, M Shapiro, H Wenzel, W C Wester, III , W Yao
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MICHIGAN STATE U – J Huston, J Mansour, R Miller
NEW MEXICO U – N Bacchetta, M W Bailey, M Frautschi, M Gold, J A J Matthews, S Seidel, T L Thomas
OSAKA CITY U – Y Kato, T Okusawa, T Takahashi, Y Teramoto, T Yoshida
PADUA U & INFN, PADUA – P Azzi, D Bisello, G Busetto, A Castro, A Fry, M Gallinaro, M Loreti, L Pescara, L Stanco, J Wyss
PENN U – F Azfar, D Benton, Y Cen, L Gladney, J Gonzalez, A Grewal, B Harral, J Heinrich, R Hollebeek, G Houk, N Lockyer, O Long, E H Low, F Ukegawa, G Unal, R Wilkinson, H H Williams, W Zhang
PITTSBURGH U – S van den Brink, E Engels, Jr , P Hu, B T Huffman, P F Shepard, P Singh
INFN, PISA & PISA, SCUOLA NORMALE SUPERIORE & PISA U – P Bartalini, F Bedeschi, S Belforte, G Bellettini, V Bolognesi, F Cervelli, A G Clark, M Cobal, S Dell'Agnello, M Dell'Orso, B Denby, S Donati, G Gagliardi, S Galeotti, P Giannetti, G Grieco, M Incagli, S Leone, D Lucchesi, M Mangano, M Mariotti, A Menzione, E Meschi, C Pagliarone, R Paoletti, G Pauletta, G Punzi, L Ristori, G Sciacca, A Scribano, D A Smith, A Stefanini, F Tartarelli, G Wang, X Wu, A Zanetti, F Zetti
PURDUE U – V E Barnes, D Bortoletto, A F Garfinkel, M Kruse, A T Laasanen, N M Shaw, Q Shen, J Tonnison
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SSCL – F Bird, C Blocker, L F Nakae, J Siegrist, J Thomas, M Turcotte
TEXAS A AND M – T Kamon, L Keeble, J Lu, P McIntyre, V Scarpine, R Webb, J Wolinski
TSUKUBA U – T Chikamatsu, S Funaki, K Hara, H Iso, T Kaneko, S H Kim, K Kondo, T Mimashi, H Mitsushio, S Miyashita, I Nakano, S Ogawa, R Oishi, Y Seiya, M Shimojima, K Takikawa, N Uemura, K Yasuoka
TUFTS U – D Benjamin, M Roach-Bellino, K Sliwa, M Timko
WISCONSIN U – J Bellinger, D Carlsmith, R Handler, P Maas, L Pondrom, J Steele, C Wendt, L Zhang
YALE U – J Bao, R M Hans, H Kasha, K E Ohl, M P Schmidt, I Yu

Accelerator FNAL-COLLIDER *Detector* CDF

Reactions

$\bar{p}\,p$ 500–2000 GeV (E_{cm})

Particles studied W^+, W^-, Z^0, higgs, top

Brief description The first physics results were obtained during 1987, in an engineering run, and in 1988/89, in a year-long run. Upgrades for the 1991 run are described in the FNAL-775 proposal, and another major improvement was proposed for the 1993 run. CDF is a general-purpose detector designed to study the physics of $p\bar{p}$ collisions. It has both azimuthal and forward-backward symmetry. A superconducting solenoid of length 4.8 m and radius 1.5 m generates a 1.4 T magnetic field and contains tracking chambers used to detect charged particles and measure their momenta. Surrounding the solenoid are sampling calorimeters used to measure the electromagnetic and hadronic energy of jets and electrons. Outside the calorimeters are drift chambers used for muon detection. Surrounding the beam pipe is a 4-layer silicon microstrip vertex detector, and a vertex drift chamber, both installed in 1992. Taking data (May 94).

Journal papers NIM 204 (1983) 351, NIM 204 (1983) 361, NIM 205 (1983) 113, NIM 216 (1983) 127, NIM 219 (1984) 472, JdeP 45 (1984) 333, NIM A238 (1985) 18, IEEE TNS 34 (1987) 865, NIM A263 (1988) 199, NIM A267 (1988) 249, NIM A267 (1988) 257, NIM A267 (1988) 272, NIM A267 (1988) 280, NIM A267 (1988) 301, NIM A267 (1988) 315, NIM A267 (1988) 330, NIM A267 (1988) 351, NIM A268 (1988) 24, NIM A268 (1988) 33, NIM A268 (1988) 41, NIM A268 (1988) 46, NIM A268 (1988) 50, NIM A268 (1988) 75, NIM A268 (1988) 92, NIM A269 (1988) 33, NIM A269 (1988) 40, NIM A269 (1988) 51, NIM A269 (1988) 63, NIM A269 (1988) 68, NIM A269 (1988) 82, NIM A269 (1988) 93, NIM A271 (1988) 387, PRL 61 (1988) 1819, PRL 62 (1989) 613, PRL 62 (1989) 1005, PRL 62 (1989) 1825, PRL 62 (1989) 3020, PRL 63 (1989) 720, PRL 63 (1989) 1447, NIM A274 (1989) 443, NIM A281 (1989) 485, PR D40 (1989) 3791, NP A498 (1989) 193c, IEEE TNS 36 (1989) 35, IEEE TNS 36 (1989) 347, IEEE TNS 36 (1989) 440, IEEE TNS 36 (1989) 765, NP (PROC SUPPL) 12 (1990) 18, NP (PROC SUPPL) 12 (1990) 254, PRL 64 (1990) 142, PRL 64 (1990) 147, PRL 64 (1990) 152, PRL 64 (1990) 157, PRL 64 (1990) 348, PRL 65 (1990) 968, PRL 65 (1990) 2243, PR D41 (1990) 1717, PR D41 (1990) 1722, PR D41 (1990) 2330, PRL 66 (1991) 2951, PRL 67 (1991) 1502, PRL 67 (1991) 2418, PRL 67 (1991) 2609, PRL 67 (1991) 2937, PRL 67 (1991) 3351, PR D43 (1991) 664, PR D43 (1991) 2070, PR D44 (1991) 29, PR D44 (1991) 601, NIM A315 (1992) 125, MPL A7 (1992) 2659, PRL 68 (1992) 447, PRL 68 (1992) 1458, PRL 68 (1992) 1463, PRL 68 (1992) 2734, PRL 68 (1992) 3398, PRL 68 (1992) 3403, PRL 69 (1992) 28, PRL 69 (1992) 2160, PRL 69 (1992) 2896, PRL 69 (1992) 3439, PRL 69 (1992) 3704, PR D45 (1992) 1448, PR D45 (1992) 2249, PR D45 (1992) 3921, PR D46 (1992) 1889, NIM A333 (1993) 209, NP (PROC SUPPL) B31 (1993) 189, PRL 70 (1993) 679, PRL 70 (1993) 713, PRL 70 (1993) 1376, PRL 70 (1993) 2232, PRL 70 (1993) 4042, PRL 71 (1993) 500, PRL 71 (1993) 679, PRL 71 (1993) 1685, PRL 71 (1993) 2396, PRL 71 (1993) 2537, PRL 71 (1993) 2542, PRL 71 (1993) 3421, PR D47 (1993) 2639, PR D48 (1993) 998, PR D48 (1993) 2998, PR D48 (1993) 3939, PRL 72 (1994) 1977, PRL 72 (1994) 3004, PRL 72 (1994) 3456, and PR D49 (1994) 1.

Related experiments FNAL-775, FNAL-830

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FNAL-745

(Proposed Sep 1983, Approved Dec 1983, Began data-taking Apr 1985, Completed data-taking Feb 1988)

MUON NEUTRINO EXPERIMENT USING THE TOHOKU HIGH RESOLUTION ONE METER BUBBLE CHAMBER

E745 COLLABORATION

BROWN U – M Aryal, D Brick, A Chen, K De, A Desilva, A Shapiro, M Widgoff
FERMILAB – D A Goloskie, T Murphy
INDIANA U – E D Alyea, Jr
BEIJING, IHEP – C Mao, L G Mu, Y Tai, S Wang, Y Wu, S W Xu, C Zhao
MIT – E S Hafen, J Harton, I A Pless
OAK RIDGE – H O Cohn
TENNESSEE U – W M Bugg, L Chatterjee, Y C Du, J Hargis, E L Hart, R Kroeger, J Shimony
TOHOKU U – T Akagi, K Furuno, H Hanada, K Hasegawa, J Katayama, H Kawamoto, T Kitagaki (✓ Spokesperson), Y Morita, S Nakai, T Nakajima, M Sasaki, H Suzuki, T Takayama, K Tamae, K Tamai, S Tanaka, A Yamaguchi, H Yuta
TOHOKU GAKUIN U – M Higuchi, Y Hoshi, M Sato

Accelerator FNAL-TEV *Detector* HLBC-1M

Reactions

ν_μ nucleus → charm X	< 500 GeV/c
ν_μ nucleus → muon X	"

Particles studied D^+, D^0, D_s^+, Λ_c^+

Brief description Uses the Tohoku high-resolution 1-meter freon bubble chamber. Studies charm production and neutrino interactions in the high Q^2 region, and the EMC effect. Took 553 KPIX, half with holograms.

Journal papers PL B214 (1988) 281, and NIM A281 (1989) 81.

Related experiments FNAL-782

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FNAL-755

(Approved Dec 1984, Completed data-taking Feb 1988)

BEAUTY AND CHARM STUDY

FERMILAB – M E Johnson, P W Lucas
YALE U – R E Beringer, S Dhawan, A Disco, E E Dougherty, P M Grudberg, J G Hissong, R D Majka (Spokesperson), P J Martin, H Pretty, F Rotondo, J Sandweiss, J P Sinnott, S Skarosi, A J Slaughter (Spokesperson), E J Wolin, Z X Wu

Accelerator FNAL-TEV *Detector* ?

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FNAL-756

(Proposed Oct 1984, Approved Jun 1985, Began data-taking Jul 1987, Completed data-taking Feb 1988)

MEASUREMENT OF THE MAGNETIC MOMENT OF THE Ω^- HYPERON

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MICHIGAN U – P M Ho, M Longo, A Nguyen
MINNESOTA U – J Duryea, G Guglielmo, K Heller, K Johns, M Shupe, K Thorne
RUTGERS U – T Diehl, S Teige, G Thompson, Y Zou

Accelerator FNAL-TEV *Detector* Spectrometer

Reactions

p Be → Ω^- X	800 GeV/c
Λ Cu → Ω^- X	300–800 GeV/c
Ξ^0 Cu → Ω^- X	"

Particles studied Ω^-, $\overline{\Omega}^+$, Σ^+, Σ^-, Ξ^-, $\overline{\Xi}^+$, K^+, K^-, π^-

Brief description Neutral beam was polarized. Ran for 1700 hours.

Journal papers PRL 65 (1990) 1713, PR D44 (1991) 3402, PRL 67 (1991) 804, PRL 67 (1991) 1193, PRL 68 (1992) 768, and PRL 70 (1993) 900.

Related experiments FNAL-800

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FNAL-760

(Proposed Mar 1985, Approved Jun 1985, Completed data-taking Jan 1992)

INVESTIGATION OF THE FORMATION OF CHARMONIUM STATES USING THE $\bar{p}$ ACCUMULATOR RING

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FERMILAB – V K Bharadwaj, M Church, A A Hahn, S Y Hsueh, W L Marsh, J Peoples, Jr , S H Pordes, P A Rapidis, R E Ray, S Werkema
FERRARA U – D Bettoni, G Borreani, R Calabrese, P Dalpiaz, M Fabbri, P Ferretti-Dalpiaz, A Gianoli, E Luppi, M Martini, F Petrucci, M Savrie
INFN, GENOA – A Buzzo, M Dameri, S Ferroni, M Macri, M M Marinelli, L Mattera, M Pallavicini, S Passaggio, C Patrignani, M G Pia, A Santroni, A Scalisi, F Tommasina, M Zito
NORTHWESTERN U – D A Dimitroyannis, C M Ginsburg, M Masuzawa, J L Rosen, M Sarmiento, K K Seth, S Trokenheim, J L Zhao
PENN STATE U – T A Armstrong, M A Hasan, R A Lewis, A M Majewska, J D Reid, G A Smith, Y Zhang
TURIN U – C Biino, G Borreani, A Ceccucci, R Cester (✓ Spokesperson), R Dibenedetto, F Marchetto, E A Menichetti, A Migliori, R Mussa, S Palestini, N Pastrone, L Pesando, G Rinaudo, B Roccuzzo, M Sozzi, L Tecchio

Accelerator FNAL-COLLIDER *Detector* Calorimeter, Counter

Reactions

$\bar{p}\,p \rightarrow \psi$(unspec)	3–7 GeV/c
$\bar{p}\,p \rightarrow 2K^+\,2K^-$	"
$\bar{p}\,p \rightarrow \gamma$'s	"
$\bar{p}\,p \rightarrow e^+\,e^-\,\gamma$(s)	"
$\bar{p}\,p \rightarrow e^+\,e^-\,\pi^+\,\pi^-\,\pi^0$	"

Particles studied charmonium

Brief description Studies charmonium states formed exclusively in $\bar{p}p$ collisions, and their decays to electromagnetic final states. Uses a gas jet hydrogen target in the Fermilab $\bar{p}$ source. The detector consists of a tracking system, hodoscopes, and Čerenkov counters surrounded by a central lead glass electromagnetic calorimeter, and a planar forward calorimeter.

Journal papers NIM A271 (1988) 417, NIM A277 (1989) 116, NIM A295 (1990) 73, NIM A301 (1991) 47, NIM A307 (1991) 254, NIM A317 (1992) 135, SJNP 55 (1992) 792, SJNP 55 (1992) 811, SJNP 55 (1992) 865, PRL 68 (1992) 1468, PRL 69 (1992) 2337, NP B373 (1992) 35, PL B307 (1993) 394, PL B307 (1993) 399, PRL 70 (1993) 1212, PRL 70 (1993) 2983, NP A558 (1993) 259c, PR D47 (1993) 772, and PR D48 (1993) 3037.

Related experiments FNAL-835

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WWW Home-page http://fn760b.fnal.gov/

FNAL-761

(Proposed Apr 1985, Approved Jun 1985, Completed data-taking Aug 1990)

STUDY OF HYPERON RADIATIVE DECAYS

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RIO DE JANEIRO, CBPF – A M F Endler, M C Pommot Maia
FERMILAB – R A Carrigan, Jr , P S Cooper, J Lach, A M Morelos-Pineda
IOWA U – T Dubbs, E R McCliment, C R Newsom
MOSCOW, ITEP – P A Goritchev, M A Kubantsev
SAO PAULO U – I F Albuquerque, C O Escobar, P Gouffon, J R P Mahon
ST PETERSBURG, INP – N F Bondar, A S Denisov, V L Golovtsov, V T Grachev, A V Khanzadeev, A G Krivshich, N P Kuropatkin, V M Samsonov, V A Schegelsky, N N Smirnov, N K Terentiev, L N Uvarov, A A Vorobiev (Spokesperson)
YALE U – M Foucher

Accelerator FNAL-TEV *Detector* Spectrometer, Transition radiation

Reactions

p nucleus $\rightarrow \Sigma^+$ X	800 GeV/c
p nucleus $\rightarrow \Xi^-$ X	"

Particles studied Σ^+, Ξ^-

Brief description Measures branching fractions and asymmetry parameters of $\Sigma^+ \rightarrow p\gamma$ and $\Xi^- \rightarrow \Sigma^-\gamma$ decays. Uses a polarized charged hyperon beam and a new very high resolution spectrometer.

Journal papers PRL 68 (1992) 3004, PRL 69 (1992) 3286, PRL 71 (1993) 2172, PRL 71 (1993) 3417, PRL 72 (1994) 808, and PR D50 (1994) 13.

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FNAL-769

(Proposed Nov 1985, Approved Dec 1985, Completed data-taking Feb 1988)

PION AND KAON PRODUCTION OF CHARM AND CHARM–STRANGE STATES

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FERMILAB – J A Appel (✓ Spokesperson), R L Dixon, D Green, S Kwan, L H Lueking, P M Mantsch, W J Spalding, C Stoughton, M Streetman
MISSISSIPPI U – L M Cremaldi, A Rafatian, D J Summers
NORTHEASTERN U – D Kaplan, I D Leedom, S Reucroft
TORONTO U – S B Bracker, C Gay, R Jedicke, G J Luste
TUFTS U – J Astorga, R Milburn, A Napier, D Passmore
WISCONSIN U – D Errede, M Sheaff
YALE U – C Darling, P E Karchin, W R Ross, S F Takach, A Wallace, Z Wu

Accelerator FNAL-TEV *Detector* TPS

Reactions

pion nucleus $\rightarrow$ charm X	250 GeV/c
kaon nucleus $\rightarrow$ charm X	"
p nucleus $\rightarrow$ charm X	"

Particles studied D^0, D^+, D^-, $D^*(2010)$, D_s^+, D_s^-, Λ_c^+, $\overline{\Lambda}_c^-$

Brief description A sequel to FNAL-691. Ran for 1900 hours. Physics focuses on charm production dynamics: dependence on beam particle, target material, Feynman x, transverse momentum, and final charm particle. Targets are W, Cu, Al, and Be foils.

Journal papers IEEE TNS 34 (1987) 870, IEEE TNS 36 (1989) 106, NP (PROC SUPPL) B7 (1989) 60, PRL 69 (1992) 3147, PRL 70 (1993) 722, PRL 72 (1994) 812, PRL 72 (1994) 1946, and PR D49 (1994) 4317.

Related experiments FNAL-687, FNAL-691, FNAL-791, CERN-NA-014-2, CERN-WA-082, CERN-WA-089, CERN-WA-092

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FNAL-770

(Proposed Dec 1985, Approved Dec 1985, Began data-taking Jun 1987, Completed data-taking Feb 1988)

NEUTRINO PHYSICS AT THE TEVATRON

CCFR COLLABORATION
CHICAGO U – F S Merritt, M J Oreglia
COLUMBIA U – C Arroyo, K T Bachmann, A O Bazarko, T Bolton, C Foudas, B J King, W C Lefmann, W C Leung, S R Mishra, P Z Quintas, S A Rabinowitz, F J Sciulli, B Seligman, M H Shaevitz

FERMILAB – R H Bernstein, F O Borcherding, H E Fisk, D Jovanovic, M Lamm, W Marsh, K W B Merritt, H M Schellman
ROCHESTER U – A Bodek, H Budd, P De Barbaro, W K Sakumoto
WISCONSIN U – T Kinnel, P H Sandler, W H Smith (✓ Spokesperson)

Accelerator FNAL-TEV *Detector* LAB-E

Reactions

pion nucleus → muon X	40, 70, 100 GeV/c
kaon nucleus → muon X	"
ν_μ nucleus → muon(s) X	< 600 GeV/c
$\overline{\nu}_\mu$ nucleus → muon(s) X	"

Particles studied ν_μ, kaon, pion, muon

Brief description Uses iron target, scintillators, and flash ADC calorimeter drift chamber readout. A continuation of FNAL-744. Ran for 1600 hours.

Journal papers NIM A294 (1990) 179, PR D42 (1990) 759, PL B252 (1990) 170, NIM A302 (1991) 254, PRL 66 (1991) 3117, PR D45 (1991) 3042, PRL 68 (1992) 3499, PL B317 (1993) 655, PRL 70 (1993) 134, PRL 71 (1993) 1307, ZPHY C57 (1993) 1, and NIM A340 (1994) 474.

Related experiments FNAL-356, FNAL-595, FNAL-616, FNAL-701, FNAL-744, FNAL-815

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FNAL-771

(Proposed Feb 1986, Approved Apr 1987, Began data-taking 1991, Completed data-taking Jan 1992)

BEAUTY PRODUCTION AND OTHER HEAVY QUARK PHYSICS ASSOCIATED WITH DIMUON PRODUCTION IN 800 (925) GeV/c p Si INTERACTIONS

SOUTH ALABAMA U – R K Clark, C M Jenkins
UC, BERKELEY – H C Ballagh, H H Bingham, J Lys, S Misawa
UCLA – A F Boden, D B Cline, S Ramachandran, J M Rhoades
DUKE U – L R Fortney, W R Kowald, C Wei, B T Zou
FERMILAB – P O Mazur, C T Murphy, R P Smith, L Spiegel, W Yang
HOUSTON U – K H Lau, G H Mo
DUBNA – J Budagov, S Tokar
LECCE U – P Creti, V Elia, E Evangelista, E Gorini, F Grancagnolo, M Panareo
MCGILL U – J M Trischuk
NANJING U – T Y Chen, N G Yao
NORTHWESTERN U – M M Block
PAVIA U – L Antoniazzi, G Bonomi, G Introzzi, A Lanza, G Liguori, P Torre
PENN U – A Blankman, S Borodin, W I Kononenko, W Selove, S N Zhang
PRAIRIE VIEW A AND M – M L Haire, D J Judd, L Turnbull, D E Wagoner
SHINSHU U – M He, C Wang, N Zhang
VANIER COLL – M S Cooper
VIRGINIA U – M W Arenton, Z L Cao, S Conetti, G Corti, B B Cox (✓ Spokesperson), E C Dukes, V Golovatyuk, K Hagan-Ingram, P M Hanlet, T Lawry, A Ledovskoy, A P Mcmanus, K S Nelson, V Pogosyan, M Recagni, J Segal, J Sun, Y Tzamouranis
WISCONSIN U – T Alexopoulos, C Durandet, A R Erwin, J Jennings

Accelerator FNAL-TEV *Detector* Spectrometer

Reactions

p Si → $\mu^+ \mu^-$ X	800 GeV/c
p Si → muon X	"
p Si → $B \overline{B}$ X	"
p Si → $J/\psi(1S)$ X	"
p Si → χ_c(unspec) X	"

Particles studied B^+, B^0, $J/\psi(1S)$, $\psi(2S)$, $\chi_{c1}(1P)$, χ_c(unspec)

Brief description Uses the FNAL-705 spectrometer augmented by a 10,000-channel silicon detector and a new single muon and dimuon trigger to select $B\overline{B}$ events at a high rate ($\sim 2 \times 10^6$/s).

Journal papers NP (PROC SUPPL) B23 (1991) 249, NIM A314 (1992) 563, NIM A315 (1992) 92, NIM A333 (1993) 142, NIM A337 (1993) 350, and NIM A340 (1994) 491.

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FNAL-772

(Proposed Mar 1986, Approved Jul 1986, Completed data-taking Feb 1988)

STUDY OF THE NUCLEAR ANTIQUARK SEA VIA pN → DIMUONS

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FERMILAB – C N Brown, W E Cooper, Y B Hsiung
ILLINOIS U, CHICAGO – M R Adams
NORTHERN ILLINOIS U – R Guo, D M Kaplan
SUNY, STONY BROOK – R L McCarthy
CASE WESTERN RESERVE U – G Danner, M J Wang
TEXAS U – M Barlett, G W Hoffmann

Accelerator FNAL-TEV *Detector* Spectrometer

Reactions

p deut → $\mu^+ \mu^-$ X	800 GeV/c
p nucleus → $\mu^+ \mu^-$ X	"

Brief description A precise measurement of the A dependence of the Drell-Yan process with particular emphasis on the kinematic region $M > 4$ GeV/c^2, $x > 0.2$, which is most sensitive to the beam–valence-quark target–antiquark annihilation. Also measures the dependence of J/ψ, ψ', and Υ resonances on A, for Feynman x between −0.1 and 0.6. Uses the FNAL-605 spectrometer. Targets are deuteron, C, Ca, Fe, and W. Ran for 1700 hours.

Journal papers NIM A282 (1989) 62, PRL 64 (1990) 2479, PR D41 (1990) 2334, PR D41 (1990) 2924, PR D43 (1991) 954, PRL 66 (1991) 133, PRL 66 (1991) 2285, and NP A544 (1992) 197c.

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FNAL-773

(Proposed Mar 1986, Approved Jul 1986, Jun 1989, Began data-taking Jul 1991, Completed data-taking Sep 1991)

MEASUREMENT OF THE PHASE DIFFERENCE BETWEEN η_{00} AND η_{+-} TO A PRECISION OF 0.5°

E773 COLLABORATION
CHICAGO U – A R Barker, R A Briere, E Cheu, D Harris, G D Makoff, K Mcfarland, A Roodman, B Schwingenheuer, S Somalwar, Y W Wah, B D Winstein, R Winston
ELMHURST COLL – E C Swallow
FERMILAB – G J Bock, R N Coleman, M Crisler, J Enagonio, R Ford, Y B Hsiung, D Jensen, E Ramberg, R S Tschirhart, T Yamanaka
ILLINOIS U, URBANA – E Collins, G D Gollin (✓ Spokesperson)
RUTGERS U – P Haas, W P Hogan, S K Kim, J N Matthews, S S Myung, G Ping, S R Schnetzer, G B Thomson, Y Zou

Accelerator FNAL-TEV *Detector* Spectrometer

Reactions

$K_L \to \pi^+ \pi^-$	50–150 GeV/c
$K_L \to \pi^+ \pi^- \gamma$	"
$K_L \to \pi^0 \pi^0$	"
$K_S \to \pi^+ \pi^-$	"
$K_S \to \pi^+ \pi^- \gamma$	"
$K_S \to \pi^0 \pi^0$	"

Particles studied K_L, K_S

Brief description This experiment adds an additional regenerator to the FNAL-731 spectrometer. A double K_L beam is incident on the spectrometer, which has 804 lead glass blocks and four drift chambers. One beam passes through a thin regenerator at the start of the fiducial decay volume, the other traverses a thick regenerator 11 meters further upstream. The regenerators switch beams between machine pulses. Neutral beam is produced by 800 GeV protons on a 36-cm beryllium target. The experiment tests CPT invariance. Data analysis in progress (May 94).

Related experiments FNAL-731, FNAL-799

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FNAL-774

(Proposed Apr 1986, Approved Dec 1986, Completed data-taking Aug 1990)

ELECTRON BEAM DUMP PARTICLE SEARCH IN THE WIDE BAND HALL

FERMILAB – A D Bross, M B Crisler (√ Spokesperson), H C Fenker, S A Pordes, J T Volk
ILLINOIS U, URBANA – S M Errede
NORTHEASTERN U – I Leedom

Accelerator FNAL-TEV *Detector* Calorimeter, Spectrometer

Reactions

e^- nucleus →	350 GeV (E_{lab})

Particles studied axion

Brief description A search for short-lived particles that couple to electron by looking for their decay in flight downstream from an electron beam dump. Inspired by the observation of an anomalous electron–positron pair production seen in heavy-ion collisions at the GSI.

Journal papers PRL 67 (1991) 2942.

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FNAL-775

(Proposed May 1986, Approved Apr 1987, Oct 1988, Jan 1989)

THE UPGRADED CDF DETECTOR AT FERMILAB

Accelerator FNAL-COLLIDER *Detector* CDF

Brief description The detector used in FNAL-741 is upgraded with the level-3 trigger, silicon vertex detector, and the muon detection system. Completed in 1991. See FNAL-741 for list of people, and published papers. See also FNAL-830.

Related experiments FNAL-741, FNAL-830

FNAL-776

(Proposed Aug 1986, Approved Jan 1987, Began data-taking May 1987, Completed data-taking Feb 1988)

MEASUREMENT OF NUCLEAR CALIBRATION CROSS SECTIONS FOR PROTONS WITH ENERGIES > 400 GeV

FERMILAB – R A Allen, S I Baker (√ Spokesperson), P Yurista
BROOKHAVEN – J B Cumming
CERN – V Agoritsas

Accelerator FNAL-TEV *Detector* Photon spectrometer

Reactions

p Cu → ^{24}Na X	30, 150, 400, 800 GeV (E_{lab})

Brief description Extends studies of FNAL-631. Natural copper foil is exposed to the proton beam, and then a gamma-ray from ^{24}Na (15-hour half-life) is detected with a high-resolution Ge(Li) detector.

Journal papers PR C43 (1991) 2862.

Related experiments FNAL-631

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FNAL-778

(Proposed Oct 1986, Approved Dec 1986, Completed data-taking Jan 1991)

STUDY OF THE SSC MAGNET APERTURE CRITERION

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FERMILAB – D A Edwards, D A Finley, A Gerasimov, R E Gerig (√ Spokesperson), G Goderre, M A Harrison, R P Johnson, I Kourbanis, L Michelotti, S Peggs, S Pruss, S Saritepe, T Satogata, M Syphers
LBL – L C Schachinger
SSCL – A W Chao, B Cole, D E Johnson, S Peggs, J M Peterson, F Pilat, C Saltmarsh, C G Trahern
SLAC – C B Manz, N Merminga
NORTH TEXAS STATE U – G Tsironis

Accelerator FNAL-TEV *Detector* Other

Reactions

p	150 GeV (E_{lab})

Brief description Tests assumptions made in the conceptual design of the SSC concerning the optimal magnet aperture. Studies (1) betatron oscillation amplitudes before and after introduction of nonlinear field components, (2) diffusive beam growth, yielding a phenomenological description, and (3) resonant detrapping of beam trapped in metastable states. May 94 update: no further work expected.

Journal papers PRL 61 (1988) 2752, PRL 68 (1992) 33, and PRL 68 (1992) 1838. No other papers expected.

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FNAL-781

(Proposed Mar 1987, Approved Oct 1988)

SEGMENTED LARGE-X BARYON SPECTROMETER (SELEX)

BEIJING, IHEP – L Chengze, W Dianrong, L Fengfei, T Fukun, Z Jiaquan, X Yigang, L Yunshan, L Zhigang
BRISTOL U – V J Smith
CARNEGIE MELLON U – R M Edelstein, D Gibaut, D M Potter, M Procario, J S Russ (Spokesperson), S Yang
RIO DE JANEIRO, CBPF – A M F Endler, M C Pommot Maia
FERMILAB – P S Cooper, J Lach, L G Stutte
IOWA U – K R Barger, U Mallik, E R Mccliment, C R Newsom, Y Onel
MOSCOW, ITEP – P A Goritchev, V D Khovansky, M A Kubantsev
ROCHESTER U – T Ferbel, M Zielinski
SAO PAULO U – O P Eboli, C O Escobar, P Gouffon
ST PETERSBURG, INP – A S Denisov, V L Golovtsov, V T Gratchev, A V Khanzadeev, A G Krivshich, N P Kuropatkin, V M Samsonov, V A Schegelsky, N N Smirnov, N K Terentiev, L N Uvarov, A P Vorobiev
TEL AVIV U – M Moinester
WASHINGTON U, SEATTLE – V Chaloupka, T Zhao

Accelerator FNAL-TEV *Detector* Spectrometer

Particles studied charmed-baryon

Brief description Studies both charmed baryon production and decays. Trigger is based on impact parameter. The spectrometer deploys a number of existing detectors as well as the new silicon strip and pixel devices and a ring-imaging Čerenkov counter. Unscheduled (May 94).

E-mail contact russ@cmphys.phys.cmu.edu

WWW Home-page http://fn781a.fnal.gov/

FNAL-782

(Proposed Feb 1987, Approved Jul 1987, Completed data-taking Jul 1990)

A MUON EXPOSURE IN THE TOHOKU HIGH RESOLUTION BUBBLE CHAMBER

BEIJING, IHEP – F N Bai, G C Li, C S Mao, H L Ni, J W Xi, S W Xu, C Z Zhao
BROWN U – M M Aryal, M Widgoff
FERMILAB – G M Koizumi, C T Murphy
MIT – I A Pless
OAK RIDGE – H O Cohn
SHINSHU U – M Sasaki
SUGIYAMA JOGAKUEN U – S Fukui
TENNESSEE U – W M Bugg, P Y C Du, J Hargis, E L Hart, R S Kroeger, M Pugh
TOHOKU GAKUIN U – S Fujii, M Higuchi, Y Hoshi, H I Iso, S Okuno, M Sato, O Suzuki
TOHOKU U – T Kitagaki (√ Spokesperson), H Suzuki, R Takahashi, K Tamai, S Tanaka, A Yamaguchi

Accelerator FNAL-TEV *Detector* HLBC-1.4M-HYB

Reactions

muon nucleus →	300 GeV/c

Brief description Uses the Tohoku high-resolution freon bubble chamber. Studies (1) production of vector mesons and strange and charm particles down to small Q^2, (2) the energy dependence of meson–baryon pair production in strange and charm channels, (3) the comparison of neutrino and muon interactions in the same 4π detector (see FNAL-745), (4) the structure function in the small Q^2 region, and (5) the EMC effect.

Related experiments FNAL-745

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FNAL-789

(Proposed Nov 1987, Approved Oct 1988, Began data-taking 1990, Completed data-taking)

MEASUREMENT OF THE PRODUCTION AND DECAY INTO TWO-BODY MODES OF b-QUARK MESONS AND BARYONS

ABILENE CHRISTIAN U – L D Isenhower, M E Sadler
TAIWAN, INST PHYS – Y Chen, G C Kiang, P K Teng
CHICAGO U – L M Lederman, M Schub
FERMILAB – C N Brown, W E Cooper, D Finley, H Glass, C S Mishra
LBL – G Gidal, P M Ho, M S Kowitt, K B Luk, D Pripstein
LOS ALAMOS – T A Carey, D Jansen, M J Leitch, P L Mcgaughey, J M Moss, J C Peng (√ Spokesperson)
NORTHERN ILLINOIS U – M Apolinski, D M Kaplan (√ Spokesperson), V Martin, R S Preston, V Tanikella
SOUTH CAROLINA U – R L Childers, C W Darden, J R Wilson

Accelerator FNAL-TEV *Detector* Spectrometer

Reactions

p nucleon	800 GeV (T_{lab})

Particles studied bottom, charm

Brief description Studies low multiplicity decays of b- and c-quark hadrons. Essential to evaluating the suitability of dihadronic beauty decays for the study of CP violation in the B system. Sensitive also to dileptonic modes, allowing limits to be set on their branching ratios. Uses the existing FNAL-605/772 spectrometer with suitably upgraded trigger processor system. Data analysis in progress (May 94).

Journal papers IEEE TNS 38 (1991) 461, IEEE TNS 39 (1992) 758, NP A544 (1992) 197c, PRL 72 (1994) 1318, PRL 72 (1994) 2542, and PR D50 (1994) 9.

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WWW Home-page http://p2hp2.lanl.gov/e789/e789.html

FNAL-790

(Proposed Jun 1987, Approved Dec 1987, Began data-taking May 1989, Completed data-taking Aug 1990)

CALORIMETER MODULE CALIBRATION FOR THE ZEUS DETECTOR

AMZEUS COLLABORATION
ARGONNE – M Derrick, B Musgrave, J Repond, R Talaga
COLUMBIA U – A Bernstein, A Caldwell, I Gialas, J Parsons, S M Ritz, F J Sciulli (√ Spokesperson), G Tzanakos, L Wai, S H Yang
IOWA U – T Bienz, A Hamri, H Kreuzmann, U Mallik (√ Spokesperson), M T P Roco, M Z Wang, J Wu
LOUISIANA STATE U – L Chen, R L Imlay, S Kartik, H J Kim, R McNeil, W Metcalf
OHIO STATE U – C G Li, K W McLean, S K Park
PENN STATE U – J N Lim, B Y Oh, J J Whitmore
VIRGINIA TECH – B Lu
WISCONSIN U – T Kinnel, R J Loveless, D D Reeder, P Sandler, W H Smith (√ Spokesperson)

Accelerator FNAL-TEV *Detector* Calorimeter

Reactions

hadron	5–150 GeV/c
$e^{\pm}$	"
muon	"

Brief description Testing of components and electronics of the HERA-ZEUS calorimeter by US members of the ZEUS collaboration. Principal goal is the precise resolution in the jet energy measurement.

Journal papers NIM A336 (1993) 23.

Related experiments DESY-HERA-ZEUS

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FNAL-791

(Proposed Nov 1987, Approved Jun 1988, Completed data-taking Jan 1992)

HADROPRODUCTION OF HEAVY FLAVORS AT THE TAGGED PHOTON LABORATORY

RIO DE JANEIRO, CBPF – S F Amato, J Anjos, I Bediaga, H Carvalho, I Costa, J De Mello Neto, J M De Miranda, A Reis, A F S Santoro, J Solano
UC, SANTA CRUZ – G Blaylock, P R Burchat, P Gagnon, J Leslie, K O'Shaughnessy, R Zaliznyak
CINCINNATI U – B Meadows, L Perera, A K Santha, M D Sokoloff
FERMILAB – J A Appel (√ Spokesperson), S Banerjee, S Bracker, T G Carter, K Denisenko, A M Halling, C C James, S Kwan, B G Lundberg, K A Thorne
ILLINOIS TECH – R A Burnstein, P A Kasper, K C Peng, H A Rubin
KANSAS STATE U – M Aryal, A Nguyen, N W Reay, R A Sidwell, N R Stanton, A Tripathi, N Witchey, C Zhang
MEXICO, IPN – G Herrera
MISSISSIPPI U – E Aitala, L M Cremaldi, K Gounder, A Rafatian, J J Reidy, D J Summers, D Y Yi
PRINCETON U – D Langs, M V Purohit (√ Spokesperson), A Schwartz, J Wiener
TEL AVIV U – D Ashery, S Gerzon, G Hurvits, J Lichtenstadt, S MayTal-Beck, R Weiss
TUFTS U – R H Milburn, A Napier
WISCONSIN U – S Radeztsky, M C Sheaff, S Watanabe
YALE U – C L Darling, R D Majka, J Sandweiss, A J Slaughter, S F Takach, E J Wolin

Accelerator FNAL-TEV *Detector* TPS

Reactions

π^- nucleus → charm X	500 GeV (E_{lab})
π^- nucleus → bottom X	"

Particles studied charm, bottom

Brief description Continues studies of FNAL-769. Emphasizes charm physics and a first look at bottom hadroproduction. Targets are Pt, and C foils. Some 20 billion events are collected. More than 200,000 fully reconstructed charm particles are anticipated. Data analysis in progress (May 94).

Journal papers NIM A324 (1993) 535.

Related experiments FNAL-653, FNAL-687, FNAL-691, FNAL-769, CERN-WA-082, CERN-WA-089

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FNAL-792

(Proposed Jan 1988, Approved Jan 1988, Completed data-taking Feb 1988)

STUDY OF FRAGMENTATION PRODUCTS FROM THE REACTION p ^{197}Au AT 800 GeV

UPPSALA U – K Aleklett (Spokesperson), L Sihver (Spokesperson)
OREGON STATE U – W D Loveland
LOS ALAMOS – P L McGaughey
HAHN-MEITNER INST – D H E Gross, H R Jaqaman

Accelerator FNAL-TEV *Detector* Photon spectrometer

Reactions

p ^{197}Au	800 GeV (E_{lab})

Brief description Measures angular distributions, target fragmentation cross sections, and range spectra.

Journal papers NP A543 (1992) 703. No other papers expected.

FNAL-793

(Proposed Nov 1987, Approved Sep 1988, In preparation)

EMULSION EXPOSURE TO 1000 GeV, OR HIGHEST ENERGY PROTONS

KAZAKH STATE U – E V Kolomeets
WASHINGTON NATURAL PHILOSOPHY INST – P Kotzer
WASHINGTON U, SEATTLE – R Davisson, J J Lord (✓ Spokesperson)

Accelerator FNAL-TEV *Detector* Emulsion

Reactions

p Wt	1000 GeV (E_{lab})

Brief description Exposes six stacks of emulsion with 10 μm tungsten targets and looks for evidence for the quark–gluon phase of matter. Approved/Inactive (May 94).

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FNAL-799

(Proposed Jan 1989, Approved Jun 1989, Began data-taking Oct 1991, In progress)

SEARCH FOR THE DECAY $K_L \to \pi^0 e^+ e^-$

UCLA – K Arisaka, D Roberts, W E Slater, M Weaver
CHICAGO U – R A Briere, E Cheu, D Harris, G D Makoff, K Mcfarland, A Roodman, B Schwingenheuer, S Somalwar, Y W Wah (✓ Spokesperson), B D Winstein, R Winston
COLORADO U – A R Barker
ELMHURST COLL – E C Swallow
FERMILAB – G J Bock, R N Coleman, M Crisler, J Enagonio, R Ford, Y B Hsiung, D A Jensen, E J Ramberg, R S Tschirhart
ILLINOIS U, URBANA – E Collins, G D Gollin
OSAKA U – T Nakaya, T Yamanaka (✓ Spokesperson)
RUTGERS U – P M Haas, W P Hogan, S K Kim, J N Matthews, S S Myung, G Ping, S R Schnetzer, G B Thomson, Y Zou

Accelerator FNAL-TEV *Detector* Spectrometer, Calorimeter

Reactions

$K_L \to \pi^0 e^+ e^-$	50–150 GeV/c
$K_L \to \pi^0 \mu^+ \mu^-$	"
$K_L \to \pi^0 \nu_e \bar{\nu}_e$	"
$K_L \to e^+ e^- e^+ e^-$	"
$K_L \to e^+ e^- \gamma\gamma$	"
$K_L \to \mu^+ \mu^- \gamma$	"

Particles studied K_L, π^0

Brief description The goal is to use rare K_L decays as a probe for the CP violation. Phase-I modifies the existing apparatus of FNAL-731 to handle increased K_L flux and extended decay region, and to provide a better muon identification. Studies various multibody rare K_L decays, and π^0 decays. Phase-I completed data taking in January 92. Phase-II uses a new beam line and a new detector including a new CsI calorimeter to improve the rejection of $K_L \to e^+e^-\gamma\gamma$ background from the $K_L \to \pi^0 e^+ e^-$ signal. It also uses a new transition radiation detector (TRD) to achieve a better π/e rejection. The sensitivity is expected to approach the 10^{-11} level for many rare K_L decays. Phase-II is in preparation (May 94).

Journal papers PRL 71 (1993) 31, PRL 71 (1993) 3914, PRL 71 (1993) 3918, PL B320 (1994) 407, and PRL 72 (1994) 3000.

Related experiments FNAL-731, FNAL-773, FNAL-832

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FNAL-800

(Proposed Mar 1988, Approved Oct 1988, Completed data-taking Jan 1992)

MEASUREMENT OF THE MAGNETIC MOMENT OF THE Ω^- HYPERON

ARIZONA U – K A Johns (Spokesperson)
FERMILAB – R A Rameika (Spokesperson)
MICHIGAN U – Y T Gao, M J Longo
MINNESOTA U – P M Border, D Ciampa, G M Guglielmo, K J Heller, N B Wallace, D M Woods

Accelerator FNAL-TEV *Detector* Spectrometer

Reactions

p Be $\to \Omega^-$ X	800 GeV/c
Λ Cu $\to \Omega^-$ X	300–500 GeV/c
Λ Cu $\to \Xi^-$ X	"
Ξ^0 Cu $\to \Omega^-$ X	"
Ξ^0 Cu $\to \Xi^-$ X	"

Particles studied Ω^-, Ξ^-

Brief description An extension of FNAL-756. Uses two methods to produce polarized Ω's. The spin transfer method uses 800-GeV protons to produce a secondary neutral beam of polarized Λ's and Ξ^0's, which is then used to produce a tertiary beam of polarized Ω's at 0 mr. The neutral production method uses a secondary beam of unpolarized Λ's and Ξ^0's incident at a production angle to produce polarized Ω's. The spectrometer consists of a set of silicon strip detectors and a set of multiwire proportional chambers.

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FNAL-802

(Proposed Dec 1988, Approved Feb 1989, Completed data-taking Dec 1991)

DEEP INELASTIC MUON INTERACTIONS WITH NUCLEAR TARGETS USING THE EMULSION TELESCOPE TECHNIQUE

FERMILAB – C T Murphy
JADAVPUR U – L Chatterjee (Spokesperson), D Ghosh (Spokesperson), J Roy

Accelerator FNAL-TEV *Detector* Emulsion

Reactions

muon nucleus → 420 GeV (T_{lab})

Brief description Studies deep inelastic scattering and the EMC effect. Exposes a stack of nuclear emulsion plates 10 cm long to a flux of 1.1 × 10^7 muons.

E-mail contact thornton@fnalv.fnal.gov

FNAL-803

(Proposed Oct 1990, Oct 1993, Approved Nov 1993, In preparation)

ν_μ TO ν_τ OSCILLATIONS

E803 COLLABORATION
AICHI U OF EDUCATION – K Kodama, N Ushida
ATHENS U – G S Tzanakos
UC, DAVIS – V Paolone, P M Yager
CHANGWON NATIONAL U – C H Hahn
CHONNAM NATIONAL U – J Y Kim
COLUMBIA U – J M Conrad, M H Shaevitz, E G Stern
FERMILAB – V D Bogert, G M Koizumi, B G Lundberg, A J Malensek, J G Morfin, R A Rameika
GIFU U – K Nakazawa, S Tasaka
GYEONGSANG NATIONAL U – I G Park, J S Song
HIROSAKI U – S Kuramata
ILLINOIS TECH – R A Burnstein, H A Rubin
INDIANA U – C Bower, R M Heinz, L Miller, S Mufson, J Musser
KANSAS STATE U – T A Bolton, N W Reay (✓ Spokesperson), R A Sidwell, N R Stanton
KINKI U, OSAKA – M Chikawa
KOBE U – S Aoki, T Hara
KOREA INST SCI – J K Kim
KOREA U – J S Kang, C O Kim
MICHIGAN U – S Coutu, K Green, D Levin, J Matthews, S McKee, D F Nitz, S Nutter, B Roe, G Tarle, R P Thun, J C Vander Velde
MINNESOTA U – R W Rusack, V M Singh
NAGOYA INST TECH – Y Isokane, Y Tsuneoka
NAGOYA U – K Hoshino, H Kitamura, M Kobayashi, M Miyanishi, M Nakamura, Y Nakamura, S Nakanishi, K Niu, K Niwa, M Nomura, K Saito, H Tajima, K Teraoka, S Yoshida
OKAYAMA U – K Moriyama, H Shibata
OSAKA CITY U – T Okusawa, M Teranaka, T Tominaga, T Watanabe, T Yoshida
OSAKA PREFECTURE U, SCI EDUC INST – H Okabe, J Yokota
OSAKA U OF COMMERCE – G Fujioka, Y Takahashi
SEOUL NATIONAL U – J W Kim
SOAI U – O Kusumoto
SOUTH CAROLINA U – F T Avignone, C Rosenfeld
TECHNION – J Goldberg
TOHO U – M Adachi, M Kazuno, Y Kobayashi, E Niu, S Ono, H Shibuya, Y Umezawa
TUFTS U – T Kafka, A Napier, W P Oliver, J Schneps
UCLA – M Atac, D Cline, W Hong, J Park, J Rhoades
UTSUNOMIYA U – Y Sato, I Tezuka
YOKOHAMA NATIONAL U – Y Maeda

Accelerator FNAL-TEV *Detector* Emulsion, Spectrometer

Reactions

ν_τ nucleon → τ X —

Particles studied ν_μ, ν_τ

Brief description Uses the Main Injector, 10–70 GeV ν_μ beam (also 10–70 GeV ν_e beam) and a hybrid emulsion spectrometer. In preparation (May 94).

Related experiments CERN-WA-095, CERN-WA-096

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FNAL-811

(Proposed Mar 1991, Approved Jul 1992, In preparation)

$\bar{p}p$ ELASTIC SCATTERING

CERN – R Desalvo, M C Lundin, M R Mondardini
CORNELL U – C Avila, C M Guss, J Orear (✓ Spokesperson)
FERMILAB – W F Baker, D P Eartly, H Jostlein, R Rubinstein

Accelerator FNAL-COLLIDER *Detector* Scintillator

Reactions

$\bar{p}\,p \rightarrow \bar{p}\,p$ 1800 GeV (E_{cm})

Brief description The detector is a solid bundle of scintillating fibers. The fibers are parallel to the beam, inside the beam pipe. Can be remotely moved close to the beam. Measures x and y coordinates of scattered protons to 50-micron accuracy. Scattering angles are small enough to observe Coulomb interference and to use optical theorem to get total cross section. In preparation (May 94).

Journal papers NIM A323 (1992) 419, NP (PROC SUPPL) B25 (1992) 261, and NP (PROC SUPPL) B25 (1992) 294.

Related experiments FNAL-710

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FNAL-815

(Proposed Oct 1990, Approved Jul 1992, In preparation)

NEUTRINO STUDY

NuTeV COLLABORATION
ADELPHI U – W C Lefmann, R V Steiner
BARNARD COLL – S Koutsoliotas
CINCINNATI U – R Johnson, M M Nussbaum, L P Perera, M Vakili
COLUMBIA U – J M Conrad, J H Kim, C McNulty, A Romosan, P C Rowson, M H Shaevitz (✓ Spokesperson), E G Stern
FERMILAB – R H Bernstein (✓ Spokesperson), G Koizumi, M J Lamm, W L Marsh, K McFarland, D L Naples
KANSAS STATE U – T A Bolton, J Norris, N W Reay, R A Sidwell, N R Stanton, S W Yangs, C Zhang
OREGON U – J E Brau, R B Drucker, R E Frey
ROCHESTER U – P S Auchincloss, A Bodek, H S Budd, P Debarbaro, D Harris, W K Sakumoto, U K Yang

Accelerator FNAL-TEV *Detector* LAB-E

Reactions

$\nu\, n \rightarrow \mu^-$ X 250 GeV (E_{lab})

Particles studied ν

Brief description The primary physics goal is to measure $\sin^2\vartheta_W$ to a precision of ±(0.002–0.003). The high precision is achieved by making use of a new high-intensity sign-selected neutrino beam. The new beam design permits clean separation of ν from $\bar{\nu}$ while providing enough intensity to maintain small statistical errors. Other goals include the study of the QCD scale parameter Λ, the charm mass, the CKM matrix element V_{cd}, and the effects of the strange quark sea and charm quark sea on proton. The two year run is scheduled to begin in early 1996, using the upgraded Tevatron. In preparation (May 94).

Related experiments FNAL-744, FNAL-770

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WWW Home-page http://cordelia.fnal.gov/NuTeV.html

FNAL-819

(Proposed Nov 1990, Approved Aug 1991, Began data-taking Oct 1990, Completed data-taking Oct 1991)

EMPACT MUON TELESCOPE EVALUATION AT FERMILAB

EMPACT MUON GROUP
HOUSTON U – K H Lau, B W Mayes, L Pinsky, R Weinstein

INDIANA U – T R Marshall
MIT – J I Friedman, E S Hafen, P Haridas, H W Kendall, L S Osborne (√ Spokesperson), I A Pless, L Rosenson, R Verdier

Accelerator FNAL-TEV *Detector* Streamer chamber

Reactions

muon	480 GeV (T_{lab})

Particles studied muon

Brief description Tests a muon measuring subsystem envisaged for the EMPACT detector at SSC. Uses high-energy real muons in the pair production region to study the accuracy and performance of the subsystem. The telescope is built of aluminum extrusion streamer chambers.

Journal papers NIM A315 (1992) 55, and NIM A (to be published).

E-mail contact osborne@mitlns.mit.edu

FNAL-823

(Approved Jul 1991, In progress)

D0 DETECTOR UPGRADE

Accelerator FNAL-COLLIDER *Detector* D0

Brief description The upgraded D0 experiment will continue the study of large-transverse-momentum, short-distance phenomena begun with the initial D0 program. Considerable stress will be placed on making a combination of precision measurements (W mass, top-quark mass, forward–backward asymmetry of leptons from Z, *etc.*) to seek departures from the Standard Model. New opportunities for study of b-quark states include b production, mixing of B^0 mesons, rare decays of b hadrons, and a search for CP violation. See FNAL-740 for the list of participants.

Journal papers See FNAL-740 for the list of published papers.

Related experiments FNAL-740

FNAL-830

(Approved Jul 1991)

PROPOSAL FOR AN UPGRADED CDF DETECTOR

Accelerator FNAL-COLLIDER *Detector* CDF

Brief description A major upgrade is proposed for the CDF detector in order to exploit fully the physics opportunities of high luminosity running at the Tevatron. The upgrade is planned for the 1998 run. For the list of participants, see FNAL-741. See also FNAL-775.

Related experiments FNAL-741, FNAL-775

FNAL-831

(Proposed Oct 1990, Approved Dec 1992, In preparation)

HIGH STATISTICS STUDY OF STATES CONTAINING HEAVY QUARKS USING THE WIDEBAND PHOTON BEAM

E831 COLLABORATION
UC, DAVIS – G Grim, R L Lander, V Paolone, P M Yager
COLORADO U – L Cinquini, J P Cumalat (√ Spokesperson), E S Erdos, J Ginkel, V S Greene, W Johns, M Nehring, G E Schultz, E Vaandering
FERMILAB – J N Butler, H W K Cheung, S Cihangir, I Gaines, P H Garbincius, L A Garren, S A Gourlay, D J Harding, P H Kasper, A E Kreymer, P L G Lebrun, S Shukla, D Torretta
FRASCATI – S Bianco, F Fabbri, M Giardoni, S Sarwar, A Zallo
ILLINOIS U, URBANA – F D Cogswell, R Gardner, D McGlaughlin, L Peak, A M Rahimi, J E Wiss
KOREA U – B G Cheon, Y S Chung, J S Kang, K Y Kim, K B Lee
LEBEDEV INST – B Govorkov
INFN, MILAN – G Alimonti, P D'Angelo, P Inzani, P F Manfredi, D Menasce, L Moroni (√ Spokesperson), D Pedrini, F P Prelz, A Sala-Grabar, S Sala
MILAN U – G Bellini, M Boschini, B Caccianiga, M Dicorato, P Dini, F Leveraro, L Milazzo
NORTH CAROLINA U – T F Davenport, III
NOTRE DAME U – N M Cason, J LoSecco, W D Shephard
PAVIA U – V Arena, O Barnaba, G Boca, G Bonomi, S Bricola, C Casella, E D'Uscio, A Freddi, G Gerard, G Gianini, J Giuseppe, E Imbres, T Locatelli, S Malvezzi, S P Ratti, C M Riccardi, F Vercellati, L Viola, P Vitulo
PUERTO RICO U, MAYAGUEZ – J Alemar, A M Lopez, L Mendez, R Wolfe
SOUTH CAROLINA U – D Friddel, J R Wilson
TENNESSEE U – G R Blackett, W M Bugg, G T Condo, K A Danyo, T Handler, M Pisharody
VANDERBILT U – J W Cao, P D Sheldon, M S Webster
WISCONSIN U – M Sheaff

Accelerator FNAL-TEV *Detector* Spectrometer

Reactions

γ nucleus $\rightarrow$ X	< 250 GeV/c (P_{lab})

Particles studied ψ(unspec), charm

Brief description Continues studies of FNAL-687. Uses bremsstrahlung photons from a wideband 250 GeV (±15%) electron beam, a new large-aperture multiparticle spectrometer, a beryllium target, and a silicon microstrip decay-vertex detector. Studies the dynamics of heavy quark photoproduction. In preparation (May 94).

Related experiments FNAL-687, FNAL-791

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WWW Home-page http://da831.fnal.gov/

FNAL-832

(Proposed Oct 1990, Approved Jun 1992, In preparation)

SEARCH FOR DIRECT CP VIOLATION IN THE 2π DECAYS OF THE NEUTRAL KAON

KTeV COLLABORATION
UCLA – K Arisaka, J R Jennings, J Kubic, D A Roberts, W E Slater, M B Spencer, R F Troy, M J Weaver
UC, SAN DIEGO – H G E Kobrak, R A Swanson, A White
CHICAGO U – E Cheu, G E Graham, R S Kessler, A J Roodman, P S Shawhan, N Solomey, Y W Wah, B D Winstein (√ Spokesperson), R Winston
COLORADO U – A R Barker, U Nauenberg
ELMHURST COLL – E C Swallow
FERMILAB – G J Bock, S R Childress, R N Coleman, M B Crisler, R L Ford, Y B Hsiung (√ Spokesperson), D Jensen, T Kobilancik, H Nguyen, V O'Dell, R Pordes, S A Pordes, E J Ramberg, R E Ray, Jr , K C Stanfield, R S Tschirhart, K Vaziri, H B White, J Whitmore
OSAKA U – K Hanagaki, Y Matsumiya, T Nakaya, M Takita, T Tsuji, M Yagi, T Yamanaka
RICE U – J Barnes, M D Corcoran, P Padley
RUTGERS U – J W Belz, P Gu, W P Hogan, R Li, S R Schnetzer, S V Somalwar, R Tesarek, G B Thomson
WISCONSIN U – T Alexopoulos, A Erwin

Accelerator FNAL-TEV *Detector* Spectrometer, Calorimeter

Reactions

$K_L \rightarrow \pi^+ \pi^-$	30–160 GeV/c (P_{lab})
$K_L \rightarrow \pi^0 \pi^0$	"
$K_L \rightarrow \pi^+ \pi^- \gamma$	"
$K_L \rightarrow \pi^0 \gamma \gamma$	"
$K_L \rightarrow \pi^0 \nu \bar{\nu}$	"
$K_S \rightarrow \pi^+ \pi^-$	"
$K_S \rightarrow \pi^0 \pi^0$	"
$K_S \rightarrow \pi^+ \pi^- \gamma$	"

Particles studied K_L, K_S

Brief description Measures the direct CP violation parameter $\mathrm{Re}(\epsilon'/\epsilon)$ to the precision of 10^{-4}. The new neutral kaon beam facility, KTeV, is constructed to give five times more flux, with reduced muon background and accidental rate. The apparatus gives two times longer decay region, higher rate capability, and more hermetic photon veto coverage against the $3\pi^0$ background. The position and energy resolution of electromagnetic calorimeter (CsI) for electron and photon are improved. Data taking expected in 1996/97 fixed-target run.

Related experiments FNAL-731, CERN-NA-048

E-mail contact bruce@fnalv.fnal.gov, bruce@hep.uchicago.edu, hsiung@fnalv.fnal.gov

FNAL-835

(Approved Dec 1992, In preparation)

STUDY OF CHARMONIUM SPECTROSCOPY IN PROTON–ANTIPROTON ANNIHILATION

UC, IRVINE – G D Blanford, D R Broemmelsiek, K E Gollwitzer, M A Mandelkern, J L Marques, J Schultz, A Smith, G Zioulas
FERMILAB – M Church, A A Hahn, W L Marsh, J Peoples, Jr , S A Pordes, P A Rapidis, R E Ray, Jr , S Werkema
FERRARA U – D Bettoni, G Bonora, R Calabrese, B Camanzi, V Carassiti, P Dalpiaz, P Ferretti-Dalpiaz, A Gianoli, E Luppi, M Martini, F Petrucci, M Savrie, G L Sorrentino, L Tracchi
INFN, GENOA – G Barisone, D Bondi, A Buzzo, R Cereseto, R Dicapua, G Franzone, M Lovetere, M Macri, M M Marinelli, S Minutoli, M Negri, M Pallavicini, S Passaggio, C Patrignani, M G Pia, P Poggi, A Pozzo, A Santroni, E Vigo
NORTHWESTERN U – C M Ginsburg, T K Pedlar, J L Rosen, M Sarmiento, K K Seth, S Trokenheim
PENN STATE U – T A Armstrong, M A Hasan, R A Lewis, A M Majewska, R McTaggart, J Passaneau, J D Reid, G A Smith, Y L Zhang
TURIN U – C Biino, G Borreani, A Ceccucci, R Cester (Spokesperson), G Dughera, G Giraudo, F Marchetto, E A Menichetti, A Migliori, R Mussa, S Palestini, N M Pastrone, L Pesando, G Rinaudo, B Roccuzzo, M S Sozzi, B Tencone

Accelerator FNAL-TEV *Detector* ?

Related experiments FNAL-760

E-mail contact cester@to.infn.it, cester@fnalv.fnal.gov

WWW Home-page http://fn760b.fnal.gov/

FNAL-843

(Approved Jul 1991, Completed data-taking Jul 1991)

INTERACTIONS OF 50, 100, AND 490 GeV MUONS WITH EMULSION NUCLEI

CHONNAM NATIONAL U – J Y Kim, I T Lim
KOREA U – C O Kim (Spokesperson)

Accelerator FNAL-TEV *Detector* Emulsion

Reactions

μ nucleus $\rightarrow$ μ nucleus	50, 100, 490 GeV (T_{lab})

Brief description Studies the target diffractive excitation and the small-distance structure of nucleons and nuclei by exposing C, N, O, Ag, and Br nuclei in nuclear emulsions to high-energy muons.

FNAL-847

(Proposed Feb 1991, Approved Jul 1991, Completed data-taking Jan 1992)

TEST OF A FULL-SCALE SSC SCINTILLATING FIBER CALORIMETER PROTOTYPE

BOSTON U – L R Sulak (Spokesperson)

Accelerator FNAL-TEV

FNAL-853

(Proposed May 1991, Approved Jul 1992, In preparation)

TEST OF LOW INTENSITY EXTRACTION FROM THE TEVATRON USING CHANNELING IN A BENT CRYSTAL

UCLA – A F Boden, D B Cline, W Gabella, S Ramachandran, J M Rhoades, J Rosenzweig
CEBAF – R Rossmanith
FERMILAB – R A Carrigan, P Colestock, H T Edwards, G P Goderre, D Herrup, G Jackson (Spokesperson), C T Murphy (Spokesperson), S Peggs
DUBNA – V Golovatyuk, A B Sadovsky, A Taratin, E Tsyganov, A Vodopyanov
NEW MEXICO U – J A Ellison
SUNY, ALBANY – C R Sun
SERPUKHOV – M Bavizhev, V Biryukov, M A Maslov, N V Mokhov
SSCL – S I Baker, A W Chao, B L Parker, H J Shih, R Soundranayagam, R J Stefanski, T E Toohig
ST PETERSBURG, INP – A V Khanzadeev, V M Samsonov
TEXAS U – B S Newberger
VIRGINIA U – M W Arenton, S Conetti, G Corti, B B Cox, E C Dukes, K Hagan-Ingram, T J Lawry, A A Ledovskoy, A P McManus, K S Nelson, B Norum, V S Pogosyan, I Tzamouranis
WISCONSIN U – A R Erwin

Accelerator FNAL-COLLIDER *Detector* ?

E-mail contact thornton@fnalv.fnal.gov, gpj@fnalv.fnal.gov

FNAL-854

(Proposed Jul 1991, Approved Sep 1991, Began data-taking Jan 1992, Completed data-taking Jan 1992)

FLUX OF CIRCULATING MUONS IN THE DEBUNCHER

COLUMBIA U – W Y Lee, E Mannel
FERMILAB – A D Bross (√ Spokesperson), M F Gormley, S O'Day, H K Park

Accelerator FNAL-TEV *Detector* ?

Particles studied muon, $\overline{p}$

Brief description Using a novel technique this experiment measures the flux of circulating pions, electrons, muons and antiprotons in the Fermilab Debuncher ring.

Journal papers NIM A332 (1993) 27.

E-mail contact bross@fnalv.fnal.gov

FNAL-855

(Approved Nov 1991, Completed data-taking Dec 1991)

TEST BEAM REQUEST TO DIRECTLY MEASURE dE/dx OF HIGH ENERGY MUONS FROM 150 TO 650 GeV/c IN THE MUON LABORATORY

OKLAHOMA U – G R Kalbfleisch (Spokesperson), D Lawrence
SSCL – R J Stefanski

Accelerator FNAL-TEV *Detector* Counter

Reactions

muon	600 GeV (T_{lab})

Brief description The aim is to measure the three components (ionization, direct pair, and direct photon) of energy loss of muons above 200 GeV. Uses a thin and a thick active detector of each of two different materials, plastic scintillator and sodium iodide.

E-mail contact grk@fnalv.fnal.gov

FNAL-861

(Proposed Feb 1992, Approved Mar 1992, Began data-taking Apr 1992, Completed data-taking Jun 1992)

SEARCHING FOR ANTIPROTON DECAY AT THE FERMILAB ANTIPROTON SOURCE

APEX COLLABORATION

UCLA – M Lindgren, T Muller, J Quackenbush

FERMILAB – S Geer (√ Spokesperson), J P Marriner, R E Ray, Jr , J Streets

PENN STATE U – T A Armstrong

Accelerator FNAL-TEV *Detector* Calorimeter

Reactions

$\overline{p} \rightarrow e^-$ X 8.9 GeV/c (P_{lab})

Particles studied $\overline{p}$

Brief description Searches for two-body decay of antiproton into an electron and one of the following particles: π^0, η, photon, K_L, or K_S. Uses the Antiproton Accumulator facility.

Journal papers PRL 72 (1994) 1596.

Related experiments FNAL-868

E-mail contact sgeer@fnalv.fnal.gov, sgeer@fnald.fnal.gov

FNAL-862

(Proposed Aug 1992, Approved Mar 1993, In preparation)

DETECTION OF RELATIVISTIC ANTI-HYDROGEN ATOMS PRODUCED BY PAIR PRODUCTION WITH POSITRON CAPTURE

ANTIHYDROGEN COLLABORATION

UC, IRVINE – G D Blanford, K E Gollwitzer, M A Mandelkern, G G McGrath, J Schultz, G Zioulas

FERMILAB – D C Christian (√ Spokesperson)

PENN STATE U – T A Armstrong, M A Hasan, R A Lewis, G A Smith

SLAC – C T Munger

Accelerator FNAL-TEV *Detector* Spectrometer

Reactions

$\overline{p}\,p$ 3–8.8 GeV/c (P_{lab})

Brief description The experiment seeks to synthesize and observe atoms of antihydrogen, the atomic bound state $\overline{H} = (\overline{p}e^+)$. The antiproton beam stored in the Fermilab Accumulator ring circulates through the hydrogen gas target of the experiment FNAL-835. The formed antihydrogen atoms escape the ring at the first bend magnet as a neutral beam with the same narrow momentum spread as that of the antiprotons stored in the Accumulator. An antihydrogen atom hits a carbon target and disassociates into e^+ and $\overline{p}$, each with equal, known and tightly constrained velocities: the coincidence in space, time and velocity selects an event. The $\overline{p}$ is identified by measuring its momentum by tracking its flight through magnetic fields using wire chambers, and by measuring its velocity by time-of-flight. The e^+ is identified by selecting its momentum using a special positron spectrometer, its energy deposit as it stops in a scintillator, and by detecting both its 2γ-annihilation X-rays in a 4π NaI detector. In preparation (May 94).

Journal papers HFI 76 (1993) 175, and PR D49 (1994) 3228.

E-mail contact dcc@fnalv.fnal.gov

FNAL-864

(Proposed Apr 1993, Approved May 1993, Began data-taking Nov 1993, In progress)

MINIMAX: A TEST / EXPERIMENT FOR THE FERMILAB COLLIDER

CASE WESTERN RESERVE U – K del Signore, W J Fickinger, T L Jenkins, E Kangas, M Knepley, K L Kowalski, C C Taylor (√ Spokesperson)
DUKE U – S H Oh, W D Walker
FERMILAB – P Colestock, B M Hanna, M Martens, J Streets
MICHIGAN U – R Ball, H R Gustafson, L W Jones, M J Longo
SLAC – J D Bjorken (√ Spokesperson)
TENNESSEE U – A Weidemann
VIRGINIA TECH – A Abashian, D Haim, N K Morgan

Accelerator FNAL-COLLIDER *Detector* MINIMAX

Particles studied γ, charged

Brief description The apparatus is located in the C0 collision region. Its main part is a tracking telescope with 12 MPC's of size 30 × 30 cm^2, 128 wires per chamber, and converter within the telescope. Event-by-event, the number of charged particles and photons is counted. A trigger is provided by the scintillator and downstream of the tracking telescope is an electromagnetic calorimeter for diagnostics. The physics goals are (i) the search for events containing the residue of disoriented chiral condensate (Centauro/anti-Centauro behavior) in the far forward direction, and (ii) the study of intermittency. Taking data (May 94).

Related experiments CERN-UA-005, CERN-NA-022

E-mail contact cct@po.cwru.edu, bjorken@slac.stanford.edu

FNAL-866

(Proposed Sep 1992, Approved Dec 1992, In preparation)

MEASUREMENT OF THE RATIO OF ANTIQUARK DISTRIBUTIONS $\overline{d}(x)/\overline{u}(x)$ IN THE PROTON

ABILENE CHRISTIAN U – L D Isenhower, M E Sadler, R S Towell
BEIJING, IHEP – Y C Chen, G C Kiang, P K Teng, M J Wang
ARGONNE – D F Geesaman, H E Jackson, Jr , S Kaufman, V Papavassiliou, B Zeidman
CAL TECH – D Brey, P Carter, B Filippone, R McKeown
FERMILAB – C N Brown, W E Cooper, C S Mishra
LOS ALAMOS – M L Brooks, T A Carey, F Federspeil, G T Garvey (√ Spokesperson), D M Jansen, D Lee, M J Leitch, J B McClelland, P L McGaughey, C L Morris, J M Moss, J C Peng
LOUISIANA STATE U – P N Kirk, Y C Wang, Z F Wang
NEW MEXICO STATE U – G Burleson, T H Chang, G S Kyle, B Park, Z M Wang
NORTHERN ILLINOIS U – D M Kaplan
OAK RIDGE – T Awes, H Kim, F Obenshain, S Saini, P Stankus, G R Young
TEXAS A AND M – C A Gagliardi, E Hawker, R E Tribble
VALPARAISO U, INDIANA – D D Koetke, S Stanislaus

Accelerator FNAL-TEV *Detector* Spectrometer

Reactions

p nucleon 800 GeV (T_{lab})

Brief description The experiment is a precision measurement of Drell-Yan yields from hydrogen and deuterium. The ratio of these yields can be used to infer the ratio $\overline{u}(x)/\overline{d}(x)$ in the proton, over the x interval between 0.03 and 0.3 . Measures also the J/ψ, ψ', Υ, Υ', and Υ'' yields from both targets. Uses the Magnetic Dilepton Spectrometer, with 3 dipoles, 3 stations of wire chambers, 1 station with prop-tubes, 4 hodoscope stations, and high rate capability with better than 100 MeV resolution at the J/ψ. Beam produces 10^{12} protons/spill. Targets are LH and LD. Scheduled to run in December 95.

Related experiments FNAL-772, CERN-NA-051

E-mail contact garvey@lampf.lanl.gov, garvey@lanl.gov

WWW Home-page http://p2hp2.lanl.gov/e866/e866.html

FNAL-868

(Proposed Sep 1992, Approved Mar 1993, In preparation)

SEARCH FOR ANTIPROTON DECAY AT THE ANTIPROTON ACCUMULATOR

APEX COLLABORATION
UCLA – C D Buchanan, B Corbin, M Lindgren, T Muller
FERMILAB – S Geer (√ Spokesperson), J P Marriner, M Martens, R E Ray, Jr , J Streets
MICHIGAN U – H R Gustafson, L W Jones, G R Snow
PENN STATE U – T A Armstrong, R A Lewis, G A Smith

Accelerator FNAL-TEV *Detector* Calorimeter

Reactions

$\bar{p} \rightarrow e^{-}$ X 8.9 GeV/c (P_{lab})

Particles studied $\bar{p}$

Brief description The detector consists of a calorimeter, fiber tracker, pre-radiator, DEDX, and vetos. Uses the Antiproton Accumulator facility. In preparation (May 94).

Related experiments FNAL-861

E-mail contact sgeer@fnalv.fnal.gov, sgeer@fnald.fnal.gov

INS Experiments

INS-ES-116

(Proposed 1986, Approved Jul 1986, Began data-taking Jun 1987, Completed data-taking Mar 1988)

STUDIES OF THE PHOTONUCLEAR PROCESS ON He

HIROSHIMA U – I Endo, M Harada, S Kasai, K Niki, Y Sumi
SAGA U, JAPAN – A Hisadomi, H Ito
SASKATCHEWAN U – C Rangacharyulu (√ Spokesperson)
TOKYO U, INS – S Kato (√ Spokesperson), K Maruyama, Y Murata, K Yoshida
KITAKYUSHU, UNIV OCCUP ENVIR HEALTH – T Maki
AKITA U – A Sasaki
TOKYO INST TECH – H Shimizu
MEIJI COLL, PHARMACY – Y Wada

Accelerator TOKYO *Detector* TAGX

Reactions

γ He $\rightarrow p\ n$ X	0.17–0.27 GeV/c

Brief description Studies nucleon–nucleon correlations.

Journal papers NIM A276 (1989) 451, and NIM A290 (1990) 315.

INS-ES-118

(Proposed 1987, Approved 1987, Began data-taking May 1988, Completed data-taking Nov 1988)

RADIOCHEMICAL STUDY OF HIGH-ENERGY PHOTONUCLEAR REACTIONS

TOKYO U, INS – S Shibata (√ Spokesperson)
KANAZAWA U – K Kawaguchi, Y Ohura, T Okui, K Sakamoto
NAGOYA U – M Furukawa
OTEMON GAKUIN U – I Fujiwara

Accelerator TOKYO *Detector* Combination

Reactions

γ nucleus	0.25 – 1.05 GeV/c (P_{lab})

Brief description Uses Ge and Si(Li) detectors.

Journal papers PR C35 (1987) 254, NP A501 (1989) 693, PR C42 (1990) 1545, RCHA 55 (1991) 113, and RCHA 55 (1991) 139.

E-mail contact sshibata@jpnutins.ins.u-tokyo.ac.jp

INS-ES-119

(Proposed 1988, Began data-taking Jul 1988, Completed data-taking Jan 1989)

DETERMINATION OF ATOMIC FORM FACTORS BY MEANS OF COHERENT BREMSSTRAHLUNG

HIROSHIMA U – I Endo (√ Spokesperson), T Kino, T Monaka, A Sakaguchi, Y Sumi, M Tobiyama
TOKYO U, INS – K Watanabe, K Yoshida
TSUKUBA U – T Ohba
HIROSHIMA SHUDO U – K Baba
TOKYO U OF AGRIC TECH – T Emura

Accelerator TOKYO *Detector* Counter

Reactions

e^- crystal $\rightarrow e^-\ \gamma$ X	1.2 GeV (E_{lab})

Brief description Uses Si, Ni, Al, and Zn crystals.

Journal papers PL A146 (1990) 150, and PL A166 (1992) 140.

E-mail contact endo@photon.hepl.hiroshima-u.ac.jp

INS-ES-120

(Proposed 1988, Approved Feb 1989, Began data-taking Feb 1989, Completed data-taking Nov 1989)

MEASUREMENT OF SHORT-RANGE *N N* CORRELATIONS IN THE ^{4}He NUCLEUS

TAGX COLLABORATION
AKITA U – A Sasaki
HIROSHIMA U – I Endo, S Endo, K Niki, Y Sumi
TOKYO U, INS – S Kato, M Koike, K Maruyama (√ Spokesperson), Y Murata, K Yoshida
MEIJI COLL, PHARMACY – Y Wada
KITAKYUSHU, UNIV OCCUP ENVIR HEALTH – T Maki
SAGA U, JAPAN – H Itoh, S Maruo
SASKATCHEWAN U – C Rangacharyulu
TOHOKU U – K Maeda, T Suda
TOKYO U OF AGRIC TECH – T Emura

Accelerator TOKYO *Detector* TAGX

Reactions

γ He $\rightarrow p\ n$ X	130–450 MeV (E_{lab})
γ He $\rightarrow p\ n$ deut	"
γ He $\rightarrow p\ p\ n\ n$	"
γ He $\rightarrow p\ \pi^+$ X	"
γ He $\rightarrow p\ \pi^-$ X	"

Brief description Uses tagged photons.

Journal papers NIM A290 (1990) 315, NIM A294 (1990) 534, PL B267 (1991) 460, and PL B286 (1992) 229.

E-mail contact maruyama@jpnutins.ins.u-tokyo.ac.jp

INS-ES-121

(Proposed Nov 1988, Approved Feb 1989, Began data-taking May 1989, Completed data-taking Dec 1989)

RADIOCHEMICAL STUDIES OF HIGH-ENERGY PHOTONUCLEAR REACTIONS

TOKYO U, INS – M Imamura, S Shibata (√ Spokesperson)
KANAZAWA U – T Fukasawa, Y Hamajima, K Kawaguchi, Y Kuboto, A Kunugise, M Masatani, S Okizaki, M Ootani, Y Oura, K Sakamoto, S R Sarkar, M Soto, M Yoshida
NAGOYA U – M Furukawa
OTEMON GAKUIN U – I Fujiwara

Accelerator TOKYO *Detector* Photon spectrometer

Reactions

γ nucleus	$<$ 1 GeV (E_{lab})

Brief description Uses Ge and Si detectors.

Journal papers NP A510 (1989) 693, and PR C42 (1990) 1545.

E-mail contact sshibata@jpnutins.ins.u-tokyo.ac.jp

INS-ES-122

(Proposed Oct 1989, Approved Jan 1990, Began data-taking Apr 1990, Completed data-taking Jun 1990)

STUDY OF THE SINGULARITY IN THE BREMSSTRAHLUNG PROCESS BY HIGH-ENERGY ELECTRONS IN A SINGLE CRYSTAL

HIROSHIMA U – I Endo (√ Spokesperson), T Tanioka, M Tobiyama, H Uchida
TOKYO U, INS – M Mutou, K Watanabe, K Yoshida
TEIKYO U – T Ohba
HIROSHIMA SHUDO U – K Baba
TOKYO U OF AGRIC TECH – T Emura

Accelerator TOKYO *Detector* Counter

Reactions

e^- Si $\rightarrow \gamma$ X	1.2 GeV (E_{lab})

Brief description Target is a silicon single crystal.

Journal papers PL A164 (1992) 319.

E-mail contact endo@photon.hepl.hiroshima-u.ac.jp

INS-ES-123

(Approved Jan 1990, Began data-taking Jan 1991, Completed data-taking Apr 1991)

STUDY ON 2N-PHOTOABSORPTION IN THE $\gamma\,^3$He $\rightarrow$ *ppn* REACTION

TAGX COLLABORATION
AKITA U – A Sasaki
HIROSHIMA U – S Endo, Y Sumi
TOKYO U, INS – S Kato, M Koike, K Maruyama (Spokesperson), K Niki
MEIJI COLL, PHARMACY – Y Wada
KITAKYUSHU, UNIV OCCUP ENVIR HEALTH – T Maki
REGINA U – G Huber, G J Lolos
SAGA U, JAPAN – H Itoh, R Naridomi, T Ogata
SASKATCHEWAN U – C Rangacharyulu
TOHOKU U – O Konno, K Maeda, T Suda, H Yamazaki
TOKYO U OF AGRIC TECH – T Emura, H Miyamoto

Accelerator TOKYO *Detector* TAGX

Reactions

$\gamma\,^3\mathrm{He} \rightarrow p\,n\,\mathrm{X}$	130–450 MeV (E_{lab})
$\gamma\,^3\mathrm{He} \rightarrow p\,p\,n$	"

Brief description Uses tagged photons.

Journal papers NIM A307 (1991) 213, and PR C49 (1994) 597.

Related experiments INS-ES-124

E-mail contact maruyama@jpnutins.ins.u-tokyo.ac.jp

INS-ES-124

(Approved Jan 1990, Began data-taking Apr 1991, Completed data-taking Jun 1991)

SEARCH FOR ISOBAR COMPONENTS IN ^{3}He

TAGX COLLABORATION
AKITA U – A Sasaki
HIROSHIMA U – S Endo, Y Sumi
TOKYO U, INS – S Kato, M Koike, K Maruyama, K Niki
MEIJI COLL, PHARMACY – Y Wada
KITAKYUSHU, UNIV OCCUP ENVIR HEALTH – T Maki
REGINA U – G Huber, G J Lolos
SAGA U, JAPAN – H Itoh, R Naridomi, T Ogata
SASKATCHEWAN U – B Lasiuk, C Rangacharyulu (Spokesperson)
TOHOKU U – O Konno, K Maeda, T Suda (Spokesperson), H Yamazaki
TOKYO U OF AGRIC TECH – T Emura, H Miyamoto

Accelerator TOKYO *Detector* TAGX

Reactions

$\gamma\,^3\mathrm{He} \rightarrow \pi^-\,p\,\mathrm{X}$	380–700 MeV (E_{lab})
$\gamma\,^3\mathrm{He} \rightarrow \pi^+\,p\,\mathrm{X}$	"

Brief description Uses tagged photons.

Related experiments INS-ES-123, INS-ES-134

INS-ES-125

(Approved Jan 1990, Began data-taking Sep 1990, Completed data-taking Oct 1990)

TEST EXPERIMENT ON THE ^{12}C(γ, K^+) REACTION WITH THE TAGGED PHOTON BEAM

TAGX COLLABORATION
HIROSHIMA U – S Asano, I Endo, S Endo, H Ifuku, A Sakaguchi, Y Sumi, H Uchida
TOKYO U, INS – M Koike, K Maruyama, K Niki, H Okuno, K Yoshida
TOHOKU U – K Maeda (✓ Spokesperson), T Sasaki, T Suda, H Yamazaki

Accelerator TOKYO *Detector* TAGX

Reactions

$\gamma\,^{12}\mathrm{C} \rightarrow K^+\,\mathrm{X}$	780–1100 MeV (E_{lab})

Brief description Uses tagged photons.

E-mail contact maeda@kekvax.kek.jp, kekvax::maeda

INS-ES-126

(Proposed Nov 1990, Approved Jan 1991, Began data-taking Jul 1991, Completed data-taking Nov 1991)

RADIOCHEMICAL STUDIES OF HIGH ENERGY PHOTONUCLEAR REACTIONS

TOKYO U, INS – M Imamura, S Shibata (✓ Spokesperson)
KANAZAWA U – K Kawaguchi, M Ootani, Y Oura, K Sakamoto, S R Sarkar
NAGOYA U – M Furukawa
OTEMON GAKUIN U – I Fujiwara

Accelerator TOKYO *Detector* Photon spectrometer

Reactions

γ nucleus	$<$ 1 GeV (E_{lab})

Brief description Uses Ge and Si detectors.

Journal papers RCHA 55 (1991) 113, RCHA 55 (1991) 139, and RCHA 62 (1993) 7.

E-mail contact sshibata@jpnutins.ins.u-tokyo.ac.jp

INS-ES-127

(Approved Jan 1991, Began data-taking Sep 1991, Completed data-taking Oct 1991)

A STUDY OF THE PHOTON ABSORPTION MECHANISM IN ^{6}Li PHOTODISINTEGRATION

TAGX COLLABORATION
TOKYO U OF AGRIC TECH – T Emura (✓ Spokesperson), H Miyamoto, H Nagata
AKITA U – A Sasaki
TOHOKU U – O Konno, K Maeda, T Suda
TOKYO U, INS – S Kato, K Maruyama, K Niki
HIROSHIMA U – S Asano, Y Sumi
SASKATCHEWAN U – C Rangacharyulu
REGINA U – G Huber, G Lolos

Accelerator TOKYO *Detector* TAGX

Reactions

$\gamma\,^6\mathrm{Li} \rightarrow n\,p\,\mathrm{X}$	150–450 MeV (E_{lab})

Brief description Uses tagged photons. Data analysis in progress (May 94).

E-mail contact emura@kekvax.kek.jp

INS-ES-128

(Proposed Nov 1990, Approved Jan 1991, Began data-taking Nov 1991, Completed data-taking Dec 1991)

POLARIZATION MEASUREMENT OF COHERENT BREMSSTRAHLUNG FROM A SINGLE CRYSTAL

HIROSHIMA U – I Endo, A Isobe, Y Iwata (✓ Spokesperson), T Kobayashi, T Nishizuru, M Tobiyama
TOKYO U, INS – M Mutou, K Yoshida
TOKYO U OF AGRIC TECH – T Emura, K Nagata, Y Nagata
HIROSHIMA SHUDO U – K Baba

HIROSHIMA INST TECH – M Asai

Accelerator TOKYO *Detector* Counter

Reactions

e^- Si $\rightarrow \gamma$ X 1.2 GeV (E_{lab})

Brief description Measures the angular distribution of recoil electrons in triplet photoproduction. Target is a single silicon crystal.

Journal papers NIM A336 (1993) 146.

E-mail contact iwatay@kekvax.kek.jp, hirovx::iwata

INS-ES-129

(Approved Jan 1991, Began data-taking Sep 1991, Completed data-taking Jun 1992)

MEASUREMENT OF THE π^0 ELECTROMAGNETIC FORM FACTOR — TEST EXPERIMENT

TOKYO U, INS – A Imanishi, K Maruyama (Spokesperson), K Nakayoshi, K Niki, H Okuno, K Watanabe
MIYAZAKI U – J Kubota, T Nakamura, Y Terachi

Accelerator TOKYO *Detector* Counter, Calorimeter

Reactions

γ ^{12}C $\rightarrow \pi^0$ X —

Brief description This is a test experiment for a study of the π^0 Dalitz decay. Uses a CsI (pure) calorimeter.

INS-ES-130

(Approved Sep 1991, Began data-taking Jul 1992, Completed data-taking Feb 1993)

RADIOCHEMICAL STUDIES OF HIGH-ENERGY PHOTONUCLEAR REACTIONS

TOKYO U, INS – M Imamura, S Shibata (Spokesperson)
KANAZAWA U – K Kawaguchi, Y Oura, K Sakamoto, S R Sarkar
NAGOYA U – M Furukawa
OTEMON GAKUIN U – I Fujiwara

Accelerator TOKYO *Detector* Photon spectrometer

Reactions

γ nucleus 0.2–1.0 GeV (E_{lab})

Related experiments INS-ES-126

E-mail contact sshibata@jpnutins.ins.u-tokyo.ac.jp

INS-ES-132

(Proposed Nov 1991, Approved Jan 1992, Began data-taking Sep 1992, Completed data-taking Nov 1992)

STUDY OF K^+ PHOTOPRODUCTION IN NUCLEI WITH ^{12}C(γ, K^+) REACTION

HIROSHIMA U – S Asano, S Endo, A Sakaguchi, Y Sumi
TOKYO U, INS – K Maruyama
TOKYO U OF AGRIC TECH – T Emura, K Niwa, H Yamashita
TOHOKU U – S Ito, H Itoh, O Konno, K Maeda (✓ Spokesperson), T Suda, M Takeya, T Terasawa, H Yamazaki

Accelerator TOKYO *Detector* TAGX

Reactions

γ ^{12}C $\rightarrow K^+$ X 0.7–1.1 GeV (E_{lab})

Brief description Uses tagged photons and a large-aperture spectrometer system.

E-mail contact maeda@kekvax.kek.jp, kekvax::maeda

INS-ES-133

(Approved Jan 1992, Completed data-taking Jun 1992)

INTENSITY MEASUREMENT OF THE PARAMETRIC X-RAY RADIATION

HIROSHIMA U – T Asano, I Endo (✓ Spokesperson), M Harada, S Ishii, T Kobayashi, T Nagata
TOKYO U, INS – M Muto, K Yoshida
TOKYO GAKUGEI U – H Nitta

Accelerator TOKYO *Detector* Counter

Reactions

e^- crystal $\rightarrow \gamma$ X 200–1100 MeV (T_{lab})

Particles studied γ

Brief description Target is a silicon (single) crystal.

Journal papers PRL 70 (1993) 3247.

Related experiments INS-ES-136

E-mail contact endo@photon.hepl.hiroshima-u.ac.jp

INS-ES-134

(Proposed Aug 1992, Approved Nov 1992, Began data-taking Jun 1994, In progress)

STUDY OF ρ^0 PRODUCTION IN ^{3}He($\gamma, \pi^+\pi^-$) REACTION

TAGX COLLABORATION
REGINA U – F Farzanpay, G Huber, M Iurescu, G J Lolos (✓ Spokesperson), A Weinerman
AKITA U – A Sasaki
TOHOKU U – O Konno, K Maeda, A Shinozaki, T Suda, T Teresawa, H Yamazaki
TOKYO U, INS – K Maruyama (✓ Spokesperson)
TOKYO U OF AGRIC TECH – T Emura, T Hirosawa, K Niwa, H Yamashita
MEIJI COLL, PHARMACY – Y Wada
HIROSHIMA U – S Endo, K Miyamoto, Y Sumi
KITAKYUSHU, UNIV OCCUP ENVIR HEALTH – T Maki
KYUSHU U – Y Matoba, H Murooka
GEORGE WASHINGTON U – Z Papandreou
INFN, LECCE – A Leone, R Perrino
SEOUL NATIONAL U – J Kim

Accelerator TOKYO *Detector* TAGX

Reactions

γ ^{3}He $\rightarrow \pi^+ \pi^-$ X 0.80–1.12 GeV (E_{lab})

Particles studied ρ

Brief description Uses a tagged-photon beam, liquid ^{3}He target, and a multiparticle tracking device.

Related experiments INS-ES-124

E-mail contact gjlolos@meena.cc.uregina.ca, maruyama@jpnutins.ins.u-tokyo.ac.jp

INS-ES-135

(Approved Nov 1992, Began data-taking Oct 1993, Completed data-taking Dec 1993)

RADIOCHEMICAL STUDY OF PHOTONUCLEAR π^+ EMISSION

TOKYO U, INS – M Imamura, S Shibata (Spokesperson)
KANAZAWA U – T Okui, Y Oura, K Sakamoto
NAGOYA U – M Furukawa
OTEMON GAKUIN U – I Fujiwara

Accelerator TOKYO *Detector* Photon spectrometer

Reactions

γ nucleus 0.2–1.0 GeV (E_{lab})

E-mail contact sshibata@jpnutins.ins.u-tokyo.ac.jp

SUMMARIES OF INS (TOKYO) EXPERIMENTS

INS-ES-136

(Proposed Nov 1992, Approved Nov 1992, Began data-taking Apr 1993, Completed data-taking Jun 1993)

STUDY OF HIGHER ORDER EFFECTS IN PARAMETRIC *X*-RADIATION

HIROSHIMA U – I Endo (√ Spokesperson), M Harada, T Kobayashi, Y S Lee, T Ohgaki
TOMSK POLYTECHNIC INST – A P Potylitsin, V N Zabaev
TOKYO U, INS – M Muto, K Yoshida
TOKYO GAKUGEI U – H Nitta

Accelerator TOKYO *Detector* Counter

Reactions

e^- crystal $\rightarrow \gamma$ X 400, 600, 900 MeV (T_{lab})

Particles studied γ

Brief description Uses NaI detector, and Si and Ge single crystal targets. Studies parametric *X*-rays (PXR) – a new type of radiation caused by passage of high-energy charged particles through a single crystal.

Related experiments INS-ES-133

E-mail contact endo@photon.hepl.hiroshima-u.ac.jp

WWW Home-page http://photon.hepl.hiroshima-u.ac.jp/

INS-ES-137

(Approved Nov 1992, Began data-taking Oct 1993, Completed data-taking Feb 1994)

STUDY OF NUCLEAR COHERENT π^0 PHOTOPRODUCTION

TOKYO U, INS – A Imanishi, K Maruyama, K Nakayoshi, H Okuno (Spokesperson)
MIYAZAKI U – J Kubota, T Nakamura
TOKYO U OF AGRIC TECH – T Emura, T Sawamoto
YAMAGATA U – H Shimizu

Accelerator TOKYO *Detector* Calorimeter

Reactions

$\gamma\ ^{12}C \rightarrow \pi^0$ X 0.5–1.0 GeV (E_{lab})

Brief description Uses carbon and other nuclear targets and a CsI (pure) calorimeter.

ITEP Experiments

ITEP-762

(Proposed 1976, Approved 1976, Began data-taking 1977, Completed data-taking 1988)

MEASUREMENT OF $\pi^- d$ BACKWARD ELASTIC SCATTERING AT 1–3 GeV

MOSCOW, ITEP – V M Abramov, L S Bagdasaryan, S A Bulychev, I A Dukhovskoy, V S Fedorets, V V Kishkurno, L A Kondratyuk, Y S Krestnikov, A P Krutenkova, V V Kulikov (√ Spokesperson), M A Matsyuk, P A Murat, S V Proshin, I A Radkevich, E N Turdakina, V P Yurov

Accelerator ITEP *Detector* MTS

Reactions

π^- deut → deut π^-	0.9–3.0 GeV/c (P_{lab})

Brief description MTS is a 3-meter magnet spectrometer with optical spark chambers.

Journal papers NP A372 (1981) 301, PL B189 (1987) 295, YF 50 (1989) 1042 = SJNP 50 (1989) 650, CZJP B39 (1989) 88, and NP A542 (1992) 579. No other papers expected.

E-mail contact kulikov@vxitep.itep.msk.su

ITEP-802

(Proposed 1980, Approved 1980, Began data-taking 1981, Completed data-taking 1989)

STUDY OF K^+ INTERACTIONS WITH XENON

MOSCOW, ITEP – V V Barmin, V G Barylov, G V Davidenko, V S Demidov (√ Spokesperson), A G Dolgolenko, V E Luchmanov, A G Meshkovsky, G S Mirosidi, V A Shebanov (√ Spokesperson), N N Shishov, N K Zombkovskaya

Accelerator ITEP *Detector* HLBC-DIANA

Reactions

K^+ Xe → K^+ X	0.79 GeV/c
K^+ Xe → K^0 X	"

Brief description Study of cumulative effects in xenon. The detector (DIANA) is a 700-liter xenon bubble chamber.

Journal papers No journal papers expected.

E-mail contact demidov@vxitep.itep.msk.su, shebanov@vitep2.itep.msk.su

ITEP-814

(Proposed 1981, Approved 1981, Began data-taking 1982, Completed data-taking 1990)

STUDY OF K^+ DECAYS

MOSCOW, ITEP – V V Barmin, V G Barylov, T A Chistyakova, G V Davidenko, V S Demidov, A G Dolgolenko, A G Meshkovsky (√ Spokesperson), G S Mirosidi, V A Shebanov (√ Spokesperson), N N Shishov, N K Zombkovskaya

Accelerator ITEP *Detector* HLBC-1M

Reactions

K^+ Xe → K^+ X	0.56–0.81 GeV/c (P_{lab})
$K^+ \to \pi^0\, e^+\, \nu_e$	—
$K^+ \to 2\pi^+\, \pi^-$	—
$K^+ \to \pi^0\, e^+\, \nu_e\, \gamma$	—
$K^+ \to 2\pi^+\, \pi^-\, \gamma$	—
$K^+ \to 2\pi^0\, e^+\, \nu_e$	—
$K^+ \to \mu^+\, \nu_e\, \gamma$	—

Particles studied K^+

Journal papers YF 45 (1987) 97 = SJNP 45 (1987) 62, YF 47 (1988) 1011 = SJNP 47 (1988) 643, YF 48 (1988) 1719 = SJNP 48 (1988) 1032, YF 50 (1989) 79, YF 52 (1990) 1595 = SJNP 52 (1990) 1006, YF 53 (1991) 981 = SJNP 53 (1991) 606, and YF 55 (1992) 976. No other papers expected.

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ITEP-828

(Proposed 1982, Approved 1982, Began data-taking 1982, Completed data-taking 1988)

STUDY OF HELICITY NONCONSERVATION IN THE DIFFRACTION PRODUCTION OF $b_1(1235)^-$ MESONS IN THE REACTION $\pi^- p \to b_1(1235)^- p$

MOSCOW, ITEP – Y D Aleshin (√ Spokesperson), V M Guzhavin, L A Prostova

Accelerator ITEP *Detector* HBC-2M, HBC-50CM

Reactions

$\pi^- p \to p\, \pi^+\, \pi^0\, 2\pi^-$	4.5 GeV/c

Particles studied $b_1(1235)^-$

Journal papers YF 48 (1988) 148 = SJNP 48 (1988) 92, and YF 55 (1992) 3255.

E-mail contact asratyan@cl.itep.msk.su

ITEP-831

(Proposed 1983, Approved 1983, Began data-taking 1984, Completed data-taking 1989)

MEASUREMENT OF π^-, π^+, K^+, K^-, p, $\bar{p}$, ^{2}H, ^{3}H, ^{3}He, AND ^{4}He INCLUSIVE CROSS SECTIONS IN PROTON INTERACTIONS WITH Be, Al, Cu, AND Ta NUCLEI IN THE ENERGY RANGE 3.7 TO 9.2 GeV

MOSCOW, ITEP – V A Ergakov, G A Safronov, N Smirnov, N V Stepanov, Y V Trebukhovsky (√ Spokesperson), S V Voronin, I A Vorontsov

Accelerator ITEP *Detector* Spectrometer

Reactions

p nucleus → π^+ X	3.7–9.2 GeV (T_{lab})
p nucleus → π^- X	"
p nucleus → K^+ X	"
p nucleus → K^- X	"
p nucleus → p X	"
p nucleus → $\bar{p}$ X	"
p nucleus → deut X	"
p nucleus → trit X	"
p nucleus → ^{3}He X	"
p nucleus → He X	"
p nucleus → ^{6}He X	10.0 GeV (T_{lab})

Journal papers CZJP B36 (1986) 985, YF 47 (1988) 1040 = SJNP 47 (1988) 662, YF 47 (1988) 1523 = SJNP 47 (1988) 966, YF 51 (1990) 1587 = SJNP 51 (1990) 1001, YF 53 (1991) 191, YF 55 (1992) 259, and YF 55 (1992) 2223.

E-mail contact trebukhovsky@vxitep.itep.msk.su

ITEP-832

(Proposed 1983, Approved 1983, Began data-taking 1988, In progress)

A TRACKING EXPERIMENT FOR STUDY OF DOUBLE BETA DECAY IN ^{136}Xe

MOSCOW, ITEP – V A Artemiev, E V Brakhman, M A Ivanovsky, A K Karelin, V V Kirichenko, V M Knyazev,

O M Kozodaeva, V A Lyubimov (√ Spokesperson), A I Mitin, V P Nikolaev, V V Paramokhin, T N Tsvetkova, O Y Zeldovich (√ Spokesperson)

Accelerator NONE *Detector* Spectrometer

Reactions

$^{136}Xe \rightarrow {}^{136}Ba\ 2e^-$	—
$^{136}Xe \rightarrow {}^{136}Ba\ 2e^-\ 2\overline{\nu}_e$	—

Particles studied $\overline{\nu}_e$

Brief description Uses a 10-kg ^{136}Xe target. The detector is a time projection chamber at atmospheric pressure. Taking data (May 94).

Journal papers NIM A303 (1991) 309, YF 54 (1991) 881, YF 54 (1991) 1485, and PL B280 (1992) 159.

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ITEP-833

(Proposed 1983, Approved 1983, Began data-taking 1985, Completed data-taking 1988)

SEARCH FOR ^{136}Xe, ^{134}Xe, AND ^{124}Xe DOUBLE BETA DECAYS

MOSCOW, ITEP – A S Barabash (√ Spokesperson)
MOSCOW, INR – V V Kuzminov, V M Lobashev, V M Novikov, B M Ovchinnikov, A A Pomansky

Accelerator NONE *Detector* Spectrometer

Reactions

$^{136}Xe \rightarrow {}^{136}Ba\ 2e^-$	—
$^{136}Xe \rightarrow {}^{136}Ba\ 2e^-\ 2\overline{\nu}_e$	—
$^{136}Xe \rightarrow {}^{136}Ba\ 2e^-$ majoron	—
$^{134}Xe \rightarrow {}^{134}Ba\ 2e^-$	—
$^{134}Xe \rightarrow {}^{134}Ba\ 2e^-\ 2\overline{\nu}_e$	—
$^{124}Xe \rightarrow {}^{124}Te\ 2e^+$	—
$^{124}Xe \rightarrow {}^{124}Te\ 2e^+\ 2\nu_e$	—
$^{124}Xe \rightarrow {}^{124}I\ e^+$	—
$^{124}Xe \rightarrow {}^{124}I\ e^+\ 2\nu_e$	—

Particles studied majoron

Brief description Studies different $2\beta^-$ decay modes of ^{136}Xe and ^{134}Xe, and $2\beta^+$ decay modes of ^{124}Xe. Searches also for $K\beta^+$ decay modes of ^{124}Xe in which an electron from the xenon K-shell decays.

Journal papers PL B223 (1989) 273.

E-mail contact barabash@vxitep.itep.msk.su

ITEP-851

(Proposed 1981, Approved 1985, Began data-taking 1986, Completed data-taking 1988)

STUDY OF π^- Nucleus INTERACTIONS WITH SINGLE PHOTON EMISSION

MOSCOW, ITEP – V V Barmin, V G Barylov, T A Chistyakova, G V Davidenko, V S Demidov, A G Dolgolenko, V E Luchmanov, A G Meshkovsky (√ Spokesperson), G S Mirosidi, V A Shebanov (√ Spokesperson), N N Shishov, N K Zombkovskaya

Accelerator ITEP *Detector* HLBC-1M

Reactions

π^- Xe $\rightarrow \gamma$ X	0.0, 0.4, 1.0 GeV/c (P_{lab})

Journal papers YF 50 (1989) 3 = SJNP 50 (1989) 1. No other papers expected.

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ITEP-852

(Proposed 1985, Approved 1985, Began data-taking 1986, Completed data-taking 1988)

SLOW PION PRODUCTION IN NUCLEUS–NUCLEUS INTERACTIONS

MOSCOW, ITEP – A I Dubinina, E D Kolganova, E A Pozharova, V A Smirnitsky (√ Spokesperson)

Accelerator JINR *Detector* Emulsion

Reactions

Ne Ag → pion X	4.1 GeV (E_{lab}/N)
Ne Br → pion X	"
Mg Ar → pion X	"
Mg Br → pion X	"

Brief description Studies slow, charged pions with energies up to 13 MeV.

Journal papers ZETFP 48 (1988) 233 = JETPL 48 (1988) 251.

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ITEP-853

(Proposed 1985, Approved 1985, Began data-taking 1987, Completed data-taking 1991)

STUDY OF PIONIC NUCLEAR DEGREES OF FREEDOM IN $(\pi, \pi\pi)$ REACTIONS

MOSCOW, ITEP – Y D Bayukov, Y V Efremenko, V B Fedorov, V B Gavrilov, F M Khassanov, M V Kossov (√ Spokesperson), S V Kuleshov, G A Leksin (√ Spokesperson), N A Pivnyuk, S M Shuvalov, B B Shvartsman, A V Smirnitsky, D A Suchkov, L S Vorobyev

Accelerator ITEP *Detector* FOCUS

Reactions

π^- Ti → $\pi^-\ \pi^\pm$ X	1.4 GeV/c (P_{lab})
π^+ Ti → $\pi^+\ \pi^\pm$ X	"
π^- Fe → $\pi^-\ \pi^\pm$ X	"
π^+ Fe → $\pi^+\ \pi^\pm$ X	"

Brief description Studies pion condensation and selective, unnatural parity excitations of π-like levels in nuclei. FOCUS is a modification of the NHS detector.

Journal papers YF 55 (1992) 3261. No other papers expected.

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ITEP-861

(Proposed 1984, Approved 1984, Began data-taking 1987, Completed data-taking 1991)

SEARCH FOR ^{76}Ge DOUBLE BETA DECAY

MOSCOW, ITEP – I V Kirpichnikov (√ Spokesperson), V A Kuznetsov, A S Starostin, A A Vasenko
YEREVAN PHYS INST – A G Djanyan, V S Pogosov, L A Pogosyan, A G Tamanyan

Accelerator NONE *Detector* Spectrometer

Reactions

$^{76}Ge \rightarrow {}^{76}Se\ 2e^-$	—
$^{76}Ge \rightarrow {}^{76}Se\ 2e^-\ 2\overline{\nu}_e$	—
$^{76}Ge \rightarrow {}^{76}Se\ 2e^-$ unspec	—

Brief description The apparatus is in a Yerevan salt mine. Uses the 85% enriched ^{76}Ge semiconductor.

Journal papers PTE 2 (1989) 56, MPL A5 (1990) 1299, PL B256 (1991) 559, and NP (PROC SUPPL) A28 (1992) 210. No other papers expected.

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SUMMARIES OF ITEP (MOSCOW) EXPERIMENTS

ITEP-863

(Proposed 1986, Approved 1986, Began data-taking 1986, Completed data-taking 1988)

BACKWARD TWO-PION PRODUCTION IN PION–DEUTERIUM INTERACTIONS AT 0.9–2.0 GeV/c

MOSCOW, ITEP – B M Abramov, S A Bulychjov, B L Druzhinin, I A Dukhovskoy, V S Fedorets, V V Kishkurno, L A Kondratyuk, Y S Krestnikov, A P Krutenkova, V V Kulikov, I A Radkevich, N G Tkach, E N Turdakina (√ Spokesperson)

Accelerator ITEP *Detector* MTS

Reactions

π^- deut → deut π^0 π^-	0.9–2.0 GeV/c (P_{lab})

Brief description Uses a π^- beam with intensity 7×10^5 pions per burst, and a liquid deuterium target.

Journal papers YF 54 (1991) 1013. No other papers expected.

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ITEP-864

(Proposed 1986, Approved 1986, Began data-taking 1987, Completed data-taking 1988)

PION–PROTON ELASTIC SCATTERING AT LARGE ANGLES

MOSCOW, ITEP – B M Abramov, S A Bulychjov, I A Dukhovskoy, V S Fedorets, V V Kishkurno, Y S Krestnikov, A P Krutenkova, V V Kulikov (√ Spokesperson), M A Matsyuk, P A Murat, S V Proshin, I A Radkevich, N G Tkach, E N Turdakina

Accelerator ITEP *Detector* MTS

Reactions

π^- p → p π^-	0.9–2.0 GeV/c (P_{lab})

Brief description MTS is a 3-meter magnet spectrometer with optical spark chambers.

Journal papers YF 54 (1991) 550. No other papers expected.

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ITEP-865

(Proposed 1986, Approved 1986, Began data-taking 1986, Completed data-taking 1992)

ANTIPROTON–NUCLEI ANNIHILATION CROSS SECTIONS WITH Be, C, Al, Fe, Cd, Cu, AND Pb TARGETS AT 0.70, 0.95, 1.26, 1.53, 1.76 AND 2.50 GeV/c

MOSCOW, ITEP – B F Kuzichev, Y B Lepikhin (√ Spokesperson), V A Smirnitsky

Accelerator ITEP *Detector* Counter, Wire chamber

Reactions

$\bar{p}$ Be → X	0.70–2.50 GeV/c (P_{lab})
$\bar{p}$ C → X	"
$\bar{p}$ Al → X	"
$\bar{p}$ Fe → X	"
$\bar{p}$ Cd → X	"
$\bar{p}$ Cu → X	"
$\bar{p}$ Pb → X	"

Brief description Uses a scintillator and lead glass Čerenkov counters.

E-mail contact smirnitsky@vxitep.itep.msk.su

ITEP-871

(Proposed 1987, Approved 1987, Began data-taking 1988, Completed data-taking 1990)

STUDY OF KAON–NUCLEUS INTERACTIONS WITH SINGLE PHOTON EMISSION

MOSCOW, ITEP – V V Barmin, V G Barylov, G V Davidenko, A G Dolgolenko, V E Luchmanov, A G Meshkovsky (√ Spokesperson), G S Mirosidi, V A Shebanov (√ Spokesperson), N N Shishov, A A Sibirtsev, N K Zombkovskaya

Accelerator ITEP *Detector* HLBC-DIANA

Reactions

K^+ Xe → γ X	0–0.8 GeV/c (P_{lab})
K^- Xe → γ X	"

Brief description The detector (DIANA) is a 700-liter xenon bubble chamber.

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ITEP-872

(Proposed 1987, Approved 1987, Began data-taking 1988, Completed data-taking 1989)

DETAILED STUDY OF BACKWARD PRODUCTION OF HADRONS IN π^- A INTERACTIONS

MOSCOW, ITEP – Y V Efremenko, V B Fedorov, Y G Grishuk, F M Khassanov, M V Kossov, S V Kuleshov, G A Leksin (√ Spokesperson), N A Pivnyuk, V S Serov, S M Shuvalov, B B Shvartsman, A V Smirnitsky, L S Vorobyev, B V Zagreev

Accelerator ITEP *Detector* NHS, Wire chamber

Reactions

π^- nucleus → pion X	5.0 GeV (E_{lab})
π^- nucleus → p X	"
π^- nucleus → deut X	"

Brief description Studies pion, proton, and deuteron backward productions at $\vartheta_{lab} = 180°$. Targets are C, Cu, and Pb.

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ITEP-873

(Proposed 1987, Approved 1987, Began data-taking 1987, Completed data-taking 1991)

HIGH-ENERGY CUMULATIVE PARTICLE PRODUCTION AT 10 GeV

MOSCOW, ITEP – S V Boyarinov, I I Evseev, S A Gerson, Y T Kiselev (√ Spokesperson), G A Leksin, A N Martemyanov, K R Mikhailov, V L Novikov, S A Pozdnyakov, V A Sheinkman, Y V Terekhov (√ Spokesperson), V I Ushakov

Accelerator ITEP *Detector* FHS-2

Reactions

p nucleus → p X	10 GeV/c (P_{lab})
p nucleus → deut X	"
p nucleus → trit X	"
p nucleus → π^+ X	"
p nucleus → π^- X	"
p nucleus → K^+ X	"
p nucleus → K^- X	"
p nucleus → $\bar{p}$ X	"

Brief description Nuclear targets are beryllium, aluminum, copper, and tantalum. The production is studied at $\vartheta_{lab} = 97°$.

Journal papers YF 54 (1991) 119, YF 55 (1992) 1675, and YF 56 (1993) 125.

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SUMMARIES OF ITEP (MOSCOW) EXPERIMENTS

ITEP-875

(Proposed 1987, Approved 1987, Began data-taking 1987, Completed data-taking 1988)

PRODUCTION OF STRANGE PARTICLES IN BARYON EXCHANGE PROCESSES

MOSCOW, ITEP – V M Abramov, I A Dukhovskoy, V S Fedorets, A I Khanov, V V Kishkurno, Y S Krestnikov, A P Krutenkova, M A Matsyuk, P A Murat, V V Orlov, S V Proshin, I A Radkevich, F D Ratnikov, A N Starodumov, A I Sutormin (√ Spokesperson), N G Tkach

Accelerator ITEP *Detector* MTS

Reactions

$\pi^+ n \to \Lambda K^+$	2.0 GeV/c (P_{lab})

Brief description Uses an unseparated π^+ beam with intensity 10^5 pions per burst and a liquid deuterium target. Detects backward kaons.

Journal papers YF 54 (1991) 550. No other papers expected.

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ITEP-876

(Proposed 1987, Approved 1987, Began data-taking 1987, Completed data-taking 1992)

SEARCH FOR ^{94}Zr AND ^{96}Zr DOUBLE BETA DECAYS IN PHOTOGRAPHIC EMULSION

MOSCOW, ITEP – A S Barabash (√ Spokesperson), E D Kolganova, E A Pozharova, T Y Skorodko, V A Smirnitsky
MOSCOW, INR – A A Klimenko, A A Smolnikov

Accelerator NONE *Detector* Emulsion

Reactions

$^{96}Zr \to {}^{96}Mo\ 2e^-$	—
$^{96}Zr \to {}^{96}Mo\ 2e^-\ 2\bar{\nu}_e$	—
$^{96}Zr \to {}^{96}Mo\ 2e^-$ majoron	—
$^{94}Zr \to {}^{94}Mo\ 2e^-$	—
$^{94}Zr \to {}^{94}Mo\ 2e^-\ 2\bar{\nu}_e$	—
$^{94}Zr \to {}^{94}Mo\ 2e^-$ majoron	—

Particles studied majoron

E-mail contact barabash@vxitep.itep.msk.su

ITEP-891

(Proposed 1989, Approved 1989, Began data-taking 1989, Completed data-taking 1990)

SEARCH FOR ^{100}Mo AND ^{116}Cd DOUBLE BETA DECAYS TO EXCITED ^{100}Ru AND ^{116}Sn STATES

MOSCOW, ITEP – A S Barabash (√ Spokesperson)
MOSCOW, INR – V I Cherechovsky, A V Kopylov

Accelerator NONE *Detector* Spectrometer

Reactions

$^{100}Mo \to {}^{100}Ru\ 2e^-$	—
$^{100}Mo \to {}^{100}Ru\ 2e^-\ 2\bar{\nu}_e$	—
$^{116}Cd \to {}^{116}Sn\ 2e^-$	—
$^{116}Cd \to {}^{116}Sn\ 2e^-\ 2\bar{\nu}_e$	—

Journal papers PL B249 (1990) 186.

E-mail contact barabash@vxitep.itep.msk.su

ITEP-892

(Proposed 1989, Approved 1989, Began data-taking 1989, Completed data-taking 1994)

STUDY OF ^{4}He p INTERACTIONS

MOSCOW, ITEP – A V Blinov, I V Chuvilo, V E Grechko (√ Spokesperson), Y V Korolev, Y M Selektor, V V Solovyev, V F Turov, S M Zombkovsky

Accelerator ITEP *Detector* HBC-2M

Reactions

He $p \to {}^3$He $p\ n$	3 GeV/c (P_{lab})
He $p \to$ trit $2p$	"
He $p \to$ deut $2p\ n$	"
He $p \to$ He p	5 GeV/c (P_{lab})
He $p \to$ He $p\ \pi^0$	"
He $p \to$ He $n\ \pi^+$	"
He $p \to {}^3$He $p\ n$	"
He $p \to$ trit $2p$	"
He $p \to$ trit $2p\ \pi^0$	"
He $p \to$ trit $p\ n\ \pi^+$	"
He $p \to$ deut $2p\ n$	"

Brief description A measurement of the total and differential cross sections and a search for the momentum distribution of particles inside the ^{4}He nucleus.

Journal papers SJNP 56-4 (1993) 536, and SJNP 56-5 (1993) 670.

E-mail contact grechko@vitep1.itep.msk.su

ITEP-893

(Proposed 1989, Approved 1989, Began data-taking 1989, Completed data-taking 1990)

STUDY OF $pp \to pp\pi^+\pi^-$ REACTION AT 0.91 GeV

MOSCOW, ITEP – B M Bobchenko, P V Dyagtyarenko, Y V Efremenko, V B Fedorov, Y G Grishuk, M V Kossov, S V Kuleshov, G A Leksin (√ Spokesperson), N A Pivnyuk (√ Spokesperson), S M Shuvalov, B B Shvartsman, A V Smirnitsky, L S Vorobyev (√ Spokesperson)

Accelerator ITEP *Detector* NHS

Reactions

$p\ p \to 2p\ \pi^+\ \pi^-$	1.6 GeV/c (P_{lab})
$p\ p \to$ deut π^+	"
$p\ p \to$ deut $\pi^+\ \pi^0$	"
$p\ n \to 2p\ \pi^0\ \pi^-$	"
$p\ n \to$ deut $\pi^+\ \pi^-$	"

Particles studied dibaryon

Brief description Uses the modified forward Nonmagnetic Hadron Spectrometer. Targets are C and CH_2.

E-mail contact leksin@vitep2.itep.msk.su, pivnyuk@vxitep.itep.msk.su

ITEP-894

(Proposed 1989, Approved 1989, Began data-taking 1990, Completed data-taking 1991)

QUASIPARTICLE VELOCITY MEASUREMENTS

MOSCOW, ITEP – E A Doroshkevich, Y V Efremenko, Y G Grishuk, S V Kuleshov, A A Kurzenkov, G A Leksin (√ Spokesperson), N A Pivnyuk, G A Safronov, A V Stavinsky, A V Vlassov (√ Spokesperson), L S Vorobyev

Accelerator ITEP *Detector* NHS

SUMMARIES OF ITEP (MOSCOW) EXPERIMENTS

Reactions

p nucleus → $2p$ X	2.2, 7.5 GeV/c (P_{lab})
p nucleus → deut p X	"
p nucleus → 2deut X	"
p nucleus → p pion X	"

Brief description Targets are C and Pb. Polar angles of secondary particles are between 10° and 20° in the lab.

E-mail contact leksin@vitep2.itep.msk.su, vlassov@vxitep.itep.msk.su

ITEP-895

(Proposed 1989, Approved 1989, Began data-taking 1991, In progress)

DETAILED STUDY OF SPECTRA OF Λ PARTICLES AND OF THE POLARIZATION IN THE NUCLEAR FRAGMENTATION REGION IN HADRON–NUCLEON INTERACTIONS

LAMBDA-III COLLABORATION

MOSCOW, ITEP – V A Akimov, Y D Bayukov, I M Belyaev, M P Bezuglov, B M Bobchenko, E A Doroshkevich, S V Frolov, Y G Grishuk, Y V Kantserov, M M Katz, S M Kiselev, Y V Korchagin, S V Kuleshov, L N Kuleshova, A I Kurzenkov, A A Lebedev, G A Leksin (√ Spokesperson), N A Pivnyuk, N K Sergeev, V S Serov, S M Shuvalov, A V Smirnitsky (√ Spokesperson), A V Stavinsky, V P Surin, A V Vlasov, K G Voloshin, L S Vorobyev, A V Yumashev, B V Zagreev, V V Zhurkin

KURCHATOV INST, MOSCOW – S L Fokin, M S Ippolitov, A L Lebedev, V I Manko, G M Mgebrishvili, P I Shcherbachev, M A Vasilyev

Accelerator ITEP *Detector* LAMBDAMETER

Reactions

p Al → Λ X	7.5 GeV/c
p Pb → Λ X	"

Brief description The kinetic energy range of the detector is 10–300 MeV. Taking data (May 94).

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ITEP-896

(Proposed 1989, Approved 1989, Began data-taking 1990, In progress)

TWO-NEUTRINO DOUBLE BETA DECAY OF ^{100}Mo TO THE FIRST EXCITED 0^+ STATE IN ^{100}Ru

MOSCOW, ITEP – A S Barabash (√ Spokesperson), V I Umatov

SOUTH CAROLINA U – F T Avignone (√ Spokesperson), C K Guerard

BATTELLE MEMORIAL INST, NORTHWEST – R L Brodzinski, H S Miley, J H Reeves

Accelerator NONE *Detector* Spectrometer

Reactions

^{100}Mo → ^{100}Ru $2e^-$	—
^{100}Mo → ^{100}Ru $2e^-$ $2\overline{\nu}_e$	—

Particles studied $\overline{\nu}_e$

Brief description Studies the double (2ν) beta decay of ^{100}Mo to the first 0^+ excited state of ^{100}Ru. Taking data (May 94).

Journal papers NP (PROC SUPPL) A28 (1992) 236.

E-mail contact barabash@vxitep.itep.msk.su

ITEP-901

(Proposed 1990, Approved 1990, Began data-taking 1993, In progress)

QUASIELASTIC (π^-, d) BACKWARD SCATTERING ON NUCLEI AT 0.7–1.3 GeV

MOSCOW, ITEP – B M Abramov, I A Dukhovskoy, V S Fedorets, A I Khanov, V V Kishkurno, Y S Krestnikov, A P Krutenkova (√ Spokesperson), V V Kulikov, M A Matsyuk, P A Murat, V V Orlov, S V Proshin, I A Radkevich, A N Starodumov, A I Sutormin, N G Tkach, E N Turdakina

Accelerator ITEP *Detector* MTS

Reactions

π^- nucleus → deut π^- X	0.7–1.3 GeV/c (P_{lab})

Brief description Uses a π^- beam with intensity 5×10^5 pions per burst. Targets (^{6}Li, ^{7}Li, C, H_2O, D_2O, *etc.*) are placed inside the MTS magnet. Measures momenta of backward pions. Taking data (May 94).

E-mail contact krutenkova@vxitep.itep.msk.su

ITEP-911

(Proposed 1990, Approved 1991, Began data-taking 1991, Completed data-taking 1994)

FORWARD DIRECTION CUMULATIVE PARTICLE PRODUCTION AT 10 GeV

MOSCOW, ITEP – S V Boyarinov, M M Chumakov, I I Evseev, Y T Kiselev (√ Spokesperson), G A Leksin, A N Martemyanov, K R Michajlov, S A Pozdnyakov, V A Sheinkman, Y V Terekhov (√ Spokesperson), V I Ushakov

Accelerator ITEP *Detector* FHS-3

Reactions

p nucleus → p X	10 GeV (E_{lab})
p nucleus → pion X	"
p nucleus → $\overline{p}$ X	"

Brief description Uses the upgraded Focusing Hadron Spectrometer. Nuclear targets are beryllium, aluminum, copper, and tantalum. The production is studied at $\vartheta_{lab} = 60°$.

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ITEP-912

(Proposed 1991, Approved 1991, Began data-taking 1993, In progress)

SEARCH FOR NEUTRINOLESS DOUBLE BETA DECAY OF ^{76}Ge

MOSCOW, ITEP – I V Kirpichnikov (√ Spokesperson), A S Starostin, A A Vasenko

MOSCOW, INR – A A Klimenko, S B Osetrov, A A Smolnikov

YEREVAN PHYS INST – V S Pogosov, A G Tamanyan

BATTELLE MEMORIAL INST, NORTHWEST – R L Brodzinski (√ Spokesperson), W K Hensley, H S Miley, J H Reeves

SOUTH CAROLINA U – F T Avignone (√ Spokesperson), J I Collar

ZARAGOZA U – A Morales (√ Spokesperson), J Morales, R Nunez-Lagos, J A Villar

Accelerator NONE *Detector* Spectrometer

Reactions

^{76}Ge → ^{76}Se $2e^-$	—
^{76}Ge → ^{76}Se $2e^-$ unspec	—

Brief description Uses ^{76}Ge semiconductor, 85% enriched. Experimental sites are in Homestake (USA), Canfranc (Spain), Baksan (Russia), and Yerevan (Armenia) underground laboratories. Taking data (May 94).

Journal papers NP (PROC SUPPL) B31 (1993) 76.

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SUMMARIES OF ITEP (MOSCOW) EXPERIMENTS

ITEP-913

(Proposed 1990, Approved 1990, Began data-taking 1990, In progress)

STUDY OF THE INTERACTION OF LOW-ENERGY ANTIPROTONS WITH NUCLEI USING THE XENON BUBBLE CHAMBER DIANA

MOSCOW, ITEP – V V Barmin, V G Barylov, S F Chernukha, G V Davidenko, V S Demidov, E V Demidova, V N Dobrokhotov, A G Dolgolenko (√ Spokesperson), V A Ergakov, V E Lukhmanov, V A Matveev, A G Meshkovsky, G S Mirosidi, A N Nikitenko, V A Shebanov, N N Shishov, Y V Trebukhovsky, B S Volkov, N K Zombkovskaya

OSLO U – K M Danielsen, T Jacobsen

DUBNA – I N Falomkin, G B Pontecorvo

DUBNA & FRASCATI – F Nichitiu

MOSCOW, INR – E S Golubeva, A S Ilyinov, I A Pshenichnov

BERGEN U – A Haatuft, A Halsteinslid, K Myklebost, J M Olsen

FRASCATI – C Guaraldo

Accelerator ITEP *Detector* HLBC-DIANA

Reactions

$\bar{p}$ Xe → K_S X	< 1 GeV/c (P_{lab})
$\bar{p}$ Xe → Λ (Σ^0) X	"
$\bar{p}$ Xe → Σ^0 X	"
$\bar{p}$ Xe → K_S K_S X	"
$\bar{p}$ Xe → K_S Λ (Σ^0) X	"
$\bar{p}$ Xe → K^+ Λ (Σ^0) X	"
$\bar{p}$ Xe → K^+ Σ^+ X	"
$\bar{p}$ Xe → K^+ Σ^- X	"
$\bar{p}$ Xe → K^+ K^+ X	"
$\bar{p}$ Xe → K_S K^- X	"
$\bar{p}$ Xe → K^+ K^- X	"
$\bar{p}$ Xe → K_S Σ^+	"
$\bar{p}$ Xe → K_S Σ^-	"
$\bar{p}$ Xe → ω X	"
$\bar{p}$ Xe → η X	"

Journal papers YF 55 (1992) 1253, YF 55 (1992) 1268, NP A556 (1993) 409, and NP A558 (1993) 361C.

E-mail contact dolgolenko@vxitep.itep.msk.su

ITEP-914

(Proposed 1991, Approved 1991, Began data-taking 1993)

MEASUREMENT OF SPIN ROTATION PARAMETERS *R* AND *A* IN ELASTIC π *p* SCATTERING

MOSCOW, ITEP – I G Alekseev, P E Budkovsky, V P Kanavets (√ Spokesperson), L I Koroleva, I I Levintov, V I Martynov, B V Morozov, V M Nesterov, V V Platonov, V V Ryltsov, V A Sakharov, A D Sulimov, D N Svirida

ST PETERSBURG, INP – V V Abaev, N A Bazhanov, V S Bekrenev, Y A Beloglazov, E A Filimonov, A I Kovalev, N G Kozlenko, S P Kruglov (√ Spokesperson), A A Kulbardis, L V Lapochkina, I V Lopatin, V A Shchedrov, V V Sumachev, V Y Trautman

Accelerator ITEP *Detector* Wire chamber

Reactions Polarized target

π^+ p → π^+ p	1–2 GeV/c (P_{lab})
π^- p → π^- p	"

Brief description Requested 3000 hours.

E-mail contact alekseev@mvax1.itep.msk.su, kruglov@lnpi.spb.su

ITEP-921

(Proposed 1992, Approved 1992, Began data-taking 1993, In progress)

INVESTIGATION OF QUASICOHERENT AND DEEP INELASTIC INTERACTIONS OF PIONS AND PROTONS WITH NUCLEI

MOSCOW, ITEP – V S Demidov (√ Spokesperson), E V Demidova, N D Galanina, K E Gusev, N A Khaldeeva, I V Kirpichnikov (√ Spokesperson), R A Menshchikov, A A Nedosekin, V A Sadykov, A S Starostin, A A Vasenko, M E Vishnevsky, M O Vlasova

Accelerator ITEP *Detector* MAGE

Reactions

π^- ^{32}S → ^{32}S* π^- X	2–3.6 GeV/c (P_{lab})
π^- ^{24}Mg → ^{24}Mg* π^- X	"
π^- ^{40}Ca → ^{40}Ca* π^- X	"
π^- ^{31}Ph → ^{31}Ph* π^- X	"

Brief description Gamma–hadrons correlations are used for the study of mechanism of nuclear reactions. The detector consists of a magnetic spectrometer with proportional chambers and Ge(NaI) gamma detector for identification of nuclear levels. Taking data (May 94).

E-mail contact demidov@vxitep.itep.msk.su, kirpichnikov@vxitep.itep.msk.su

ITEP-922

(Proposed 1992, Approved 1992, Began data-taking 1994, In progress)

SEARCH FOR *H*-PARTICLE AND RESONANT STATES IN $\Lambda\Lambda$ SYSTEM

MOSCOW, ITEP – E G Bogdanov, V S Demidov (√ Spokesperson), N D Galanina, K E Gusev, N A Khaldeeva, V N Markisov, R A Menshchikov, A A Nedosekin, V A Sadykov, Y P Shkurenko, M E Vishnevsky (√ Spokesperson), M O Vlasova

Accelerator ITEP *Detector* Spectrometer

Reactions

n nucleus → Λ Λ X	4–9 GeV/c (P_{lab})
n nucleus → dibaryon($S = -2$) X	"

Brief description Search for the *H*-dibaryon through the $\pi^- p\Lambda$ decay channel. Taking data (May 94).

E-mail contact demidov@vxitep.itep.msk.su

IUCF Experiments

IUCF-CE-01

(Proposed Oct 1984, Approved Dec 1984, Began data-taking Oct 1989, Completed data-taking Mar 1990)

MEASUREMENTS NEAR THRESHOLD OF NUCLEON AND FEW-NUCLEON PION PRODUCTION IN THE COOLER

INDIANA U – A Berdoz, F Dohrmann, J E Goodwin, H O Meyer (√ Spokesperson), M G Minty, H Nann, P V Pancella, S F Pate, R E Pollock, T Rinckel, M A Ross, F Sperisen, B von Przewoski

Accelerator IUCF-COOLER *Detector* Counter

Reactions

$p\ p \rightarrow p\ p\ \pi^0$	270–325 MeV (T_{lab})

Brief description Measures the total cross section. Uses a jet H_2 target.

Journal papers PRL 65 (1990) 2846.

Related experiments IUCF-CE-23

E-mail contact meyer1@indiana.edu

IUCF-CE-03

(Proposed Nov 1985, Completed data-taking Jul 1991)

KINEMATICALLY COMPLETE MEASUREMENTS OF $pp \rightarrow pn\pi^+$ NEAR THRESHOLD

PITTSBURGH U – W W Daehnick (Spokesperson), S A Dytman, P C Li, K F von Reden
INDIANA U – L Bland, W W Jacobs

Accelerator IUCF-COOLER *Detector* Counter

Reactions

$p\ p \rightarrow p\ n\ \pi^+$	270–325 MeV (T_{lab})

Brief description Measures the angular distribution and the total cross section. Uses a jet H_2 target. Data analysis in progress (May 94).

Related experiments IUCF-CE-38

E-mail contact daehnick@vms.cis.pitt.edu

IUCF-CE-08

(Proposed Jun 1988, Completed data-taking Nov 1990)

PROTON–PROTON ANALYZING POWER IN THE COULOMB NUCLEAR INTERFERENCE REGION

WISCONSIN U – W Haeberli, W K Pitts (Spokesperson), J S Price
INDIANA U – H O Meyer, P V Pancella, S F Pate, R E Pollock, T Rinckel, J Sowinski, F Sperisen, B von Przewoski

Accelerator IUCF-COOLER *Detector* Counter

Reactions Polarized beam

$p\ p \rightarrow p\ p$	186 MeV (T_{lab})

Brief description Studies the spin dependence in pp scattering. Uses a jet H_2 target and IUCF-CE-01 detector.

Journal papers PR C45 (1992) 1.

E-mail contact kpitts@glueball.physics.louisville.edu, wkpitt01@ulkyvx.bitnet

IUCF-CE-21

(Proposed Nov 1990, Approved Dec 1990, Began data-taking Aug 1991, Completed data-taking Oct 1991)

PION PRODUCTION IN *pd* REACTIONS NEAR THRESHOLD

HAMBURG U – H Rohdjess, W Scobel (√ Spokesperson), L Sprute
INDIANA U – H O Meyer (√ Spokesperson), S F Pate, R E Pollock, T Rinckel, P P Singh, F Sperisen, B von Przewoski
WESTERN MICHIGAN U – P V Pancella
KENTUCKY U – M A Pickar

Accelerator IUCF-COOLER *Detector* Counter

Reactions

p deut $\rightarrow p$ deut π^0	200–225 MeV (T_{lab})

Brief description Measures the total cross section. Uses a jet deuteron target and IUCF-CE-01 detector.

Journal papers PRL 70 (1993) 2864.

Related experiments NONE

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IUCF-CE-23

(Proposed Oct 1990, Approved Dec 1990, Began data-taking Dec 1990, Completed data-taking Dec 1990)

ENERGY DEPENDENCE OF $pp \rightarrow pp\pi^0$ NEAR THRESHOLD

INDIANA U – C Horowitz, H O Meyer (√ Spokesperson), H Nann, P V Pancella, S F Pate, R E Pollock, T Rinckel, M A Ross, F Sperisen, B von Przewoski

Accelerator IUCF-COOLER *Detector* Counter

Reactions

$p\ p \rightarrow p\ p\ \pi^0$	280–300 MeV (T_{lab})
$p\ p \rightarrow p\ p\ \gamma$	"

Brief description Measures the angular distribution and the total cross section. Uses a jet H_2 target and IUCF-CE-01 detector.

Journal papers NP A539 (1992) 633, and PR C45 (1992) 2001.

Related experiments IUCF-CE-01

E-mail contact meyer1@indiana.edu

IUCF-CE-25

(Proposed Oct 1990, Approved Dec 1990, Began data-taking Apr 1992, Completed data-taking Mar 1993)

INVESTIGATION OF THE ^{3}He WAVE FUNCTION BY QUASIFREE SCATTERING

CE-25 COLLABORATION
ARGONNE – C E Jones
INDIANA U – C Bloch, C D Goodman, W W Jacobs, M Leuschner, H O Meyer, T Rinckel, G Savopulos, A Smith, J Sowinski (√ Spokesperson), F Sperisen, B von Przewoski
WISCONSIN U – H J Bulten, M A Miller, J S Neal, W K Pitts, O Unal, J F J van den Brand, Z L Zhou
MIT, BATES LINEAR ACCELERATOR & MIT, LNS – D DeSchepper, R Ent, J O Hansen, W Korsch, L H Kramer, K Lee, N C R Makins, R G Milner, S F Pate, C Tschalar, T P Welch
OHIO STATE U – D Marchlenski, E Sugarbaker
TRIUMF – W Lorenzon
WESTERN MICHIGAN U – P V Pancella

Accelerator IUCF-COOLER *Detector* Counter

Reactions Polarized beam and target

$p\ ^3$He $\rightarrow$ nucleon nucleon	200, 300, 415 MeV (T_{lab})
$p\ ^3$He $\rightarrow$ nucleon deut	"
$p\ ^3$He $\rightarrow p\ ^3$He	"

Brief description Measures spin observables using a storage ring with polarized beam and internal gas target. The target is a storage cell filled with ^{3}He that was polarized by optical pumping. Studies the quasifree reaction mechanism and spin

structure of the wave function particularly as it pertains to the use of polarized ^{3}He as a polarized neutron target. Data analysis in progress (May 94).

Journal papers PRL 70 (1993) 738.

Related experiments IUCF-CE-35, IUCF-CE-47, DESY-HERA-HERMES, SLAC-E-142, TRIUMF-541

E-mail contact sowinski@iucf.indiana.edu

IUCF-CE-31

(Proposed Apr 1991, Approved Jun 1991, Began data-taking Jan 1992, Completed data-taking May 1993)

DIFFERENTIAL CROSS SECTION AND ANALYZING POWER MEASUREMENTS OF THE $pp \rightarrow d\pi^+$ REACTION NEAR THRESHOLD

ARGONNE – K E Rehm
INDIANA U – R D Bent, J Blomgren, Y Chen, H O Meyer, H Nann, R E Pollock, T Rinckel, B von Przewoski, A Zhuralev
KENTUCKY U – M A Pickar (✓ Spokesperson)
NORTHWESTERN U – F J Chen, P Heimberg, R E Segel (✓ Spokesperson)
PRINCETON U – J D Brown, E Jacobsen
WESTERN MICHIGAN U – G Hardie (✓ Spokesperson), P Pancella

Accelerator IUCF-COOLER *Detector* Scintillator, Wire chamber

Reactions Polarized beam
$p\,p \rightarrow$ deut π^+ 285–300 MeV (T_{lab})

Brief description Uses a jet H_2 target. Detector stack consists of optimized plastic scintillators and wire chambers. Data analysis in progress (May 94).

Related experiments IUCF-CE-35, LAMPF-1085, TRIUMF-466

E-mail contact ralph@nuhep.phys.nwu.edu, pickar@nlab1.pa.uky.edu, hardie@gw.wmich.edu

IUCF-CE-35

(Proposed Dec 1991, Approved Dec 1991, Began data-taking Jul 1993, In progress)

MEASUREMENTS OF $\vec{p}\vec{p}$ SPIN CORRELATION PARAMETERS AT THE INDIANA COOLER

INDIANA U – W A DeZarn, J Doskow, H O Meyer, R E Pollock, T Rinckel, F Sperisen, B von Przewoski
WISCONSIN U – W Haeberli (✓ Spokesperson), B Lorentz, F Rathmann, T Wise
WESTERN MICHIGAN U – P Pancella

Accelerator IUCF-COOLER *Detector* Counter

Reactions Polarized beam and target
$p\,p \rightarrow p\,p$ 200 MeV (T_{lab})

Brief description The target is a storage cell filled with polarized H atoms from an atomic beam source. The goal is to measure pp spin correlation parameters and to study the target polarization.

Journal papers NIM A326 (1993) 424, and NIM A344 (1994) 307.

Related experiments IUCF-CE-42, IUCF-CE-44, IUCF-CE-45

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IUCF-CE-38

(Proposed Apr 1992, Approved Jun 1992, In preparation)

ANALYZING POWERS FOR $\vec{p}\vec{p} \rightarrow pn\pi^+$ NEAR THRESHOLD

PITTSBURGH U – W K Brooks, W W Daehnick (Spokesperson), S A Dytman, R W Flammang, J G Hardie, F Tabakin
INDIANA U – G Berg, C C Foster, W W Jacobs, T Rinckel, E J Stephenson
WESTERN MICHIGAN U – P V Pancella

Accelerator IUCF-COOLER *Detector* Counter

Reactions Polarized beam
$p\,p \rightarrow p\,n\,\pi^+$ 300 MeV (T_{lab})

Brief description Continuation of the IUCF-CE-03 experiment, this time with the polarized proton beam. Uses a jet H_2 target. In preparation (May 94).

Related experiments IUCF-CE-03

E-mail contact daehnick@vms.cis.pitt.edu

IUCF-CE-42

(Proposed Nov 1992, Approved Nov 1992, In preparation)

MEASUREMENTS OF pp SPIN CORRELATION PARAMETERS AT $\vartheta_{cm} = 90°$ IN THE ENERGY RANGE BETWEEN 100 AND 500 MeV

INDIANA U – W A DeZarn, J Doskow, J Hardie, H O Meyer, R E Pollock, T Rinckel, F Sperisen, B von Przewoski (✓ Spokesperson)
WISCONSIN U – W Haeberli, B Lorentz, F Rathmann, M A Ross, T Wise
WESTERN MICHIGAN U – P V Pancella

Accelerator IUCF-COOLER *Detector* Counter

Reactions Polarized beam
$p\,p \rightarrow p\,p$ 100–500 MeV (T_{lab})

Brief description Uses a polarized hydrogen storage cell, accelerated and decelerated stored beam for absolute calibration, and the IUCF-CE-35 detector. The goal is to measure pp spin correlation parameters as a function of angle and energy, by ramping the energy of the stored polarized beam. In preparation (May 94).

Journal papers NIM A326 (1993) 424, and NIM A344 (1994) 307.

Related experiments IUCF-CE-08, IUCF-CE-26, IUCF-CE-35, IUCF-CE-44, IUCF-CE-45

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IUCF-CE-44

(Proposed Nov 1992, Approved Dec 1992, In preparation)

$pp \rightarrow pp\pi^0$ WITH POLARIZED BEAM AND POLARIZED TARGET

INDIANA U – W A DeZarn, J Doskow, H O Meyer (✓ Spokesperson), R E Pollock, T Rinckel, F Sperisen, B von Przewoski
WISCONSIN U – W Haeberli, B Lorentz, F Rathmann, M A Ross, T Wise
WESTERN MICHIGAN U – P V Pancella

Accelerator IUCF-COOLER *Detector* Counter

Reactions Polarized beam and target
$p\,p \rightarrow p\,p\,\pi^0$ 300–375 MeV (T_{lab})

Brief description Uses a polarized hydrogen target (from the Wisconsin atomic beam source) injected into a buffer cell, and longitudinally polarized beam. Studies $\Delta\sigma_T$ and $\Delta\sigma_L$. In preparation (May 94).

Journal papers NIM A326 (1993) 424, and NIM A344 (1994) 307.

Related experiments IUCF-CE-23, IUCF-CE-35, IUCF-CE-42, IUCF-CE-45

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SUMMARIES OF IUCF EXPERIMENTS

IUCF-CE-45

(Proposed Nov 1992, Approved Dec 1992, In preparation)

MEASUREMENT OF THE SPIN CORRELATION COEFFICIENT A_{zz} WITH THE INDIANA COOLER

INDIANA U – W A DeZarn, J Doskow, H O Meyer (√ Spokesperson), R E Pollock, T Rinckel, F Sperisen, B von Przewoski
WISCONSIN U – W Haeberli, B Lorentz, F Rathmann, M A Ross, T Wise
WESTERN MICHIGAN U – P V Pancella

Accelerator IUCF-COOLER *Detector* Counter

Reactions Polarized beam and target

$p\ p \rightarrow p\ p$ 185 MeV (T_{lab})

Brief description Uses a cell polarized H target. Solenoid fields generate longitudinal beam polarization. In preparation (May 94).

Journal papers NIM A326 (1993) 424, and NIM A344 (1994) 307.

Related experiments IUCF-CE-35, IUCF-CE-42, IUCF-CE-44

E-mail contact meyer1@indiana.edu

IUCF-CE-47

(Proposed 1992, Approved Dec 1992, Completed data-taking May 1993)

INVESTIGATION OF THE DEUTERIUM WAVE FUNCTION BY QUASIFREE SCATTERING

ARGONNE – C E Jones
INDIANA U – C Bloch, C D Goodman, M Leuschner, A Smith, J Sowinski
LOUISVILLE U – W K Pitts (Spokesperson)
MIT, BATES LINEAR ACCELERATOR – R Ent, J O Hansen, W Korsch, K Lee, R G Milner, S F Pate, C Tschalar
OHIO STATE U – S DeLucia, B Luther, D Marchlenski, E Sugarbaker
OHIO U – J Rapaport
WESTERN MICHIGAN U – P V Pancella
WISCONSIN U – H J Bulten (Spokesperson), M A Miller, J S Neal, O Unal, J F J van den Brand, Z L Zhou

Accelerator IUCF-COOLER *Detector* Counter

Reactions Polarized beam

deut $p \rightarrow p\ p\ n$ 400 MeV (T_{lab})

Brief description Measures the vector analyzing power A_y and the tensor analyzing power A_{yy} in quasifree kinematics. Uses a cell H_2 target, and IUCF-CE-25 setup. Data analysis in progress (May 94).

Related experiments IUCF-CE-25

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IUCF-CE-49

(Proposed Nov 1992)

PIONIUM PRODUCTION IN THE COOLER

INDIANA U – J Blomgren, J M Cameron, W W Jacobs, H Nann, B Ni, M Spraker, S E Vigdor (Spokesperson)

Accelerator IUCF-COOLER *Detector* ?

Reactions

p deut 199.6 MeV (T_{lab})

Brief description The goal is to investigate the production yield, and subsequently the decay, of pionium, an atomic bound state of a π^+ and π^-, in the $pd \rightarrow {}^3\mathrm{He} + (\pi^+\pi^-)$ reaction very near threshold.

E-mail contact vigdor@iucf.indiana.edu

IUCF-E-080

(Proposed Nov 1978, Jun 1984)

SEARCH FOR CHARGE SYMMETRY BREAKING IN np SCATTERING

INDIANA U – C Bloch, W W Jacobs, J Sowinski, S E Vigdor (Spokesperson), C Whiddon, S W Wissink
WISCONSIN U – L D Knutson (Spokesperson)
HOPE COLL – P L Jolivette
LOS ALAMOS – R C Byrd

Accelerator IUCF-CYCLOTRON *Detector* Scintillator, Wire chamber

Reactions Polarized beam and target

$n\ p \rightarrow n\ p$ 183 MeV (T_{lab})

Brief description Carried out in the Polarized Neutron Facility experimental area.

Journal papers PRL 66 (1991) 1410, and PR C46 (1992) 410.

Related experiments TRIUMF-121

E-mail contact vigdor@iucf.indiana.edu, knutson@wiscnuc.bitnet

IUCF-E-323

(Proposed Apr 1988, Approved Jun 1988, Began data-taking Aug 1989)

MEASUREMENT OF THE ANALYZING POWER FOR $p(\vec{n},\gamma)d$ AT 180 MeV

KENTUCKY U – T P Gorringe, F Hu, M A Kovash, M T McEllistrem, M A Pickar (√ Spokesperson), J K Ternes, J Trice, M Z Wang
INDIANA U – S E Vigdor

Accelerator IUCF-CYCLOTRON *Detector* Photon spectrometer

Reactions Polarized beam

$n\ p \rightarrow \gamma$ deut 180 MeV (T_{lab})

Brief description Uses a novel active target that is highly segmented. The active medium of the target is a liquid scintillator of the type containing two hydrogen atoms per carbon atom (NE235H). Photons are detected in an array of lead glass detectors, in coincidence with deuteron. Ran in the Polarized Neutron Facility experimental area. Presently inactive (May 94).

Related experiments IUCF-E-328, IUCF-E-329

E-mail contact pickar@nlab1.pa.uky.edu

IUCF-E-328

(Proposed Oct 1988, Approved Oct 1988, Began data-taking Aug 1989, Completed data-taking Feb 1992)

A PRECISE MEASUREMENT OF C_{nn} AND A_y FOR THE $\vec{p}(\vec{n},d)\gamma$ REACTION AT T_n = 183 MeV

INDIANA U – C D Bloch (√ Spokesperson), S M Bowyer, T W Bowyer, W W Jacobs, H O Meyer, S F Pate (√ Spokesperson), E Pierce, J Sowinski, S E Vigdor, C Whiddon, S W Wissink, G Xu
HOPE COLL – P L Jolivette
KENTUCKY U – M A Pickar

Accelerator IUCF-CYCLOTRON *Detector* Counter, Wire chamber

Reactions Polarized beam and target

$n\ p \rightarrow \gamma$ deut 183 MeV (T_{lab})

Brief description Measures the spin correlation and analyzing power for the neutron–proton radiative capture. Ran in the Polarized Neutron Facility experimental area.

Journal papers PRL 70 (1993) 3205.

E-mail contact cbloch@iucf.indiana.edu, pate@mitlns.mit.edu

IUCF-E-367

(Proposed Jun 1992, Approved Jun 1992, Began data-taking Feb 1993, Completed data-taking Aug 1993)

A COINCIDENCE MEASUREMENT OF $D_{nn'}$ FOR pp ELASTIC SCATTERING AT T_{inc} = 200 MeV

INDIANA U – A D Bacher, S M Bowyer (✓ Spokesperson), T W Bowyer, S Chang, W Franklin, J Liu, J Sowinski, E J Stephenson, S P Wells, V Willcut, S W Wissink (✓ Spokesperson)
LOUISVILLE U – W K Pitts
QUEEN MARY - WESTFIELD COLL – D V Bugg

Accelerator IUCF-CYCLOTRON *Detector* Spectrometer

Reactions Polarized beam

$p\ p \rightarrow p\ p$ 200 MeV (T_{lab})

Brief description Measures the normal-component spin transfer coefficient from 5° to 38° in the lab. Identifies pp elastics by detecting and measuring the energy of both coincident protons. Uses Si/CsI recoil telescope, K600 spectrometer, and a focal plane polarimeter.

E-mail contact smbowyer@iucf.indiana.edu, wissink@iucf.indiana.edu

KEK Experiments

KEK-TE-001

(Approved Mar 1983, Began data-taking Nov 1986, In progress)

TRISTAN e^+e^- EXPERIMENTS BY THE VENUS COLLABORATION

VENUS COLLABORATION
TOKYO METROPOLITAN U – M Chiba, T Hirose, N Hosoda, T Oyama, F Yabuki
TOHOKU U – K Abe, J MacNaughton
KEK – K Amako, Y Arai, M Fukawa, Y Fukushima, F Hinode, N Ishihara, N Kanematsu, J Kanzaki, T Kondo, T Matsui, S Odaka, K Ogawa (Spokesperson), T Ohama, M Sakuda, N Sato, J Shirai, T Sumiyoshi, F Takasaki, T Tsuboyama, S Uehara, Y Unno, M Utsumi, Y Watase, Y Yamada
TSUKUBA U, INST APPL PHYS – T Arima, Y Asano, M Miura, S Mori (Spokesperson), M Shirakata, Y Takada
YASUDA WOMENS JR COLL – Y Chiba
WAKAYAMA MEDICAL COLL – M Daigo
OSAKA U – J Haba, H Hanai, N Kanda, A Kruger, Y Nagashima, A Suzuki, H Takaki, M Takita, Y Yamamoto
KYOTO U – Y Hemmi, R Kikuchi, H Kurashige, K Miyake, A Okamoto, H Sakamoto
TOHOKU GAKUIN U – M Higuchi, Y Hoshi, M Sato
KOBE U – Y Homma, A Ono
HIROSHIMA U – Y Iwata, T Ohsugi, H Ohyama
KEK & HELSINKI U – T T Korhonen
OKAYAMA U – E K Matsuda, N Tamura
TOKYO, INTERNATIONAL CHRISTIAN U – Y Nakagawa, T Yamagata
MIYAZAKI U – T Nakamura
TSUKUBA U – I Nakano
IBARAKI COLL TECH – M Shioden
KOGAKUIN U – K Tobimatsu
TSUKUBA COLL TECH – Y Yonezawa
NARUTO U OF EDUCATION – H Yoshida

Accelerator KEK-TRISTAN *Detector* VENUS

Reactions
$e^+ e^-$ < 70 GeV (E_{cm})

Brief description In progress (May 94).

Journal papers NIM 217 (1983) 181, JJAP 23 (1984) 897, NIM A228 (1985) 309, NIM A238 (1985) 328, NIM A243 (1986) 58, NIM A253 (1986) 27, IEEE TNS 33 (1986) 73, JJAP 25 (1986) 1049, NIM A254 (1987) 35, NIM A254 (1987) 317, NIM A259 (1987) 430, NIM A259 (1987) 438, JJAP 26 (1987) 982, JPSJ 56 (1987) 3763, JPSJ 56 (1987) 3767, PL B198 (1987) 570, PRL 59 (1987) 2915, NIM A265 (1988) 457, NIM A269 (1988) 171, NIM A269 (1988) 522, NIM A270 (1988) 319, NIM A271 (1988) 432, NIM A272 (1988) 687, IEEE TNS 35 (1988) 300, PL B207 (1988) 355, PL B213 (1988) 400, PRL 61 (1988) 915, NIM A274 (1989) 183, NIM A281 (1989) 462, IEEE TNS 36 (1989) 665, IEEE TNS 36 (1989) 670, JJAP 28 (1989) 1981, JPSJ 58 (1989) 3037, PL B232 (1989) 425, PL B232 (1989) 431, PRL 63 (1989) 1776, ZPHY C45 (1989) 175, PR D39 (1989) 3524, PL B234 (1990) 202, PL B234 (1990) 382, PL B240 (1990) 232, PL B246 (1990) 297, ZPHY C48 (1990) 13, NIM A301 (1991) 497, NIM A303 (1991) 346, NIM A305 (1991) 71, PL B264 (1991) 212, PL B266 (1991) 188, PL B267 (1991) 309, PRL 66 (1991) 280, NIM A311 (1992) 57, NIM A322 (1992) 211, NIM A323 (1992) 471, PL B278 (1992) 393, PL B278 (1992) 499, NIM A330 (1993) 64, PL B302 (1993) 119, PL B313 (1993) 245, PL B313 (1993) 288, PRL 71 (1993) 38, and NIM A340 (1994) 501.

WWW Home-page http://venusux1.kek.jp/

KEK-TE-002

(Approved Mar 1983)

STUDY OF e^+e^- ANNIHILATION PHENOMENA BY A DETECTOR WITH PARTICLE IDENTIFICATION

TOPAZ COLLABORATION
NARA WOMENS U – S Awa, N Fujiwara, H Hayashii, M Iwasaki, K Muramatsu, T Nagira, S Noguchi, M Takemoto, N Toomi, A Yamaguchi
TOKYO U OF AGRIC TECH – K Abe, M Aoki, K Emi, O Nitoh, T Shinohara, K Takahashi
NAGOYA U – T Abe, M Aoki, R Kajikawa (Spokesperson), K Miyabayashi, K Nakabayashi, E Nakano, Y Ohnishi, K Shimozawa, A Sugiyama, S Suzuki, F Teramae, T Toyama
KEK – I Adachi, R Belusevic, R Enomoto, H Fujii, K Fujii, J Fujimoto, N Iida, H Ikeda, R Itoh, H Iwasaki, S Kawabata (Spokesperson), H Kichimi, M Kobayashi, A Miyamoto, T Tauchi, T Tsukamoto, S Uno, A Yamamoto, M Yamauchi
TOKYO U – T Fujii
OSAKA CITY U – K Fujita, T Okusawa, T Takahashi, Y Teramoto
PURDUE U – B Howell, D Koltick, I Levine
TOKYO INST TECH – K Kaneyuki, S Minami, N Sugiyama, T Tanimori, T Watanabe, Y Watanabe
TOKYO U, INS – S Kato, H Okuno
KOBE U – K Nagai
TEZUKAYAMA U – F Ochiai

Accelerator KEK-TRISTAN *Detector* TOPAZ

Reactions
$e^+ e^-$ < 70 GeV (E_{cm})

Brief description Searches for new particles such as heavy quarks, heavy leptons, and various supersymmetric particles, and studies in detail electroweak as well as QCD phenomena. The detector has large solid angle coverage with very good particle identification and 3-dimensional tracking capabilities.

Journal papers NIM 225 (1984) 23, NIM A236 (1985) 55, NIM A252 (1986) 423, NIM A256 (1987) 449, NIM A269 (1988) 507, NIM A269 (1988) 513, NIM A270 (1988) 11, NIM A271 (1988) 404, PL B200 (1988) 391, PL B208 (1988) 319, PRL 60 (1988) 97, PR D37 (1988) 1339, PL B218 (1989) 105, PL B227 (1989) 495, PL B228 (1989) 553, PL B229 (1989) 427, NIM A297 (1990) 148, PL B234 (1990) 185, PL B234 (1990) 197, PL B234 (1990) 525, PL B240 (1990) 513, PL B244 (1990) 352, PL B249 (1990) 336, NIM A300 (1991) 575, PL B255 (1991) 613, PL B268 (1991) 457, NIM A312 (1992) 440, NIM A316 (1992) 202, PL B278 (1992) 506, PL B279 (1992) 422, PL B284 (1992) 144, PL B291 (1992) 206, NIM A334 (1993) 367, PL B304 (1993) 373, PL B313 (1993) 475, PL B314 (1993) 149, PL B314 (1993) 471, and PL B328 (1994) 535.

KEK-TE-003

(Proposed 1983, Approved Nov 1983, Began data-taking Nov 1986, Completed data-taking Jun 1994)

AMY — A HIGH RESOLUTION LEPTON DETECTOR FOR TRISTAN

AMY COLLABORATION
ROCHESTER U – A Bodek, B J Kim, T Kumita, Y K Li, C Velissaris
SOUTH CAROLINA U – C Rosenfeld, S Wilson
KOREA U – J S Kang, D Y Kim
LOUISIANA STATE U – P Kirk
BEIJING, IHEP – M H Ye, Z P Zheng
VIRGINIA TECH – A Abashian, K Gotow, D Haim, M E Mattson, L Piilonen
UC, DAVIS – R E Breedon, W Ko, R L Lander, J Rowe, J R Smith, D Stuart
HAWAII U – S Kanda, S L Olsen (√ Spokesperson), K Ueno
KEK – K Abe (√ Spokesperson), Y Fujii, Y Kurihara, F Liu, A Maki, T Nozaki, T Omori, H Sagawa, Y Sakai, T Sasaki, Y Sugimoto, Y Takaiwa, S Terada
GYEONGSANG NATIONAL U – S K Choi
KONAN U – F Kajino
MINNESOTA U – T Thomas
NIIGATA U – T Aso, K Miyano, H Miyata, N Takashimizu
NIHON DENTAL COLL – Y Yamashita
RUTGERS U – F Sannes, S Schnetzer, R Stone, J Vinson
SAGA U, JAPAN – S Behari, S Kobayashi, A Murakami, K S Saroj
SEOUL NATIONAL U – S K Kim, M H Lee, S S Myung

KYUNGPOOK NATIONAL U – D Son
CHUO U, TOKYO – S Matsumoto
SAITAMA U – T Ishizuka

Accelerator KEK-TRISTAN *Detector* AMY

Reactions

$e^+ e^-$	< 70 GeV (E_{cm})

Brief description Data analysis in progress (June 94).

Journal papers IEEE TNS 23 (1987) 520, NIM A260 (1987) 361, NIM A265 (1988) 141, PRL 60 (1988) 93, PRL 60 (1988) 2359, PRL 61 (1988) 911, NIM A274 (1989) 95, NIM A283 (1989) 665, PL B218 (1989) 112, PL B218 (1989) 499, PL B223 (1989) 476, PL B228 (1989) 548, PRL 62 (1989) 1713, PRL 63 (1989) 1342, PRL 63 (1989) 1772, PRL 63 (1989) 1910, PRL 63 (1989) 2341, PL B234 (1990) 534, PL B240 (1990) 243, PL B244 (1990) 573, PL B252 (1990) 491, PRL 64 (1990) 984, PR D41 (1990) 2675, PR D42 (1990) 737, PR D42 (1990) 949, PR D42 (1990) 1339, IJMP A6 (1991) 2583, NIM A307 (1991) 52, NIM A317 (1992) 75, NIM A323 (1992) 601, PL B277 (1992) 215, PL B303 (1993) 385, PL B313 (1993) 469, and PL B325 (1994) 248.

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KEK-TE-004

(Proposed Nov 1984, Approved Apr 1985, Began data-taking Nov 1986, Completed data-taking Mar 1989)

NIKKO-MARU EXPERIMENT — A SEARCH FOR HIGHLY IONIZING PARTICLES

SHIP COLLABORATION
HARVARD U – K Kinoshita (√ Spokesperson)
TOKYO, INST FOR SPACE AND ASTRONAUTICAL SCIENCE – M Fujii
UC, BERKELEY – P B Price
GIFU U – S Tasaka
KEK – K Nakajima

Accelerator KEK-TRISTAN *Detector* SHIP

Reactions

$e^+ e^-$	50–60.8 GeV (E_{cm})

Particles studied monopole

Journal papers PRL 60 (1988) 1610, and PL B228 (1989) 543. No other papers expected.

KEK-137

(Proposed Jun 1985, Approved Oct 1985, Began data-taking Dec 1987, Completed data-taking May 1990)

STUDY OF THE RARE DECAY $K_L \to \mu e$

KEK – T Inagaki (√ Spokesperson), M Kobayashi, T Sato, T Shinkawa, F Suekane, K Takamatsu, Y Yoshimura
TOKYO U – R Fukuhisa, K Ishikawa, T Kishida, T K Komatsubara, M Kuze, F Sai, J Toyoura, S S Yamamoto
KYOTO U – Y Hemmi
TOHOKU U – T Akagi

Accelerator KEK-PS *Detector* Double-arm spectrometer

Reactions

$K_L \to \mu^+ \mu^-$	2–8 GeV/c
$K_L \to \mu^+ e^-$	"
$K_L \to \mu^- e^+$	"
$K_L \to e^+ e^-$	"
$K_L \to e^+ e^- e^+ e^-$	"

Particles studied K_L

Brief description K_L beam is produced at 0° to 2° from a primary proton beam. Momenta of the decay products are measured by a double-arm spectrometer. The decay products are identified by a gas Čerenkov counter, a lead-scintillator sandwich counter, and an iron-block muon identifier. Branching ratios are obtained by comparing the above decay modes to $K_L \to \pi^+\pi^-$ decays, which are studied simultaneously.

Journal papers PR D40 (1989) 1712, PRL 67 (1991) 2614, PRL 67 (1991) 2618, and PR D47 (1993) 2644.

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KEK-150

(Proposed Feb 1986, Approved Feb 1986, Began data-taking Jun 1986, Completed data-taking Mar 1988)

STUDY OF Λ HYPERNUCLEI VIA THE (π^+, K^+) REACTION

KYOTO SANGYO U – F Takeuchi
KYUSHU U – K Kimura
KEK – J Chiba, M Nomachi, O Sasaki, K H Tanaka
LOS ALAMOS – J F Amann, J A McGill, H A Thiessen
OSAKA U – M Akei, H Ejiri, M Fukuda, A Higashi, T Irie, Y Iseki, A Kashitani, T Kishimoto, H Nagasawa, H Noumi, H Ohsumi, K Okuda, H Sano, Y Umeda
TOHOKU U – K Maeda
TOKYO U & TOKYO U, INS – T Fukuda, O Hashimoto (√ Spokesperson), S Homma, Y Matsuyama, T Nagae, C Nagoshi, K Omata, T Shibata (√ Spokesperson), F Soga, S Toyama, Y Yamanoi, N Yoshikawa
YAMAGATA U – S Kato

Accelerator KEK-PS *Detector* Spectrometer

Reactions

π^+ nucleus → K^+ X	1.0–1.2 GeV/c

Brief description Uses the PIK spectrometer consisting of a beam analyzer, and a kaon analyzer. The former has a single dipole magnet, a pair of quadrupole magnets, and four high-rate drift chambers. The kaon momentum analyzer is a wide solid-angle, large momentum acceptance spectrometer.

Journal papers NIM A283 (1989) 46, NC 102A (1989) 457, and NP A534 (1991) 478.

Related experiments KEK-140, KEK-160

KEK-157

(Proposed 1986, Approved Jun 1987, Began data-taking 1987, Completed data-taking Feb 1988)

STUDY OF THE PION-INDUCED DOUBLE CHARGE EXCHANGE REACTION AND DOUBLE PION PRODUCTION USING A LARGE SOLID ANGLE SPECTROMETER

KEK – J Chiba, T Kobayashi (Spokesperson), K Nakai
TOKYO U – T Nagae, H Sano, S Sasaki, K Tokushuku
TSUKUBA U – I Arai, M Kurokawa, A Manabe, M Ninomiya, M Tanaka
TOKYO INST TECH – H Yokota

Accelerator KEK-PS *Detector* FANCY

Reactions

π^+ nucleus → π^- p p X	0.5–1.5 GeV/c
π^+ nucleus → π^+ π^+ X	"

Brief description Approved for 100 shifts.

KEK-160

(Proposed Feb 1987, Approved Mar 1989, Began data-taking Nov 1989, Completed data-taking Dec 1990)

POLARIZATION IN WEAK DECAYS OF HYPERNUCLEI

OSAKA U – H Ejiri (√ Spokesperson), A Higashi, Y Iseki, T Kishimoto, H Noumi, H Ohsumi, H Sano
TRIUMF – D R Gill, L Lee, A Olin

TOKYO U, INS – T Fukuda, O Hashimoto, T Nagae, T Shibata
TOHOKU U – K Maeda
KYUSHU U – K Kimura

Accelerator KEK-PS *Detector* Wide-angle spectrometer

Reactions

$\pi^+ {}^{12}C \rightarrow K^+$ hypernuc	1.05 GeV/c

Brief description The polarization of a hypernucleus is measured by the asymmetry of the weak decay.

Journal papers PR C36 (1987) 1435, NIM A283 (1989) 46, PL B225 (1989) 35, PL B232 (1989) 24, NP A534 (1991) 478, PL B282 (1992) 293, PRL 68 (1992) 2137, and NIM A372 (1993) 287.

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KEK-162

(Proposed 1987, Approved Oct 1987, In preparation)

MEASUREMENT OF THE *CP*-VIOLATING DIRECT AMPLITUDE IN $K_L^0 \rightarrow \pi^0 e^+ e^-$ DECAY

KYOTO U – H Kurashige, T T Nakamura, T Nomura, H Sakamoto, N Sasao (√ Spokesperson), M Suehiro
KEK – Y Fukushima, M Noumachi, O Sasaki, T Taniguchi

Accelerator KEK-PS *Detector* TOKIWA

Reactions

$K_L \rightarrow \pi^0 e^+ e^-$	—

Particles studied K_L

Brief description The apparatus consists of large drift chambers, a UV-sensitive Čerenkov counter for detection of electrons, and an electromagnetic CsI calorimeter with a good energy resolution. The drift chambers use argon and CF_4 gas. Sensitive to branching ratios smaller than 10^{-10}. Data taking expected to begin in Winter 1994/95.

Journal papers NIM A270 (1988) 106, NIM A283 (1989) 709, and NIM A317 (1992) 213.

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KEK-167B

(Proposed 1988, Approved Feb 1988, Began data-taking May 1988, Completed data-taking Feb 1989)

SEARCH FOR A Σ HYPERNUCLEAR GROUND STATE BY KAON ABSORPTION ON ^{4}He

TOKYO U – R S Hayano (√ Spokesperson), T Ishikawa, M Iwasaki, H Outa, H Sakurai, E Takada
TOKYO U, INS – H Tamura, T Yamazaki
HEIDELBERG, MAX PLANCK INST – A Sakaguchi

Accelerator KEK-PS *Detector* Double-arm spectrometer

Reactions

K^- nucleus $\rightarrow \pi^-$ X	—

Brief description This experiment is a high statistics measurement of the pion momentum spectra from K^- absorption at rest on a liquid He target, using a magnetic spectrometer system. The incoming K beam trajectory as well as the trajectory of each charged-particle event in the spectrometer are recorded to obtain information about the reaction or decay vertices and particle momenta.

Journal papers NC 102A (1989) 437, PL B231 (1989) 355, and PRL 63 (1989) 1590.

KEK-173

(Proposed 1987, Approved Oct 1987, Began data-taking Oct 1988, Completed data-taking Mar 1989)

STUDY OF Δ PRODUCTION IN NUCLEI USING (p, n) REACTIONS

KEK – J Chiba (√ Spokesperson), T Kobayashi
RUTGERS U – D Beatty, G Edwards, C Glashausser, G J Kumbartzki, R D Ransome
TOKYO U, INS – T Nagae
TOKYO U – H Sano
TSUKUBA U – I Arai, A Manabe, M Ninomiya, M Tanaka, K Tomizawa – H Sakai
GEORGIA U & OSAKA U, RES CTR NUCL PHYS – F T Baker

Accelerator KEK-PS *Detector* FANCY

Reactions

p nucleus $\rightarrow n$ X	1.5 GeV/c
p nucleus $\rightarrow \Delta$(unspec) X	"
p nucleus $\rightarrow \Delta(1232\, P_{33})^{++}$ X	"

Brief description Uses the Forward–And–Cylindrical (FANCY) detector system.

Journal papers PRL 67 (1991) 1982.

KEK-174

(Proposed 1987, Approved Jun 1987, Began data-taking May 1988, Completed data-taking Dec 1988)

$A_y(E, \vartheta)$ MEASUREMENTS FOR NN REACTIONS

TEXAS A AND M – G Glass, J Hiebert, J A Holt, R Kenefick, S Nath, L C Northcliffe (√ Spokesperson), A Simon
KYOTO U – K Imai
TOKYO INST TECH – H Ohnuma, H Shimizu (√ Spokesperson), H Y Yoshida
TOHOKU U – K Kobayashi, Y Kobayashi, T Nakagawa
KEK – S Hiramatsu, Y Mori, H Sato, A Takagi, T Toyama, A Ueno

Accelerator KEK-PS *Detector* Wire chamber, Counter

Reactions Polarized beam

$p\,p \rightarrow p\,p$	0.5–3.5 GeV (T_{lab})
$p\,p \rightarrow \pi^+$ deut	"

Brief description The momentum dependence of the analyzing power is measured in various reactions using an internal target.

Journal papers PR C42 (1990) 483, NP A541 (1992) 443, and NP A (to be published).

Related experiments SATURNE-173

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KEK-176

(Proposed 1987, Approved Jun 1987, Began data-taking May 1988, Completed data-taking Mar 1989)

SEARCH FOR ΛΛ HYPERNUCLEI AND/OR THE H PARTICLE

KYOTO U – T Iijima, K Imai (√ Spokesperson), A Masaike, T Nakano, H Togawa
NAGOYA U – S Aoki, K Hoshino, K Kodama, M Miyanishi, M Nakamura, S Nakanishi, K Niu, K Niwa, H Tajima
KOBE U – T Hara
OSAKA CITY U – M Teranaka
GIFU U – K Nakazawa, S Tasaka
TOHO U – M Kazuno, H Shibuya
AICHI U OF EDUCATION – N Ushida
YOKOHAMA NATIONAL U – Y Maeda
UTSUNOMIYA U – Y Sato
OSAKA PREFECTURE U, SCI EDUC INST – J Yokota
KEK – M Ieiri, K H Tanaka
KYOTO SANGYO U – F Takeuchi

Accelerator KEK-PS *Detector* Spectrometer, Counter

Reactions

K^- nucleus $\rightarrow K^+$ X	1.65 GeV/c (P_{lab})

Brief description Studies double hypernuclei and H dihyperon. Uses the emulsion-counter hybrid method, an emulsion target, and a K^+-spectrometer.

Journal papers PRL 65 (1990) 1729, PTP 85 (1991) 951, PTP 85 (1991) 1287, NP A546 (1992) 588, NP A547 (1992) 199, and PTP 89 (1993) 493.

Related experiments KEK-224

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KEK-179

(Proposed 1987, Approved Feb 1988, Began data-taking Nov 1988, Completed data-taking May 1990)

STUDY OF $\eta\pi^{\pm}$ RESONANCES — SEARCH FOR EXOTIC PARTICLES WITH $I = 1$, $J^{PC} = 1^{-+}$

KEK – S Inaba, S Ishimoto, K Ohmi, K Takamatsu, M Takasaki, T Tsuru (√ Spokesperson), Y Yasu
TOKYO U, INS – C Ohmori
TOKYO, METROPOLITAN COLL TECH – I Yamauchi
TOKYO INST TECH – H Shimizu, Y Tajima, H Y Yoshida
NAGOYA U – H Aoyagi, N Hayashi, N Horikawa, J Iizuka, T Iwata, T Kinashi, A Kishi, T Matsuda, S Nakamura, T Nakanishi, M Okumi, C Omori, T Samoto, K Tsuchiya, A Wakai
NAGOYA UNIV COLL MEDICAL TECH – K Mori
TOHOKU U – K Kobayashi, Y Kobayashi, T Nakagawa, A Narita
MIYAZAKI U – T Hasegawa, E Kanatani, T Nakamura, K Tsuchiya
SUGIYAMA JOGAKUEN U – S Fukui
SAGA U, JAPAN – T Tsubaki
CHIBA U – H Kawai
TOKYO U, INS – Y Ishizaki
HAMAMATSU U – K Matsuda

Accelerator KEK-PS *Detector* BENKEI

Reactions

$\pi^- p \rightarrow \eta \pi^- p$	6.3 GeV/c

Particles studied $a_0(980)$, $a_2(1320)$, exotic-meson

Journal papers PL B314 (1993) 246.

E-mail contact tsuru@kekvax.kek.jp

KEK-187

(Proposed 1988, Approved Jul 1988, Began data-taking Jun 1989)

STUDY OF BACKWARD Λ PRODUCTION IN HIGH-ENERGY HADRON–NUCLEUS REACTIONS

TSUKUBA U – I Arai (Spokesperson), N Kato, H Kitayama, Y Nagasaka, M Tanaka, K Tomisawa, K Yagi
KEK – J Chiba, T Kobayashi, A Manabe
TOKYO U, INS – T Nagae, M Sekimoto
WAKO, RIKEN – I Nomura
MOSCOW, INR – V S Pantuev

Accelerator KEK-PS *Detector* FANCY

Reactions

$\pi^- {}^6\mathrm{Li} \rightarrow \Lambda X$	4 GeV/c
$\pi^- {}^6\mathrm{Li} \rightarrow \Lambda K^0 X$	"

Brief description Measures inclusive and semi-inclusive cross sections and studies multi-nucleon corrections in nuclei.

Journal papers COLL PHYS C6 (1990) 591.

KEK-195

(Proposed 1988, Approved Jul 1988, Began data-taking Apr 1989, Completed data-taking Jul 1989)

PRECISE MEASUREMENT OF μ^+ LONGITUDINAL POLARIZATION IN THE DECAY $K^+ \rightarrow \mu^+\nu$

KEK – J Imazato (√ Spokesperson), M Takasaki, K H Tanaka
TOKYO U – R S Hayano, M Iwasaki, H Tamura
TOKYO U, INS – M Aoki, H Outa, T Yamazaki
WAKO, RIKEN – Y Kawashima
TOKYO, NAT INST RADIOLOGICAL SCI – E Takada

Accelerator KEK-PS *Detector* Spectrometer

Reactions

$K^+ \rightarrow \mu^+ \nu_\mu$	0 MeV/c (P_{lab})
$\mu^+ \rightarrow e^+ \bar{\nu}_\mu \nu_e$	"

Particles studied K^+, μ^+

Brief description Uses a beam line spectrometer in the $\pi\mu$ channel. Looks for right-handed currents.

Journal papers NIM A316 (1992) 134, PRL 69 (1992) 877, and PR D50 (1994) 69.

E-mail contact imazato@kekvax.kek.jp

KEK-215

(Approved Nov 1989, Began data-taking Dec 1990, Completed data-taking Feb 1991)

STUDY OF META-STABLE STATES OF THE $\bar{p}$ ATOM IN LIQUID HELIUM

TOKYO U – R S Hayano (√ Spokesperson), T Ishikawa, M Iwasaki, S N Nakamura, K Shigaki, Y Shimizu, H Tamura
TOKYO, NAT INST RADIOLOGICAL SCI – E Takada
TOKYO U, INS – M Aoki, P Kitching, H Outa, E Widmann, T Yamazaki

Accelerator KEK-PS *Detector* Counter

Reactions

$\bar{p}$ He → pion X	519 MeV/c (P_{lab})

Journal papers PRL 67 (1991) 1246.

Related experiments CERN-PS-205

KEK-217

(Approved Nov 1989, Began data-taking Apr 1990, Completed data-taking Nov 1990)

STUDY OF ABSORPTION OF 1 GeV/c PIONS

TOKYO U, INS – T Fukuda, M Miyachi, T Nagae (Spokesperson), M Sekimoto
WAKO, RIKEN – I Nomura
TSUKUBA U – I Arai, H Kitayama, Y Nagasaka, K Tomizawa, S Ueno, K Waki
TOHOKU U – S Itoh, K Maeda, H Matsuyama, T Suda, T Terasawa
ALBERTA U – P Kitching
MOSCOW, INR – M A Prokhvatilov, V I Razin
MIT – D C Rowntree
KEK – T Kobayashi

Accelerator KEK-PS *Detector* Counter

Reactions

π^+ He → $p\,p$ X	1.0 GeV/c (P_{lab})
π^+ He → $p\,n$ X	"
$\pi^+ {}^{12}\mathrm{C} \rightarrow p\,p$ X	"
$\pi^+ {}^{12}\mathrm{C} \rightarrow p\,n$ X	"

Brief description Uses a neutron hodoscope.

KEK-218

(Approved Mar 1990, Began data-taking Sep 1992, Completed data-taking Feb 1993)

STUDY OF THE FORMATION OF ${}^{4}_{\Lambda}\mathrm{H}$ BY USING $\pi\pi$ COINCIDENCE

TOKYO U – R S Hayano, T Ishikawa, M Iwasaki, A Kawachi, T Miyamoto, S N Nakamura, K Shigaki, Y Shimizu, H Tamura (√ Spokesperson)

TOKYO U, INS – M Aoki, Y Fujita, H Outa, T Yamazaki
KEK – J Imazato
YONSEI U – J M Lee
KOREA U – I S Park

Accelerator KEK-PS *Detector* Spectrometer

Reactions

$K^- \, ^{12}C$	0 MeV/c (P_{lab})

Brief description Measures the momentum of π^- emitted during the hyperon production stage in coincidence with the π^- emitted during the ${}^4_\Lambda H \rightarrow {}^4He\,\pi^-$ decay. Uses a superconducting toroidal spectrometer. Approved for 50 shifts. Data analysis in progress.

E-mail contact tamura@tkyvax.phys.s.u-tokyo.ac.jp, tkyvax::tamura

KEK-224

(Proposed 1990, Approved Mar 1990, Began data-taking Mar 1991, Completed data-taking Jan 1992)

SEARCH FOR THE *H*-DIBARYON WITH A SCINTILLATING FIBER TRACK DETECTOR

KYOTO U – H En'yo, H Funahashi, Y Goto, T Iinuma, K Imai (√ Spokesperson), Y Itow, S Makino, A Masaike, N Saito, S Yamashita, S Yokkaichi, K Yoshida, M Yoshida
KYOTO U OF EDUCATION – R Takashima
KYOTO SANGYO U – F Takeutchi
KEK – M Ieiri
KOBE U – S Aoki
TOKYO U, INS – T Fukuda, A Higashi, T Nagoshi, M Sekimoto, P Tlusty
OSAKA CITY U – T Yoshida
TOKYO, INST PHYS CHEM RES – I Nomura
SASKATCHEWAN U – Y M Shin, S Wiebe
KOREA U – J K Ahn, M S Chung, I S Park, K S Sim
YONSEI U – K S Chung, J M Lee

Accelerator KEK-PS *Detector* KURAMA

Reactions

K^- nucleus $\rightarrow K^+$ X	1.65 GeV/c (P_{lab})

Brief description Uses KURAMA, a wide-angle spectrometer with a scintillating fiber track detector. Approved for 120 shifts.

Journal papers NP A547 (1992) 588.

Related experiments KEK-176

E-mail contact imai@kekvax.kek.jp, kytvax::imai

KEK-231

(Proposed 1990, Approved Jul 1990)

STUDY OF VIOLATION OF TIME REVERSAL INVARIANCE IN NEUTRON REACTIONS

KEK – T Adachi, S Ishimoto, Y Masuda (√ Spokesperson), Y Mori, K Morimoto, H M Shimizu
KYOTO U – M Iinuma, A Masaike, Y Matsuda
TOKYO INST TECH – K Asahi, M Harada, H Sato
TOHOKU U – K Sakai, S Tanaka, A Yamaguchi

Accelerator KEK-PS *Detector* Counter

Reactions Polarized beam and target

$n \, ^{139}La \rightarrow n$ X	—
$n \, ^{81}Br \rightarrow n$ X	—

Journal papers NIM A264 (1987) 169, NP A504 (1989) 269, and HFI 74 (1992) 149.

E-mail contact masuda@kekvax.kek.jp

KEK-235

(Proposed Oct 1990, Approved Nov 1990, Began data-taking Apr 1993, Completed data-taking Apr 1993)

DIFFERENTIAL CROSS SECTION FOR $p(n,\gamma)d$

OSAKA U – S Hirata, M Kawabata, Y Mizuno, K Tamura
KEK – S Ishimoto, Y D Kim
KENTUCKY U – T P Gorringe, M A Kovash (√ Spokesperson), M A Pickar, J Trice
KYOTO U – S Sawada
MIYAZAKI U – T Hasegawa, F Nakayama
NAGOYA U – N Horikawa, T Iwata, A Ogawa, T Sasaki
TOKYO INST TECH – H Ogami, T A Shibata

Accelerator KEK-PS *Detector* Wire chamber

Reactions

$n\,p \rightarrow \gamma$ deut	1.0 – 3.0 GeV (E_{lab})

Brief description The angular distribution of the cross section is measured over a large range of energies and angles for the purpose of testing QCD-inspired models of this exclusive photonuclear reaction. The deuteron is detected with a MWDC and a dipole magnet, γ's with a converter, MWDC, and Pb-glass. Data analysis in progress (May 94).

E-mail contact kovash@ie.pa.uky.edu

KEK-246

(Approved Jul 1991, In preparation)

SEARCH FOR *T*-VIOLATING MUON POLARIZATION IN $K^+ \rightarrow \pi^0\mu^+\nu$ DECAY USING STOPPED KAONS

E246 COLLABORATION
KEK – J Imazato (√ Spokesperson), Y Kuno, H M Shimizu, K H Tanaka
TOKYO U, INS – M Aoki, Y Fujita, H Outa, S Sugimoto, T Yamazaki
TOKYO U – R S Hayano, T Ishikawa, H Tamura
MOSCOW, INR – D V Dementyev, M Grigorev, A P Ivashkin, M M Khabibullin, Y G Kudenko, V M Lobashev, O V Mineev, V Popov
TSUKUBA U – I Arai, Y Igarashi, T Ikeda, M Ise, K Shibata
TSUKUBA U, INST APPL PHYS – M Abe, Y Asano
IBARAKI U, HITACHI – T Yokoi
TOKYO INST TECH – S Shimizu
SASKATCHEWAN U – T Baker, C Rangacharyulu, Y M B Shin
YONSEI U – E J Kim, J M Lee, Y H Shin
KYUNGSUNG U – Y M Park
BRITISH COLUMBIA U – P Gumplinger, M Hasinoff, E Saettler
TRIUMF – J Doornbos, R Henderson, J A Macdonald, N Stevenson
MONTREAL U – P Depommier
VIRGINIA TECH – M Blecher
KANAGAWA U – A Kaga

Accelerator KEK-PS *Detector* Spectrometer

Reactions

$K^+ \rightarrow \pi^0 \, \mu^+ \, \nu$	0 GeV/c (P_{lab})

Particles studied K^+

Brief description Uses the Superconducting Toroidal Spectrometer. Approved for 450 shifts. In preparation (May 94).

E-mail contact imazato@kekvax.kek.jp, kekvax::imazato

KEK-248

(Approved Jul 1991)

SEARCH FOR *H* PARTICLES IN THE $pp \rightarrow K^+K^+$ REACTION

CHIBA U – H Kawai (Spokesperson)
HAMAMATSU U – K Matsuda
KEK – S Inaba, S Ishimoto, K Takamatsu, T Tsuru, Y Yasu
MIYAZAKI U – T Hasegawa, Z Kai, H Nakayama
NAGOYA U – H Horikawa, J Iizuka, T Iwata, G Kato, T Kinashi, T Matsuda, K Mori, T Nakanishi, A Ogawa, T Sasaki, A Wakai
SUGIYAMA JOGAKUEN U – S Fukui
TOHOKU U – T Nakagawa, A Narita
TOKYO, METROPOLITAN COLL TECH – I Yamauchi
TOKYO INST TECH – Y Tajima

YAMAGATA U – K Fukunaga, S Kato, H Shimizu, H Y Yoshida

Accelerator KEK-PS *Detector* SUPERBENKEI

Reactions

$p\,p \rightarrow K^+\,K^+\,X$	12 GeV (E_{lab})

Brief description Approved for 160 shifts.

KEK-251

(Proposed Jul 1991, Approved Jul 1991, Began data-taking Feb 1992, Completed data-taking Dec 1992)

HYPERON–NUCLEON SCATTERING EXPERIMENT I: Σ^+p SCATTERING

KEK – M Ieiri (√ Spokesperson), Y D Kim
KYOTO U – M S Chung, H En'yo, H Funahashi, Y Goto, T Iinuma, K Imai, Y Itow, A Masakike, Y Matsuda, S Mihara, N Saito, R Susukita, K Yamamoto, S Yamashita, S Yokkaichi, M Yoshida
TOKYO U, INS – T Fukuda, A Higashi
KYOTO U OF EDUCATION – R Takashima
KYOTO SANGYO U – K Okada, F Takeutchi
YONSEI U – W M Chung, J M Lee
PUSAN NATIONAL U – G D Kim
KYUNGSUNG U – Y M Park
KOREA U – J K Ahn, I S Park, K S Sim
NEW MEXICO U – B Bassalleck
SASKATCHEWAN U – Y M Shin
REZ, NUCL PHYS INST – P Tlusty
SERPUKHOV – S V Golovkin
MOSCOW, ITEP – E N Kozarenko, I E Kreslo, I P Petoukhov

Accelerator KEK-PS *Detector* Single-arm spectrometer

Reactions

$\Sigma^+\,p \rightarrow \Sigma^+\,p$	0.2 – 0.6 GeV/c (P_{lab})

Brief description Uses a three-dimensional plastic scintillating fiber detector. Approved for 60 shifts.

Related experiments KEK-289

E-mail contact ieiri@kekpsa.kek.jp

KEK-257

(Approved Dec 1991, Began data-taking Apr 1992, Completed data-taking May 1992)

SUBTHRESHOLD ANTIPROTON PRODUCTION IN d A REACTIONS

KEK – J Chiba (√ Spokesperson), M Nomachi, K H Tanaka, Y Yoshimura
MOSCOW, ITEP – Y T Kiselev, M K Vlasov
TOKYO U, INS – M Koike, T Nagae, M Sekimoto
KYOTO U – H Ito, T Murakami, Y Nakai, S Sawada
TOKYO, INST PHYS CHEM RES – T Kobayashi, T Suzuki
NIIGATA U – K Miyano

Accelerator KEK-PS *Detector* ?

Reactions

p nucleus $\rightarrow \bar{p}\,X$	3.5 – 5.0 GeV/c
p nucleus $\rightarrow K^-\,X$	"
p nucleus $\rightarrow \pi^-\,X$	"
deut nucleus $\rightarrow \bar{p}\,X$	3.5 – 5.0 GeV/N (P_{lab})
deut nucleus $\rightarrow K^-\,X$	"
deut nucleus $\rightarrow \pi^-\,X$	"

Brief description This is a beam-line (T3) experiment. Approved for 40 shifts.

Journal papers NP A553 (1993) 771c.

Related experiments KEK-286

E-mail contact chibaj@kekvax.kek.jp

KEK-287

(Proposed Nov 1992, Approved Dec 1992, Began data-taking Mar 1993, Completed data-taking Jul 1993)

STUDY OF ΛN SPIN–SPIN INTERACTION USING γ SPECTROSCOPY OF HYPERFRAGMENTS

TOKYO U – R S Hayano, T Ishikawa, A Kawachi, T Miyamoto, Y Shimizu, H Tamura (√ Spokesperson)
TOKYO U, INS – M Aoki, Y Fujita, H Outa, T Yamazaki
KEK – J Chiba, J Imazato

Accelerator KEK-PS *Detector* Spectrometer

Reactions

K^- Be $\rightarrow$	—
$K^-\,{}^{12}C \rightarrow$	—

Brief description Produces hyperfragments, such as ^{7}Li, in absorption of stopped K^- on ^{9}Be and ^{12}C. Measures γ-rays from hyperfragments in coincidence with π^- weak decays of the hyperfragments. The aim is to detect the $M1$ transition within a spin doublet in a hyperfragment ground state. Uses the Superconducting Toroidal Spectrometer.

Related experiments KEK-326

E-mail contact tamura@tkyvax.phys.s.u-tokyo.ac.jp, tkyvax::tamura

KEK-326

(Approved Mar 1994)

STUDY OF HYPERFRAGMENT PRODUCTION IN ABSORPTION OF STOPPED K^-

TOKYO U – R S Hayano, T Ishikawa, A Kawachi, K Kubota, H Tamura (Spokesperson)
TOKYO U, INS – H Outa, T Yamazaki
KEK – J Chiba, J Imazato

Accelerator KEK-PS *Detector* Spectrometer

Reactions

$K^-\,{}^7$Li $\rightarrow$	0 MeV/c
K^- Be $\rightarrow$	"

Brief description Produces hyperfragments, ^{3}H, ^{4}H, ^{5}He, and others, in absorption of stopped K^- on ^{7}Li and ^{9}Be. Measures spectra of π^- weak decays to study production rates of the hyperfragments. γ-rays from excited states of ^{4}H and other hyperfragments are measured in coincidence with the π^- measurements.

Related experiments KEK-287

E-mail contact tamura@tkyvax.phys.s.u-tokyo.ac.jp, tkyvax::tamura

KEK-BF-BELLE

(Proposed 1994, Approved Mar 1994, In preparation)

A STUDY OF CP VIOLATION IN B MESON DECAYS

BELLE COLLABORATION

Accelerator KEK-B-FACTORY *Detector* BELLE

Brief description KEK B-factory is expected to be capable of producing more than ten million B meson pairs each year. When the facility becomes operational, the proposed experiment will study various aspects of B meson physics, including the long-standing puzzle of the violation of CP symmetry. The collaboration consists of physicists from six countries and more than 36 institutions. The Letter of Intent has been accepted in March 94. Expected to begin data taking in 1988. For more information, please contact spokespersons, Dr. Shiro Suzuki [Nagoya U.], Dr. Stephen L. Olsen [Hawaii U.], or Dr. Fumihiko Takasaki [KEK].

E-mail contact shiro@kekvax.kek.jp, solsen@uhhepb.phys.hawaii.edu, fumihiko@kekvax.kek.jp

WWW Home-page http://bsun01.kek.jp/

LAMPF Experiments

LAMPF-645

(Proposed Nov 1980, Began data-taking Jun 1987, Completed data-taking Sep 1989)

A SEARCH FOR NEUTRINO OSCILLATIONS AT LAMPF

OHIO STATE U – L S Durkin, R Harper, T Y Ling (Spokesperson), J Mitchell, T A Romanowski (Spokesperson), E Smith, M Timko
ARGONNE – S Freedman, J Napolitano
LOUISIANA STATE U – W C Choi, A Fazeley, R Imlay, W J Metcalf
CAL TECH – B Fujikawa, R B McKeown
LOS ALAMOS – R D Carlini, J Donahue, G T Garvey, V D Sandberg
LBL – K Lesko

Accelerator LAMPF *Detector* Combination

Reactions

$\nu_e \rightarrow \nu_e$	0–53 MeV (T_{lab})
$\overline{\nu}_\mu \rightarrow \overline{\nu}_e$	"
$\nu_\mu \rightarrow \nu_\mu$	"
$\overline{\nu}_e\, p \rightarrow e^+\, n$	"

Brief description A search for neutrino oscillations in the first three reactions. The fourth reaction is the signature for the second reaction. Ran for 9000 hours.

Journal papers PRL 61 (1988) 1811.

E-mail contact ling@ohstpy.mps.ohio-state.edu, tar@ohstpy.mps.ohio-state.edu

LAMPF-849

(Proposed Nov 1983, Approved Jan 1984, Completed data-taking 1988)

A MEASUREMENT OF THE DIFFERENTIAL CROSS SECTION FOR $\pi^- p \rightarrow \pi^0 n$ AT 0° AND 180° IN THE MOMENTUM REGION 471–687 MeV/c

LOS ALAMOS – H W Baer, J D Bowman, M D Cooper, N S P King, J C Peng, E Piasetzky, N Stein
GEORGE WASHINGTON U – W J Briscoe (Spokesperson), M F Taragin
ABILENE CHRISTIAN U – M E Sadler (Spokesperson)
CATHOLIC U – D I Sober
TEL AVIV U – M A Moinester

Accelerator LAMPF *Detector* Spectrometer

Reactions

$\pi^- p \rightarrow \pi^0 n$	471–687 MeV/c
$\pi^- p \rightarrow \pi^- p$	"
$\pi^+ p \rightarrow \pi^+ p$	"

Brief description The charge exchange reaction is measured from 0° to 40° and 150° to 180°, the elastic scattering reactions at 180°. Ran for 594 hours.

E-mail contact mp0wjb@gwuvm.gwu.edu, sadler@acuvax.acu.edu

LAMPF-869

(Proposed Nov 1983, Approved Jan 1984, Completed data-taking 1988)

HIGHER PRECISION MEASUREMENT OF THE LAMB SHIFT IN MUONIUM

YALE U – A Badertscher (Spokesperson), S Dhawan, V W Hughes (Spokesperson), D C Lu, M Ritter, K Woodle
HEIDELBERG U, PHYS INST – M W Gladisch (Spokesperson), H Orth, G zu Putlitz
WILLIAM AND MARY COLL – M Eckhause, J Kane
MISSISSIPPI U – J Reidy
LOS ALAMOS – F G Mariam

Accelerator LAMPF *Detector* ?

Reactions

$\mu^+ e^- \rightarrow$ muonium	5 MeV/c

Brief description An extension of LAMPF-724. Measures the Lamb shift to 0.1% and the hfs interval in the $2^2P_{1/2}$ state to 1%. Uses a microchannel plate and UV sensitive PM's. Ran for 2046 hours.

Journal papers PRL 52 (1984) 914.

Related experiments LAMPF-724

E-mail contact hughes@yalph1.physics.yale.edu, hughes@yalehep.bitnet

LAMPF-876

(Proposed May 1984, Approved Aug 1984, Began data-taking Jun 1991, Completed data-taking Oct 1992)

SPIN TRANSFER MEASUREMENTS FOR NEUTRON–PROTON ELASTIC SCATTERING

LOS ALAMOS – K Koch, M W McNaughton (Spokesperson), I Supek, N Tanaka
TEXAS U – D A Ambrose, J D Johnson, K H McNaughton, P J Riley, A Smith
TEXAS A AND M – G Glass, J C Hiebert, L C Northcliffe, A J Simon
RICE U – D L Adams
RUTGERS U – D B Clayton, R D Ransome
ARGONNE – H M Spinka
MONTANA U – R H Jeppesen
WASHINGTON STATE U – G E Tripard

Accelerator LAMPF *Detector* Spectrometer

Reactions

$n\, p \rightarrow n\, p$	647, 800 MeV (T_{lab})

Brief description Measures the np spin-transfer parameters K_{NN}, K_{SS}, K_{LL}, and K_{LS} from 50° to 180° c.m. Requires an intense polarized source. Ran for 1254 hours.

Journal papers PR C44 (1991) 2267, and PR C48 (1993) 256.

Related experiments LAMPF-1309

E-mail contact mcnaught@lampf.lanl.gov

LAMPF-960

(Proposed Jul 1985, Approved Aug 1985, Began data-taking 1987, Completed data-taking 1988)

MEASUREMENT OF $\Delta\sigma_L$ IN FREE np SCATTERING BETWEEN 300 AND 800 MeV

ARGONNE – R Garnett, D Grosnick, D Hill, K F Johnson (✓ Spokesperson), D Lopiano, Y Ohashi, T Shima, H Spinka, R Stanek, D Underwood, A Yokosawa
LOS ALAMOS – J J Jarmer, S Penttila
NEW MEXICO STATE U – M Beddo, G R Burleson (✓ Spokesperson), J Faucett, S Gardiner, G Kyle
TEXAS A AND M – G Glass, R A Kenefick, S Nath, L C Northcliffe (✓ Spokesperson)
MONTANA U – R Jeppesen
WASHINGTON STATE U – G E Tripard
EARLHAM COLL – M Devereux
WUPPERTAL U – P Kroll

Accelerator LAMPF *Detector* Counter

Reactions Polarized beam and target

$n\, p \rightarrow n\, p$	300–800 MeV (T_{lab})

Brief description Measurements done at five energies. A new beam buncher allows time-of-flight neutron energy measurements. Detects neutrals with a forward directed neutron hodoscope. Ran for 2217 hours.

Journal papers PL B258 (1991) 24, NIM A309 (1991) 508, and PR D50 (1994) 104.

Related experiments NONE

E-mail contact fjohnson@lampf.lanl.gov, burleson@nmsu.edu, lcno@tamcomp.bitnet

LAMPF-969

(Proposed Jul 1985, Approved Aug 1985, Began data-taking Jun 1992, In progress)

MEGA — SEARCH FOR THE RARE DECAY $\mu^+ \to e^+\gamma$

MEGA COLLABORATION
UCLA – D Barlow, B M K Nefkens, B Tippens
CHICAGO U – J Crocker, S C Wright
FERMILAB – P S Cooper
HAMPTON U – L Tang
HOUSTON U – M Barakat, Y Chen, M Dzemidzic, J Flick, E V Hungerford, K Johnston, K Lan, B W Mayes, R Phelps, L Pinsky, W von Witsch
INDIANA U – J Knott, K M Stantz, J Szymanski
LOS ALAMOS – J F Amann, K Black, R D Bolton, M Brooks, S Carius, M D Cooper (✓ Spokesperson), W Foreman, C M Hoffman, G E Hogan, T Kozlowski, M Kroupa, D Lee, R E Mischke, F J Naivar, M A Oothoudt, C Pillai, R D Werbeck, D Whitehouse, C Wilkinson
QUEENS U, KINGSTON – A Hallin
STANFORD U – E B Hughes, C Jui, J N Otis, M W Ritter
TEXAS A AND M – C Gagliardi, G Kim, F Liu, R E Tribble, X Tu, L Van Ausdeln, X Zhou
VALPARAISO U, INDIANA – R Fisk, D D Koetke, R W Manweiler, S Stanislaus
VIRGINIA U – R Marshall, B Wright, K O H Ziock
VIRGINIA TECH – D Haim, L E Piilonen, Y Zhang, W Zhou
WYOMING U – A R Kunselman
YALE U – K Hahn, J Markey

Accelerator LAMPF *Detector* MEGA

Reactions Polarized beam

$\mu^+ \to e^+ \gamma$	0 MeV/c
$\mu^+ \to e^+ \gamma \nu \nu$	"

Particles studied μ^+

Brief description Also searches for a $V+A$ contribution to radiative decay. Approved for 4000 hours. Looks for $\mu^+ \to e^+\gamma$ at a level of 6×10^{-13}, a factor of 80 better than the Crystal Box detector. Took data in 1992/93 and scheduled for 1994/95.

Journal papers NIM A303 (1991) 298.

Related experiments PSI-R-87-03

E-mail contact cooper@lampf.lanl.gov

LAMPF-973

(Proposed Jul 1985, Approved Aug 1985, Began data-taking Oct 1985, Completed data-taking 1990)

SEARCH FOR NARROW RESONANCES IN THE $B = 2$ MISSING-MASS SPECTRUM FROM p He REACTIONS AND IN THE EXCITATION FUNCTIONS OF THE $pp\pi$ PRODUCTION

TEXAS U – M Barlett, D Ciskowski, G Hoffmann, G Pauletta (✓ Spokesperson), M Purcell
UDINE U – R Garfagnini, L Santi
MINNESOTA U – M Gazzaly
LOS ALAMOS – K Jones, C Morris, S Seestrom-Morris, N Tanaka
VIRGINIA U – L C Smith, R Whitney

Accelerator LAMPF *Detector* LAHRS

Reactions Polarized beam

$p\ ^3\mathrm{He} \to$ deut X	370, 630, 730, 800 MeV (T_{lab})
p He $\to$ trit X	"
p He $\to\ ^3$He X	"

Particles studied dibaryon

Brief description Ran for 72 hours in 1985, and additional 462 hours in 1990.

Journal papers PR C38 (1988) 2466.

E-mail contact pauletta@fnald.fnal.gov

LAMPF-981

(Proposed Jul 1985, Approved Aug 1985, Completed data-taking Oct 1988)

DO BOUND STATES OF REAL PIONS EXIST?

NORTHWESTERN U – M Artuso, G Garino, B Parker, K K Seth (Spokesperson), M Sethi, R Soundra

Accelerator LAMPF *Detector* Spectrometer

Reactions

π^- deut $\to \pi^+ n n \pi^-$	292 MeV (T_{lab})

Particles studied dibaryon

Brief description Searches for an $nn\pi^-$ bound state. Ran for 534 hours.

E-mail contact seth@numep2.phys.nwu.edu

LAMPF-1054

(Proposed Dec 1986, Approved Feb 1987, Began data-taking 1991, In progress)

ULTRAHIGH PRECISION MEASUREMENTS ON THE MUONIUM GROUND STATE: HYPERFINE STRUCTURE AND MUON MAGNETIC MOMENT

LOS ALAMOS – D Ciskowski
HEIDELBERG U, PHYS INST – K Jungmann, B Matthias, G zu Putlitz (Spokesperson)
SYRACUSE U – P A Souder (Spokesperson)
WILLIAM AND MARY COLL – M Eckhause, P Guss, J Kane
YALE U – S Dhawan, V W Hughes (Spokesperson)

Accelerator LAMPF *Detector* Other

Particles studied muon, muonium

Brief description An ultrahigh precision measurement of the muonium hyperfine structure interval $\Delta\nu$ and of the microwave magnetic moment ratio μ_μ/μ_p with the goal of determining $\Delta\nu$ to 5 ppb and μ_μ/μ_p to 50 ppb. Uses the microwave magnetic resonance spectroscopy method with an intense and pure subsurface μ^+ beam, a large superconducting homogeneous solenoid, and a line-narrowing method involving a chopped μ^+ beam. Approved for 1200 hours. Expected to run till 1995.

E-mail contact souder@suhep.phy.syr.edu, hughes@yalph1.physics.yale.edu, hughes@yalehep.bitnet

LAMPF-1072

(Proposed Jun 1987, Approved Aug 1987, Began data-taking Jun 1988, Completed data-taking Sep 1988)

THE pp ELASTIC ABSOLUTE CROSS SECTION

UCLA – E Gulmez, A G Ling, C A Whitten
LOS ALAMOS – J F Amann, M W McNaughton (Spokesperson), T Noro
RICE U – D L Adams
RUTGERS U – V R Cupps, R D Ransome
TEXAS A AND M – G Glass, A J Simon
TEXAS U – K H McNaughton, P J Riley

Accelerator LAMPF *Detector* Wire chamber, Counter

Reactions

$p\ p \rightarrow p\ p$ 500–800 MeV (T_{lab})

Brief description Measures the pp differential elastic cross section between 15° and 90° c.m., to an absolute accuracy of 1%. Ran for 732 hours.

Journal papers NIM A297 (1990) 7.

E-mail contact mcnaught@lampf.lanl.gov

LAMPF-1073

(Proposed Jun 1987, Approved Aug 1987, Began data-taking Jun 1988, Completed data-taking Jun 1988)

MEASUREMENT OF MUONIUM TO ANTIMUONIUM CONVERSION WITH IMPROVED SENSITIVITY

WILLIAM AND MARY COLL – M Eckhause, J R Kane, Y Kuang, M T Witkowski
HEIDELBERG U, PHYS INST – P Jungmann, B E Matthias, H J Mundinger, H J Rosenkranz, G zu Putlitz
MISSISSIPPI U – J Reidy
YALE U – H E Ahn, F Chmely, V W Hughes (Spokesperson), S H Kettell, B Ni, H R Schaefer (Spokesperson), K A Woodle

Accelerator LAMPF *Detector* Spectrometer, Wire chamber

Reactions

muonium → $\overline{\text{muonium}}$

Particles studied muonium

Brief description The proposed sensitivity is $G_{M\overline{M}} \approx 10^{-2}\ G_F$, an improvement by a factor 100 over previous experiments. Ran for 1590 hours.

Journal papers PRL 66 (1991) 2716.

Related experiments PSI-R-89-06

E-mail contact hughes@yalph1.physics.yale.edu, hughes@yalehep.bitnet

LAMPF-1085

(Proposed Jul 1987, Approved Aug 1987, Began data-taking Aug 1988, Completed data-taking Oct 1988)

TOTAL AND DIFFERENTIAL CROSS SECTIONS FOR $\pi^+ d \rightarrow pp$ BELOW 20 MeV

VIRGINIA U – K Giovanetti, R C Minehart (✓ Spokesperson), L C Smith
ARIZONA STATE U – T D Averett, B G Ritchie (✓ Spokesperson), D Rothenberger, J R Tinsley
SOUTH CAROLINA U – G S Blanpied, B M Preedom

Accelerator LAMPF *Detector* Counter

Reactions

π^+ deut → $p\ p$ 3.7, 5.0, 9.6, 15.2, 20.5 MeV (T_{lab})

Brief description Uses CD scintillator target. Ran for 613 hours.

Journal papers PRL 66 (1991) 568, and PR C47 (1993) 21.

Related experiments IUCF-CE-31

E-mail contact minehart@virginia.edu, ritchie@phyast.la.asu.edu

LAMPF-1096

(Proposed Dec 1987, Approved Jan 1988, Began data-taking Jun 1988, Completed data-taking Jul 1988)

STUDY OF THE $(\pi NN)_{T=2}$ BOUND SYSTEM BY $d(\pi^{\pm}, \pi^{\mp})$ REACTIONS

LOS ALAMOS – C L Morris (Spokesperson), J D Zumbro
TEL AVIV U – D Ashery (Spokesperson), J Lichtenstadt, E Piasetzky
ARGONNE – R Gilman
NEW MEXICO STATE U – M W Rawool
TEXAS U – B Boyer, A Fuentes, K Johnson, J McDonald, C F Moore, S Mordechai, M J Smithson, A Williams, S H Yoo

Accelerator LAMPF *Detector* Spectrometer, Counter

Reactions

π^+ deut → $p\ p\ \pi^+\ \pi^-$ 220–300 MeV (T_{lab})
π^- deut → $n\ n\ \pi^-\ \pi^+$ "

Brief description Measures the angular distribution of pions at 256 MeV lab kinetic energy in 5° or 10° steps and excitation functions at fixed angle and fixed momentum transfer at 220 and 300 MeV/c. The presumed $pp\pi^+$ and $nn\pi^-$ bound states decay only weakly in these charge states, so resonances should be narrow. Ran for 396 hours.

Journal papers PL B215 (1988) 41.

E-mail contact morris@lampf.lanl.gov, ashery@tauphy.tau.ac.il

LAMPF-1119

(Proposed Jun 1988, Approved Aug 1988, Began data-taking Aug 1988, Completed data-taking Oct 1988)

UNPOLARIZED DIFFERENTIAL CROSS SECTIONS FOR pd ELASTIC SCATTERING AT INTERMEDIATE ENERGIES

TEXAS A AND M – A J Simon
LOS ALAMOS – M W McNaughton, J R Santana
TEXAS U – M L Barlett, K H McNaughton, P J Riley
UCLA – S Beedoe, E Gulmez (Spokesperson), T Jaroszewicz, A G Ling, C A Whitten
RUTGERS U – V R Cupps
RICE U – D L Adams

Accelerator LAMPF *Detector* Wire chamber, Counter

Reactions

p deut → p deut 650, 800 MeV (T_{lab})

Brief description Measures the absolute pd elastic scattering cross sections from 35° to 115° c.m. at 650 MeV, and from 35° to 140° c.m. at 800 MeV, with a typical accuracy of (2–3)%. Uses MWPC's. Ran for 170 hours.

Journal papers NIM A297 (1990) 7, NIM A297 (1990) 17, and PR C43 (1991) 2067.

LAMPF-1135

(Proposed Jul 1988, Approved Aug 1988, Began data-taking Oct 1988, Completed data-taking Oct 1988)

FEASIBILITY STUDY OF TAGGED η MESON PRODUCTION IN $p\ ^3\text{H} \rightarrow\ ^4\text{He}\ \eta$

UCLA – D B Barlow (✓ Spokesperson), B M K Nefkens, C T Pillai (✓ Spokesperson), J W Price, M J Wang, J A Wightman
LOS ALAMOS – K W Jones, M J Leitch, C S Mishra (✓ Spokesperson), C L Morris, J C Peng
BOSKOVIC INST, ZAGREB – I Šlaus
TAIWAN, INST PHYS – P K Teng
ARIZONA STATE U – J M Tinsley

Accelerator LAMPF *Detector* LAHRS

Reactions Polarized beam

p trit → He η 756.5, 785, 800 MeV (T_{lab})

Brief description Aimed to obtain η's tagged by ^{4}He detectors for use in investigating rare and weak η decays. Problems with tritium targets prevented this study. Instead, the beam time was used to collect data on some of the background reactions. Ran for 92 hours.

Journal papers PR C45 (1992) 293. No other papers expected.

E-mail contact barlow@lampf.lanl.gov, pillai@lampf.lanl.gov, mishra@fnalv.fnal.gov

LAMPF-1173

(Proposed Jul 1989, Approved Jan 1990, Began data-taking Sep 1993, In progress)

SEARCH FOR $\overline{\nu}_\mu \leftrightarrow \overline{\nu}_e$ OSCILLATIONS WITH HIGH SENSITIVITY

LSND COLLABORATION
UC, RIVERSIDE – K McIlhany, I Stancu, W Strossman, G J VanDalen
UC, SAN DIEGO – W Vernon
UC, SANTA BARBARA – D Bauer, D O Caldwell, A Lu, S Yellin
EMBRY-RIDDLE AERONAUTICAL U – D Smith
UCIIRPA, SLAC – A Eisner, M Sullivan, Y Wang
LINFIELD COLL, OREGON – I Cohen
LOS ALAMOS – R D Bolton, R Burman, J Donahue, F J Federspiel, G T Garvey, W C Louis (√ Spokesperson), V Sandberg, M Schillaci, D H White, D Whitehouse
LOUISIANA STATE U – R M Gunasingha, R Imlay, W Metcalf
LOUISIANA TECH U – K Johnston
NEW MEXICO U – B B Dieterle, R Reeder
PENN U – M Albert, J Hill, A K Mann
SOUTHERN U – A Fazely
TEMPLE U – C Athanassopoulos, L B Auerbach, V Highland, J Margulies, D Works, Y Xiao

Accelerator LAMPF *Detector* LSND

Reactions

$\overline{\nu}_\mu \rightarrow \overline{\nu}_e$	< 53 MeV (T_{lab})
$\nu_\mu \rightarrow \nu_e$	< 250 MeV (T_{lab})
ν_e C $\rightarrow e^-$ nucleon	< 53 MeV (T_{lab})
ν_μ C $\rightarrow \mu^-$ nucleon	< 250 MeV (T_{lab})
ν C $\rightarrow \nu$ C*	"
ν_μ p $\rightarrow \nu_\mu$ p	"
ν_e e^- $\rightarrow \nu_e$ e^-	< 53 MeV (T_{lab})

Particles studied ν

Brief description A search for neutrino oscillations to the level $\sin^2\theta = 3 \times 10^{-4}$, where θ represents the mixing angle if there was two-generation mixing. Uses neutrinos produced by both at-rest and in-flight decaying pions. Neutrinos then interact in mineral oil (CH_2) target. The detector consists of a tank with 200 tons of liquid scintillator and with 1220 photomultiplier tubes mounted on the inside tank surface. Other physics goals include measurements of neutrino elastic, charged-current, and neutral-current scattering. Taking data (May 94).

Journal papers NIM A334 (1993) 353.

E-mail contact louis@lampf.lanl.gov

LAMPF-1178

(Proposed Jul 1989, Approved Aug 1989, In preparation)

POLARIZATION ASYMMETRY MEASUREMENTS FOR ^{1}H(π^-,π^0)n BETWEEN 45 AND 100 MeV

ARIZONA STATE U – R Alarcon, C Allgower, J R Comfort (√ Spokesperson), J Goergen, C Mertz
NEW MEXICO STATE U – G R Burleson (√ Spokesperson), G Kyle, B Park
LOS ALAMOS – S Greene, J Jarmer, S Penttila, M Rawool-Sullivan, Y F Yen
MINNESOTA U – D Dehnhard, C Edwards, M Espy, J Langenbrunner, M Palarczyk
ABILENE CHRISTIAN U – D Isenhower, M Sadler
BOSKOVIC INST, ZAGREB – A Marušić, I Supek
COLORADO U – S Hoibraten, J Peterson
OLD DOMINION U – A Klein
TEXAS U – G Hoffmann

Accelerator LAMPF *Detector* NMS

Reactions Polarized target

π^- p $\rightarrow \pi^0$ n	45 – 265 MeV (T_{lab})

Brief description Measures the analyzing powers from 15° to 135° c.m. This is the first measurement at such low energies. Uses the Neutral Meson Spectrometer (NMS). Expected to run in 1995.

Related experiments LAMPF-1256, LAMPF-1268

E-mail contact comfort@phyast.la.asu.edu, burleson@nmsu.edu

LAMPF-1179

(Proposed Jul 1989, Approved Aug 1989, Began data-taking Oct 1990, Completed data-taking Jul 1992)

REACTION $\pi^+p \rightarrow \pi^+\pi^0p$ NEAR THRESHOLD

VIRGINIA U – K A Assamagan, J P Chen, E Frlež, K J Keeter, R M Marshall, R C Minehart, D Počanić (√ Spokesperson), L C Smith
STANFORD U – G E Dodge, S S Hanna, B H King
LOS ALAMOS – J N Knudson

Accelerator LAMPF *Detector* Spectrometer, Plastic

Reactions

π^+ p $\rightarrow \pi^+$ π^0 p	265 – 375 MeV/c (P_{lab})
π^- p $\rightarrow \pi^0$ n	92 MeV/c (P_{lab})

Brief description Measures inclusive and exclusive cross sections for π^0 production near threshold in order to obtain a new constraint on the $I = 2$, s-wave $\pi\pi$ scattering length. Uses liquid hydrogen target, a π^0 spectrometer, and a plastic scintillator counter array. Ran for 520 hours.

Journal papers PRL 72 (1994) 1156.

Related experiments BNL-857

E-mail contact pocanic@virginia.edu

LAMPF-1188

(Began data-taking Oct 1987, In progress)

SEARCH FOR TIME REVERSAL SYMMETRY VIOLATION AND PARITY VIOLATION AT THE PROTON STORAGE RING

LOS ALAMOS – C D Bowman, J D Bowman (Spokesperson), J J Szymanski, V Yuan
PRINCETON U – D Benton, G Cates, K P Coulter, A B McDonald
HARVARD U – T E Chupp
CHALK RIVER, AECL – E D Earle

Accelerator LAMPF *Detector* Counter

Reactions Polarized beam and target

n nucleus	—

Brief description Searches for time reversal and parity violation in low-lying nuclear states. Preliminary results have detected parity violation in states of ^{139}La, ^{165}Ho, ^{232}Th, ^{235}U, and ^{238}U. The neutron beam is 57% polarized from 1 eV to 20 KeV. Continues taking data (May 94).

Journal papers PR C39 (1989) 1721, PRL 65 (1990) 1192, PRL 67 (1991) 564, and PR C44 (1991) 2187.

E-mail contact bowman@lampf.lanl.gov

LAMPF-1190

(Proposed Jul 1990, Approved Aug 1990, Began data-taking Aug 1991, Completed data-taking Jul 1992)

PION–PROTON INTEGRAL CROSS SECTION MEASUREMENTS

COLORADO U – S Hoibraten, M Holcomb, M D Kohler, J J Kraushaar, B J Kriss, S P Parry, R A Ristinen (√ Spokesperson), A Saunders, W R Smythe
LOS ALAMOS – C L Morris (√ Spokesperson), M Rawool-Sullivan, R M Whitton
TRIUMF – J T Brack
CAL STATE, SACRAMENTO – E F Gibson
MINNESOTA U – J L Langenbrunner

Accelerator LAMPF *Detector* Scintillator

Reactions

$\pi^+ p \rightarrow \pi^+ p$	40–500 MeV (T_{lab})
$\pi^- p \rightarrow \pi^- p$	80–450 MeV (T_{lab})
$\pi^- p \rightarrow \pi^0 n$	"

Brief description Measures the integral cross section for pions scattering outside 30° forward angle at 40 energies for π^+ and 18 energies for π^-. Uses a liquid hydrogen target. Tests the currently accepted phase shift predictions, and provides new data on πp elastic scattering.

Related experiments TRIUMF-322, TRIUMF-394, TRIUMF-471, TRIUMF-645

E-mail contact ristinen%spectr@vaxf.colorado.edu

LAMPF-1208

(Proposed Nov 1990, Approved Jan 1991, Began data-taking Jun 1991, In progress)

NEUTRON–PROTON BREMSSTRAHLUNG

LOS ALAMOS – J Koster, R O Nelson, M E Schillaci, S A Wender (Spokesperson)
UC, DAVIS – F P Brady
LIVERMORE – M Blann, V R Brown, D Krofcheck
GRENOBLE U – D Lebrun, H Nifenecker, J A Pinston
SASKATCHEWAN U – D Skopik

Accelerator LAMPF *Detector* Scintillator

Reactions

$n\ p \rightarrow n\ p\ \gamma$	50–400 MeV (T_{lab})

Brief description Measurements include γ detection, γ-p coincidence, and possibly triple γ-p-n coincidence. In progress (May 94).

E-mail contact wender@lanl.gov, wender@lampf.lanl.gov

LAMPF-1213

(Proposed Nov 1990, Approved Jan 1991, Began data-taking Aug 1992, Completed data-taking Oct 1993)

MEASUREMENT OF THE NEUTRINO CAPTURE CROSS SECTION IN ^{37}Cl AND ^{127}I WITH μ^+ DECAY NEUTRINOS

LOS ALAMOS – R L Burman, B T Cleveland
PENN U – T Daily, R Davis, J Distel, K Lande (Spokesperson), C K Lee, A Weinberger, P Wildenhain
WASHINGTON U, SEATTLE – W C Haxton
HERBERT LEHMAN COLL – J Ullman

Accelerator LAMPF *Detector* Other

Reactions

$\nu_e\ ^{37}\mathrm{Cl} \rightarrow e^-\ ^{37}\mathrm{Ar}$	—
$\nu_e\ ^{127}\mathrm{I} \rightarrow e^-\ ^{127}\mathrm{Xe}$	—

Particles studied ν

Brief description Measures neutrino capture cross sections for complex nuclei used in solar neutrino experiments. Checks the calibration of the Homestake chlorine solar neutrino detector. Uses neutrinos from μ^+ decay at the LAMPF beam stop and radiochemical methods of detection.

E-mail contact klande@mail.sas.upenn.edu

LAMPF-1231

(Proposed Dec 1992)

LASER POLARIZED MUONIC ATOMS AND SPIN DEPENDENCE OF NUCLEAR MUON CAPTURE

LOS ALAMOS – D Tupa
PRINCETON U – A S Barton, P Bogorad, G D Cates (Spokesperson), H Middleton
SYRACUSE U – R Holmes, J McCracken, P A Souder (Spokesperson), J Xu

Accelerator LAMPF *Detector* ?

Reactions Polarized target

$\mu^-\ ^3\mathrm{He} \rightarrow \mathrm{trit}\ \nu$	—

Brief description Studies the induced pseudoscalar coupling g_P for ^{3}He by measuring the angular correlation between the muon spin and the triton direction.

E-mail contact cates@pucc.princeton.edu, souder@suhep.phy.syr.edu

LAMPF-1234

(Proposed Nov 1990, Approved Jan 1991, Began data-taking Aug 1991, Completed data-taking Sep 1991)

K_{LL} AND P FOR np ELASTIC SCATTERING

LOS ALAMOS – K Koch, M W McNaughton (Spokesperson), I Supek
TEXAS U – D A Ambrose, P Coffey, K Johnston, K H McNaughton, P J Riley
TEXAS A AND M – G Glass, J C Hiebert, L C Northcliffe, A J Simon
COLORADO U – D J Mercer
RICE U – D L Adams
ARGONNE – H Spinka
MONTANA U – R H Jeppesen
WASHINGTON STATE U – G E Tripard
CENTRAL ARKANSAS U – H Woolverton

Accelerator LAMPF *Detector* JANUS, Spectrometer

Reactions

$n\ p \rightarrow n\ p$	500, 580, 650, 730 MeV (T_{lab})

Brief description Measures spin-transfer K_{LL} and asymmetry A_n in two independent ways. Uses a liquid deuterium target and the SCYLLA spectrometer. Clarifies a normalization discrepancy affecting older np data at LAMPF.

Journal papers PR C (submitted).

E-mail contact mcnaught@lampf.lanl.gov

LAMPF-1240

(Proposed Jul 1991, Approved Aug 1991, Began data-taking Aug 1992, Completed data-taking Aug 1993)

MEASUREMENT OF THE MICHEL PARAMETER ρ WITH THE MEGA POSITRON SPECTROMETER

CHICAGO U – S C Wright
FERMILAB – P S Cooper
HOUSTON U – Y Chen, M Dzemidzic, E V Hungerford, K Lan, B W Mayes, L Pinsky, W von Witsch
INDIANA U – J Knott, K M Stantz, J J Szymanski
LOS ALAMOS – J F Amann, R D Bolton, M D Cooper (√ Spokesperson), W Foreman, R Harrison, G Hart, G E Hogan, T Kozlowski, M A Kroupa, R E Mischke (√ Spokesperson), C Pillai, S Schilling, D Whitehouse
TEXAS A AND M – C Gagliardi, F Liu, R E Tribble, X L Tu, L A Van Ausdeln
VALPARAISO U, INDIANA – D D Koetke, R W Manweiler, S Stanislaus
VIRGINIA U – B Wright, K O H Ziock
VIRGINIA TECH – D Haim, L E Piilonen (√ Spokesperson), Y Zhang, W Zhou

Accelerator LAMPF *Detector* MEGA

Reactions Polarized beam

$\mu^+ \rightarrow e^+ \nu_e \bar{\nu}_\mu$	28 MeV/c

Brief description An improved measurement of the Michel parameter ρ. Ran for 336 hours.

E-mail contact cooper@lampf.lanl.gov, mischke@lampf.lanl.gov, piilonen@amy.phys.vt.edu

SUMMARIES OF LOS ALAMOS EXPERIMENTS

LAMPF-1256

(Proposed Dec 1991, Approved Jan 1992, In preparation)

$\pi^{\pm}p$ ANALYZING POWERS AT 45 AND 67 MeV

ARIZONA STATE U – R Alarcon, C Allgower, J R Comfort (√ Spokesperson), J Gorgen, C Mertz
NEW MEXICO STATE U – G R Burleson (√ Spokesperson), G Kyle, M Rawool-Sullivan
LOS ALAMOS – S Greene, J Jarmer, C Morris, J O'Donnell, S Penttila
MINNESOTA U – D Dehnhard, J Langenbrunner, M Palarczyk, C M Riedel, Y F Yen
ABILENE CHRISTIAN U – D Isenhower, M Sadler
BOSKOVIC INST, ZAGREB – I Supek
OLD DOMINION U – A Klein
TEXAS U – G Hoffmann
WYOMING U – G Rebka

Accelerator LAMPF *Detector* Spectrometer

Reactions Polarized target

$\pi^+ p \rightarrow \pi^+ p$	45, 67 MeV (T_{lab})
$\pi^- p \rightarrow \pi^- p$	"

Particles studied π^+, π^-

Brief description Measures the analyzing powers from 30° to 160° c.m. This is the first measurement at such low energies. Approved for 500 hours, but not yet scheduled to run.

Related experiments LAMPF-1178, LAMPF-1268

E-mail contact comfort@phyast.la.asu.edu, burleson@nmsu.edu

LAMPF-1267

(Proposed Jan 1992, Approved Jan 1992, Began data-taking Jul 1993, Completed data-taking Oct 1993)

ELASTIC SCATTERING OF π^+ FROM POLARIZED ^{3}He AT T_π = 100, 142, 180, AND 256 MeV

MINNESOTA U – B Davis, D Dehnhard (√ Spokesperson), C Edwards, M Espy, J Langenbrunner
NEW MEXICO STATE U – S Blanchard, G R Burleson (√ Spokesperson), B Lail, B Nelson, B Park, Q Zhao
TRIUMF & SIMON FRASER U – W Cummings, P Delheij, O F Haeusser (√ Spokesperson), R Henderson, W Lorenzen, D Thiessen
RUTGERS U – E Brash, M Jones
OHIO U – B Larson
KARLSRUHE U – B Brinkmoeller
TOHOKU U – K Maeda
LOS ALAMOS – C L Morris, S Pentilla, D Swenson, D Tupa

Accelerator LAMPF *Detector* Spectrometer

Reactions Polarized target

$\pi^+ {}^3\text{He} \rightarrow \pi^+ {}^3\text{He}$	100–256 MeV (T_{lab})

Particles studied π^+

Brief description Studies pion–nucleus reaction mechanism, and particularly the spin and energy dependence of the pion–neutron interaction in a nucleus. Uses optically pumped, high-density ^{3}He gas target with polarization reaching as high as 55% and the Large Acceptance Spectrometer (LAS).

Related experiments LAMPF-1300

E-mail contact dehnhard@lampf.lanl.gov, burleson@nmsu.edu, hausser@triumf.ca

LAMPF-1268

(Proposed Nov 1992)

$\pi^- p \rightarrow \pi^0 n$ CROSS SECTIONS IN THE REGION OF THE Δ RESONANCE

ABILENE CHRISTIAN U – L D Isenhower, J Redmon, M E Sadler (Spokesperson)
ARIZONA STATE U – J R Comfort, C Mertz
BOSKOVIC INST, ZAGREB – A Marušić, I Supek
CATHOLIC U – H Crannell, L Nguyen
COLORADO U – J Wise
GEORGE WASHINGTON U – W J Briscoe, J Connelley
LOS ALAMOS – J Amann, R Boudrie, C Morris, M Rawool, R M Whitton

Accelerator LAMPF *Detector* Spectrometer

Reactions

$\pi^- p \rightarrow \pi^0 n$	—

Brief description Measures the differential cross sections in the region of the Δ(1232) resonance. Uses elements of the Neutral Meson Spectrometer (NMS) to measure the two γ-rays from the π^0 decay, eliminating the difficulty of determining the efficiency of neutron counters. The goals are to provide accurate data for input to charge-dependent partial wave analyses, and to study the charge splitting of the Δ.

E-mail contact sadler@acuvax.acu.edu

LAMPF-1286

(Proposed Jul 1990, Approved Jan 1993, Began data-taking Aug 1993, Completed data-taking Sep 1993)

MEASURING THE NEUTRON–NEUTRON SCATTERING LENGTH AND EFFECTIVE RANGE USING THE ^{2}H(π^-, 2n)γ REACTION

LOS ALAMOS – C L Morris, A Obst, S Sterbenz, M Whitton
NORTHERN BRITISH COLUMBIA U – A H Hussein (√ Spokesperson), E Korkmaz
TRIANGLE UNIV NUCLEAR LAB, DURHAM – C Howell, C Roper, F Salinas, W Tornow, R Walter
BOSKOVIC INST, ZAGREB – I Šlaus
DUBNA – F Guber, E Pasyuk
TUBINGEN U – G Mertens
TEXAS U – C F Moore, C Whitley
COSTA RICA U – G F De Teramond
ALBERTA U – F C Khanna, G C Nielson

Accelerator LAMPF *Detector* NMS

Reactions

π^- deut $\rightarrow n\ n\ \gamma$	—

Brief description Uses stopped pions and liquid deuterium target. Measures low-energy *nn* scattering parameters. The reaction products are detected in triple coincidence.

E-mail contact hussein@unbc.edu

LAMPF-1293

(Proposed Dec 1992)

np ELASTIC ANALYZING POWER

LOS ALAMOS – M W McNaughton (Spokesperson), D Swenson, D Tupa, R York
TEXAS U – D A Ambrose, P Coffey, G Glass, K H McNaughton, P J Riley
TEXAS A AND M – J C Hiebert, L C Northcliffe
ARGONNE – H Spinka
MONTANA U – R H Jeppesen
WASHINGTON STATE U – G E Tripard
CENTRAL ARKANSAS U – H Woolverton
BOGAZICI U – E Gulmez
LOUISIANA TECH U – K Johnston
RUTGERS U – R Ransome
BOSKOVIC INST, ZAGREB – I Supek

Accelerator LAMPF *Detector* JANUS, Spectrometer

Reactions Polarized beam

$n\ p \rightarrow n\ p$	500, 650, 725, 800 MeV (T_{lab})

Brief description Uses LD2 and LH2 targets.

Related experiments LAMPF-1309

E-mail contact mcnaught@lampf.lanl.gov

LAMPF-1309

(Proposed Sep 1993, Approved Oct 1993, Began data-taking Oct 1993, Completed data-taking Oct 1993)

ANALYZING POWER AND SPIN TRANSFER MEASUREMENTS IN np INELASTIC CHANNEL

ARGONNE – H M Spinka
BOSKOVIC INST, ZAGREB – I Supek
TEXAS U – G Glass (✓ Spokesperson), P J Riley
MIT, LNS – E Lomon
LOS ALAMOS – K Auer

Accelerator LAMPF *Detector* Counter, Scintillator, Multiwire proportional chamber, Drift chamber

Reactions Polarized beam

$n\ p \rightarrow n\ p\ \pi^0$	790 MeV (T_{lab})
$n\ p \rightarrow p\ p\ \pi^-$	"
$n\ p \rightarrow p\ X$	"

Brief description This is an extension of the LAMPF-1293 experiment to measure the analyzing power for single pion production in the np interaction at 790 MeV. Uses a thick scintillator array and a veto counter to distinguish between np and pp final states. Targets are CH_2 and ^{12}C.

Related experiments LAMPF-402, LAMPF-876, LAMPF-1293

E-mail contact mp0gg@lampf.lanl.gov

LAMPF-1310

(Proposed Nov 1993)

MEASUREMENT OF THE DOUBLY DIFFERENTIAL CROSS SECTION FOR $\pi^- p \rightarrow \pi^+ \pi^- n$ AT 190 AND 200 MeV AND SOFT PION THEORY

WYOMING U – G A Rebka, Jr (Spokesperson)
LOS ALAMOS – P A M Gram (Spokesperson)
MICHIGAN U – D A Roberts (Spokesperson)
COLORADO COLL – C Bordner

Accelerator LAMPF *Detector* Spectrometer

Reactions

$\pi^-\ p \rightarrow \pi^+\ \pi^-\ n$	190, 200, 275, 330 MeV (T_{lab})

Brief description Pion production in πN scattering near threshold can test soft pion calculations, a low energy manifestation of QCD, and can measure reliably s-wave $\pi\pi$ scattering lengths. The goal of the experiment is to sample cross sections uniformly in the accessible portions of $(T, \cos\vartheta)$ phase space. Uses a double focusing spectrometer and associated instrumentation tested in previous LAMPF experiments of pion production and inclusive pion double charge exchange.

Related experiments LAMPF-099, LAMPF-337

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NOVOSIBIRSK Experiments

NOVOSIBIRSK-CMD-2

(Proposed 1984, Approved 1985, Began data-taking 1991)

THE CRYOGENIC MAGNETIC EXPERIMENT AT VEPP-2M

NOVOSIBIRSK, IYF – R R Akhmetshin, G A Aksenov, E V Anashkin, V M Aulchenko, B O Baibusinov, V S Banzarov, L M Barkov (Spokesperson), S E Baru, N S Bashtovoi, G A Blinov, A E Bondar, S I Eidelman, V E Fedorenko, G V Fedotovitch, A A Grebeniuk, D N Grigoriev, P M Ivanov, B I Khazin, A S Kuzmin, I A Loop, A V Maksimov, Y I Merzlyakov, A B Nomerotsky, V S Okhapkin, S G Pivovarov, T A Purlats, S I Redin, N M Ryskulov, Y M Shatunov, A I Shekhtman, M A Shubin, B A Shwartz, V A Sidorov, A N Skrinsky, V P Smakhtin, I G Snopkov, E P Solodov, V M Titov, I B Vasserman, Y V Yudin, V G Zavarzin, I V Zhuravkov
BOSTON U – D H Brown, L B Roberts, W Worstell
PITTSBURGH U – J A Thompson, C H Yang
YALE U – S K Dhawan, V W Hughes

Accelerator NOVO-VEPP-2M *Detector* CMD-2

Reactions

$e^+ e^- \rightarrow$ charged$^+$ charged$^-$ (chargeds) (neutrals)	0.36–1.4 GeV (E_{cm})

Particles studied ρ, ω, ϕ

Brief description Measures the hadronic part of the anomalous magnetic moment of the muon. Studies the dynamics of multihadron production and rare decays of vector mesons. The magnetic detector consists of a 1.5-tesla superconducting solenoid, drift chamber, Z-chamber, muon identification system, CsI barrel calorimeter, and BGO endcap calorimeter.

Journal papers NIM A252 (1986) 299, and NIM A283 (1989) 752.

NOVOSIBIRSK-SND

(Proposed 1986, Approved 1987, In preparation)

THE NEUTRAL-SPECTROMETER EXPERIMENT AT VEPP-2M

NOVOSIBIRSK, IYF – V M Aulchenko, T V Baier, A D Bukin, S I Dolinsky, V P Druzhinin, M S Dubrovin, I A Gaponenko, V B Golubev, P V Haustov, V N Ivanchenko, E V Pakhtusova, A A Salnikov, S I Serednyakov (✓ Spokesperson), Y M Shatunov, V A Sidorov, Z K Silagadze, A N Skrinsky, Y V Usov

Accelerator NOVO-VEPP-2M *Detector* SND

Reactions

$e^+ e^- \rightarrow \pi^0 \gamma$	<1.4 GeV (E_{cm})
$e^+ e^- \rightarrow \eta \gamma$	"
$e^+ e^- \rightarrow \omega \pi^0$	"
$e^+ e^- \rightarrow \phi \pi^0$	"
$e^+ e^- \rightarrow \eta \pi^+ \pi^-$	"
$e^+ e^- \rightarrow 4\gamma$	"
$e^+ e^- \rightarrow 5\gamma$	"
$e^+ e^- \rightarrow e^- e^+ 2\gamma$	"
$e^+ e^- \rightarrow e^- e^+ 3\gamma$	"
$e^+ e^- \rightarrow 2e^- 2e^+$	"
$e^+ e^- \rightarrow 2e^- 2e^+ \gamma$	"
$e^+ e^- \rightarrow$ 2pion	"
$e^+ e^- \rightarrow$ 3pion	"
$e^+ e^- \rightarrow$ 4pion	"
$e^+ e^- \rightarrow$ 5pion	"
$e^+ e^- \rightarrow$ 2pion γ	"

Particles studied K^0, ρ, ω, $f_0(975)$, $a_0(980)$, ϕ

Brief description Studies radiative and rare decays of vector mesons, nonresonant hadronic production, and neutral kaon decays. Tests quantum electrodynamics. The Spherical Neutral Detector (SND) consists of 1680 NaI(Tl) counters. Scheduled to run in 1994.

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PNPI Experiments

PNPI-SC-124

(Proposed 1986, Approved Apr 1986, Began data-taking Jun 1986, Completed data-taking Aug 1991)

MEASUREMENT OF THE SPIN ROTATION PARAMETERS A AND R IN $\pi^- p$ ELASTIC SCATTERING IN THE REGION OF LOW-LYING PION–NUCLEON RESONANCES

ST PETERSBURG, INP – V V Abaev, N A Bazhanov, V S Bekrenev, Y A Beloglazov, E P Fedorova-Koval, E A Filimonov, A I Kovalev, N G Kozlenko, S P Kruglov (√ Spokesperson), A A Kulbardis, L V Lapochkina, I V Lopatin, V V Polyakov, A B Starostin, V V Sumachev, I I Tkach, V Y Trautman

Accelerator PNPI *Detector* Optical spark chamber

Reactions Polarized target

$\pi^- p \rightarrow \pi^- p$	573–725 MeV/c

Brief description Measures for the first time the spin rotation parameters A and R in the $\pi^- p$ elastic scattering to the backward hemisphere. Typical statistical errors are smaller than 10%. The main parts of the setup are a polarized proton target with horizontal spin orientation and a polarimeter consisting of optical spark chambers with television readout.

Journal papers JPHY G13 (1987) L19, YF 48 (1988) 1338, and NP A567 (1994) 882.

PNPI-SC-129

(Proposed 1988, Approved 1988, Began data-taking 1989, Completed data-taking 1991)

MEASUREMENT OF VECTOR ANALYZING POWER iT_{11} IN REACTION $\pi^- d \rightarrow pp$ AT THE PION KINETIC ENERGY REGION 350–450 MeV

ST PETERSBURG, INP – N A Bazhanov, V A Efimovykh, O Y Fedorov, S I Kalentarova, A I Kovalev, V I Murzin, V V Polyakov, V I Popov, A N Prokofiev (√ Spokesperson), V A Shchedrov, A I Shvedchikov, V Y Trautman, V G Vovchenko, A A Zhdanov
DUBNA – E I Bunyatova, Y M Kazarinov, Y F Usov
KARLSRUHE U – E Boschitz, B Brinkmoeller, M Wessler

Accelerator PNPI *Detector* Counter

Reactions Polarized target

π^- deut $\rightarrow p\,p$	350–450 MeV (T_{lab})

Brief description Uses polarized deuterium target made from 1.5-mm diameter beads of fully deuterated propandiol $C_2O_2D_8$, chemically doped with a Cr(V) complex. The polarization is achieved by a dynamic nuclear polarization in a dilution refrigerator inside a 2.5 T magnetic field. Scintillation counter hodoscopes, time-of-flight and the energy loss measurements are used. A marked increase in the vector analyzing power with increasing incident pion energies is observed. Studies possible structure near $\sqrt{s}$ = 2.41 GeV.

Journal papers PR C47 (1993) 395.

PNPI-SC-147

(Proposed Jun 1990, Approved Jun 1990)

STUDY OF BINARY $\pi^- p$ REACTIONS WITH NEUTRAL PARTICLES IN THE FINAL STATE IN THE REGION OF $N(1440\,P_{11})$ AND $N(1535\,S_{11})$ RESONANCES

PNPI-UCLA-ACU COLLABORATION
ST PETERSBURG, INP – V V Abaev, V S Bekrenev, E A Filimonov, A B Gridnev, M R Kan, N G Kozlenko, S P Kruglov, L V Lapochkina, I V Lopatin (√ Spokesperson), A Y Mayorov, A B Starostin, V V Sumachev
CAL STATE, LA – R M Clajus, B M K Nefkens (√ Spokesperson), J W Price, D S White
ABILENE CHRISTIAN U – S E Garner, L D Isenhover, J P Phillips, J A Redmon, M E Sadler (√ Spokesperson)

Accelerator PNPI *Detector* Counter

Reactions

$\pi^- p \rightarrow n\,\eta$	665–715 MeV/c
$\pi^- p \rightarrow n\,\pi^0$	"

Brief description In the η production process, measures absolute yields near threshold.

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PSI Experiments

PSI-R-72-02

(Proposed Nov 1972, Approved 1973, Began data-taking 1976, Completed data-taking May 1988)

EXPERIMENTS WITH NEUTRON BEAMS

FREIBURG U – R Buechle, J Franz, V Grundies, A Klett, P Koncz, M Krauth, R Peschina, E Roessle (Spokesperson), H Schmitt (Spokesperson), L Schmitt

Accelerator PSI *Detector* Spectrometer

Reactions

$n\,p \to n\,p$	0.6–1.2 GeV/c
$n\,p \to$ X	"
n deut $\to n$ deut	"
n deut $\to$ X$^\bullet$	"

Particles studied n, p

Brief description Measures energy spectra and differential cross sections.

Journal papers PL B90 (1980) 367, PL B91 (1980) 214, PL B93 (1980) 384, ZPHY A298 (1980) 253, NIM 192 (1982) 407, PL B141 (1984) 170, ZPHY A316 (1984) 43, PL B153 (1985) 382, PL B158 (1985) 15, NP A472 (1987) 733, PL B213 (1988) 125, NP A490 (1988) 667, NP A510 (1990) 774, and NP A515 (1990) 541.

E-mail contact hasch@ibm.ruf.uni-freiburg.de

PSI-R-82-04

(Proposed Apr 1983, Approved May 1983, Began data-taking 1985, Completed data-taking Sep 1988)

PRECISE DETERMINATION OF THE BRANCHING RATIO $R = (\pi \to e\nu + e\nu\gamma)/(\pi \to \mu\nu + \mu\nu\gamma)$

BERN U – G Czapek, D Frei, M Hess, C Hug, E Hugentobler, W Krebs, U Moser (Spokesperson), D Muster, G Stucki
PSI, VILLIGEN – R Abela, D Renker, E Steiner

Accelerator PSI *Detector* Counter, Calorimeter

Reactions

$\pi^+ \to e^+\,\nu_e$	85 MeV/c

Particles studied π^+

Brief description The detector includes a 4π BGO calorimeter with an average thickness of 18 radiation lengths. The resolution for 100 MeV electrons is 4% FWHM.

Journal papers PRL 70 (1993) 17.

E-mail contact moser@lhep.unibe.ch

PSI-R-83-20-2

(Proposed Nov 1983, Approved Jan 1984, Began data-taking Jun 1984, Completed data-taking Nov 1989)

MEASUREMENT OF THE $2s - 2p$ ENERGY DIFFERENCE IN MUONIC ^{4}He AT LOW GAS DENSITY

ZURICH, ETH – P Hauser, H Hofer, F Kottmann (✓ Spokesperson), C Luechinger, R Schaeren, H P von Arb

Accelerator PSI *Detector* Counter

Particles studied μ^-

Brief description Measures the $2s$–$2p$ energy difference in muonic ^{4}He ions by means of laser spectroscopy. The He gas pressure is low enough (0.04 atm) to prevent collisional quenching of the metastable $2s$ state.

Journal papers PR A46 (1992) 2363.

Related experiments PSI-R-93-06

E-mail contact kottmann@cvax.psi.ch

PSI-R-83-29

(Proposed Dec 1983, Approved Jan 1984, Began data-taking Dec 1985, Completed data-taking 1988)

MEASUREMENT OF THE ξ PARAMETER IN μ DECAY

ZURICH, ETH – H Burkard, W Fetscher (Spokesperson), H-J Gerber, K Goering, K F Johnson, R von Dincklage
PSI, VILLIGEN – M Salzmann
MAINZ U, INST KERNPHYS – F Scheck

Accelerator PSI *Detector* Wire chamber

Reactions

$\mu^+ \to e^+\,\nu_e\,\bar{\nu}_\mu$	150 MeV/c

Particles studied μ^+

Brief description Ran for 600 hours.

Journal papers HPA 60 (1987) 1, and PL B194 (1987) 326.

E-mail contact fetscher@cvax.psi.ch

PSI-R-85-11

(Proposed 1985, Approved 1985, Began data-taking 1986, Completed data-taking 1988)

PION ABSORPTION ON TRITIUM

BASEL U – G Backenstoss (✓ Spokesperson), R Powers, P Salvisberg, M Steinacher, H J Weyer
KERNFORSCHUNGSZENTRUM, KARLSRUHE & KARLSRUHE U – A Hoffart, H Ullrich (✓ Spokesperson)
ZAGREB U – M Furić, T Petković

Accelerator PSI *Detector* Counter

Reactions

π^- trit $\to n\,n\,n$	50–220 MeV (T_{lab})
π^+ trit $\to p\,p\,n$	"
π^+ He	"
π^- He	"

Particles studied π^+, π^-

Brief description The $\pi^\pm$ He reactions are used to study quasifree $2N$ absorption and exclusive $3N$ absorption.

Journal papers NP A501 (1989) 765, NP A517 (1990) 413, and PR C46 (1992) 2172. No other papers expected.

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PSI-R-85-13-3

(Proposed Jan 1989, Approved Jan 1989, Began data-taking May 1989, In progress)

MEASUREMENT OF ELASTIC $\pi^\pm p$ SCATTERING BELOW 100 MeV

LEPS COLLABORATION
KARLSRUHE U – C Joram, W Kluge (✓ Spokesperson), R Wieser
TUBINGEN U – R Bilger, H Clement (✓ Spokesperson), K Foehl, K Heitlinger, G J Wagner
PSI, VILLIGEN – F Foroughi, A Konter, S Mango, B van den Brandt

Accelerator PSI *Detector* Spectrometer

Reactions Polarized target

$\pi^+\,p \to \pi^+\,p$	30 – 100 MeV (T_{lab})
$\pi^-\,p \to \pi^-\,p$	"

Particles studied π^+, π^-, p

Brief description Angular distribution of cross sections between 10° and 125° in the laboratory system and the analyzing power are measured to determine the s- and p-wave phase shifts below 100-MeV pion energy with high accuracy. The goal is a test of the chiral perturbation theory of QCD as outlined in a

series of papers by Gasser and Leutwyler *et al.* The size of the σ term evaluated from experimental data by means of forward dispersion relations is hereby the crucial number. Taking data (May 94).

Journal papers PR D40 (1989) 3568, NIM A297 (1990) 444, and RPP 54 (1991) 1251.

Related experiments PSI-R-85-13

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PSI-R-86-02

(Proposed Dec 1985, Approved Jan 1986, Began data-taking Sep 1986, Completed data-taking Dec 1989)

STUDY OF THE REACTION $\pi^- p \to \pi^+ \pi^- n$ IN THE REGION OF Δ DOMINANCE

ERLANGEN U – R Baran, U Bohnert, M Dillig, P Helbig, G Hermann, A Hofmann, O Jaekel, H Krueger, D Malz, W Menzel, R Mueller, H W Ortner (✓ Spokesperson), L Schweinzer, S Wirth

Accelerator PSI *Detector* Spectrometer

Reactions

$\pi^- p \to \pi^+ \pi^- n$ 350–450 MeV/c

Brief description Data were collected in a reasonable part of the phase space, in- and out-of-plane. Good statistics permits determination of the triple differential cross section. Uses a spectrometer (first arm) and MWPC-array (second arm). Target is liquid hydrogen.

Journal papers PRL 64 (1990) 2759, NP A511 (1990) 733, PR C47 (1993) 447, and PR C48 (1993) 981.

Related experiments CERN-SC-094

E-mail contact ojaekel@theorie3.physik.uni-erlangen.de

PSI-R-86-05

(Proposed Jun 1987, Approved Jun 1987, Began data-taking Nov 1988, In progress)

CRYSTAL DIFFRACTION OF PIONIC HYDROGEN AND DEUTERIUM X-RAYS

NEUCHATEL U – D Chatellard, J P Egger (Spokesperson), E Jeannet
ZURICH, ETH – A Badertscher (Spokesperson), P F A Goudsmit, H J Leisi, E Matsinos, H C Schroder, D Sigg, Z G Zhao
PSI, VILLIGEN – E C Aschenauer, K Gabathuler, L M Simons

Accelerator PSI *Detector* Photon spectrometer

Reactions

$\pi^- p \to \pi^- p$ X 0 MeV/c
π^- deut $\to \pi^-$ deut X "

Particles studied π^-

Brief description The aim is the determination of the πN s-wave scattering lengths directly at zero kinetic energy. Uses a bent crystal spectrometer, with CCD's as 3-KeV X-ray detectors. New data with improved spectrometer were taken in 1993.

Journal papers PL B261 (1991) 16, PW 3 (1993) 139, PL B299 (1993) 6, and NIM A335 (1993) 470.

Related experiments PSI-R-81-01

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PSI-R-86-14

(Proposed Apr 1986, Approved Apr 1986, Began data-taking Apr 1986, Completed data-taking Mar 1988)

EXPERIMENTS WITH POLARIZED NEUTRONS IN nE1: SPIN CORRELATIONS AND TOTAL CROSS SECTIONS

FREIBURG U – R Binz, J Franz, N Hamann, R Peschina-Klett, E Roessle, H Schmitt (✓ Spokesperson)
GENEVA U – P Demierre, G Gaillard, R Hess (✓ Spokesperson), C Leluc-Lechanoine, D Rapin
PSI, VILLIGEN – M Daum, J Jaccard, J A Konter, S Mango, B van den Brandt
SACLAY – F Lehar

Accelerator PSI *Detector* Wire chamber, Counter

Reactions Polarized beam and target

$n\,p \to p\,n$ 0.55–1.2 GeV/c

Particles studied n, p

Brief description Ran for 800 hours. Measured $\Delta\sigma_L$ and $\Delta\sigma_T$.

Journal papers PL B231 (1989) 323, NP A508 (1990) 267c, NP A533 (1991) 601, and HPA 65 (1992) 880.

E-mail contact hasch@ibm.ruf.uni-freiburg.de

PSI-R-87-01

(Proposed Nov 1986, Approved Jan 1987, Began data-taking Dec 1988, Completed data-taking 1993)

PRECISION MEASUREMENT OF THE MUON MOMENTUM IN PION DECAY AT REST

PSI, VILLIGEN – M Daum, R Frosch (✓ Spokesperson), D Herter, R Horisberger, M Janousch, P R Kettle, C Wigger
VIRGINIA U – K Assamagan
ZURICH, ETH – H Forrer
ZURICH U – C Broennimann, T Spirig

Accelerator PSI *Detector* Spectrometer

Reactions

$\pi^+ \to \mu^+ \nu_\mu$ 0 MeV/c

Particles studied ν_μ, π^+

Brief description Ran for 10 weeks. Measured the muon momentum to about 5 ppm, using the surface muon channel. Data analysis in progress (May 94).

Journal papers PL B265 (1991) 425.

E-mail contact frosch@cvax.psi.ch

PSI-R-87-03

(Proposed Nov 1986, Approved Jan 1987, Began data-taking 1989, In progress)

SEARCH FOR $\mu^- \to e^-$ CONVERSION WITH SINDRUM II

SINDRUM-II COLLABORATION
AACHEN, TECH HOCHSCH, III PHYS INST – G Cahsor, C Dohmen, H Haan, W Honecker, J Kaulard, G Otter, M Starlinger, P Wintz
PSI, VILLIGEN – W Bertl, J Egger, D Renker, J Zichy
SWIERK, INST ATOMIC ENERGY – T Kozlowski
ZURICH U – S Eggli, R Engfer, C Findeisen, E A Hermes, J Hofmann, H S Pruys, M Rutsche, A van der Schaaf (✓ Spokesperson)

Accelerator PSI *Detector* SINDRUM-II

Reactions

μ^- nucleus $\to e^-$ nucleus 0 MeV/c (P_{lab})

Particles studied μ^-

Brief description The goal is to study the neutrinoless $\mu^- \to e^-$ conversion in a muonic atom, which is a test of lepton flavor conservation. Data were taken on Ti in 1989 (results are published), on Pb in 1992, and on Ti again in 1993. With the new beam line which will become available by 1995, the sensitivity is expected to reach 10^{-14}. Active (May 94).

Journal papers NIM A327 (1993) 378, and PL B317 (1993) 631.

Related experiments LAMPF-969

E-mail contact vanderschaaf@cvax.psi.ch

SUMMARIES OF PSI EXPERIMENTS

PSI-R-87-08

(Proposed Dec 1986, Approved Jan 1987, Began data-taking May 1987, Completed data-taking 1990)

DIFFUSION OF MUONIC HYDROGEN ATOMS

WILLIAM AND MARY COLL – G Chen, A Hancock, J Kraiman, R Siegel (Spokesperson), W Vulcan, R Welsh
PSI, VILLIGEN – C Petitjean, A Zehnder
VIENNA, OAW – W Breunlich, P Kammel (Spokesperson), J Marton, J Zmeskal
MISSISSIPPI U – J Reidy (Spokesperson), H Wolverton
MUNICH, TECH U – F Hartmann

Accelerator PSI *Detector* Counter

Reactions

μ^-	34 MeV/c

Brief description Measures initial velocity distribution and scattering cross sections for $(\mu^- p)$ and $(\mu^- d)$ atoms in H_2 and D_2.

Journal papers PRL 63 (1989) 1942, and MCF 5/6 (1990) 43.

E-mail contact siegel@muon.physics.wm.edu

PSI-R-87-12

(Proposed May 1987, Approved Jun 1987, Began data-taking 1992, In progress)

$n\,p$ ELASTIC SCATTERING: AN EXPERIMENT WITH POLARIZED NEUTRONS

FREIBURG U – J Arnold, J Franz, R Koger, H Lacker, E Roessle, H Schmitt (√ Spokesperson), P Sereni, R Stachetzki
GENEVA U – A Ahmidouch, P Demierre, N Goujon, E Heer, R Hess (√ Spokesperson), Z E Janout, C Lechanoine-Leluc, C Mascarini, D Rapin, B Vuaridel
DUBNA – R Drevenak, M J Finger, M Slunecka
PSI, VILLIGEN – M Daum, J A Konter, S Mango, P A Schmelzbach, B van den Brandt
CHARLES U & DUBNA – M Finger
SACLAY – F Lehar

Accelerator PSI *Detector* Wire chamber, Counter, Drift chamber

Reactions Polarized target and beam

$n\,p \rightarrow n\,p$	0.5–1.2 GeV/c

Particles studied n, p

Brief description Two experiments are installed on the polarized beam line, one behind the other. The first one uses a polarized target working in the frozen spin mode, the second uses a liquid hydrogen target. The goal is to study the 2-spin and 3-spin transfer parameters K_{0PQ0}, D_{0P0R}, and N_{0PQR}. Uses drift and multiwire proportional chambers, magnetic spectrometer, and two polarimeters. More data taking is planned for 1994 and 1995.

Related experiments SATURNE-144

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PSI-R-89-01

(Proposed Jan 1989, May 1991, Approved Jan 1992, In preparation)

A PRECISE MEASUREMENT OF THE $\pi^+ \rightarrow \pi^0 e^+ \nu$ DECAY RATE

PIBETA ($\pi\beta$) COLLABORATION

VIRGINIA U – K A Assamagan, D Day, E Frlež, R M Marshall, J S McCarthy, R C Minehart, B E Norum, D Počanić (√ Spokesperson), S Ritt, O A Rondon-Aramayo, L C Smith, W A Stephens, B K Wright, K O H Ziock
PSI, VILLIGEN – M Daum, R Frosch, R Horisberger, D Renker
PSI, VILLIGEN & ZURICH U – C Broennimann, C Wigger
SOLTAN INST, SWIERK – T Kozlowski
ARIZONA STATE U – B G Ritchie
DUBNA – V A Baranov, S Jakovlev, I V Kisel, A S Korenchenko, S M Korenchenko, D B Kozaikin, N P Kravchuk, N A Kuchinsky, A Moiseenko, K G Nekrasov
TBILISI STATE U – Y Bagaturia, W Djordjadze, G Melitauri, D Mzavia, T Sachelashvili
BOSKOVIC INST, ZAGREB & ZAGREB U – T Petković, I Šlaus, I Supek

Accelerator PSI *Detector* Calorimeter, Wire chamber, Counter

Reactions

$\pi^+ \rightarrow \pi^0\, e^+\, \nu$	0 MeV/c
$\pi^+ \rightarrow e^+\, \nu$	"

Particles studied π^+, π^0

Brief description The aim is to determine the branching ratio for the $\pi^+ \rightarrow \pi^0 e^+ \nu$ decay to about 0.5% accuracy. The apparatus is a stopped-pion detector system designed to observe the two γ's from the π^0 decay, as well as the e^+. Uses a 4π CsI calorimeter (consisting of 240 pure crystals) with a good energy resolution, together with MWPC's, and counters. Target is active and consists of 77 plastic scintillation fibers 3×3 mm^2. Development runs are scheduled for 1992-94. Data taking is expected in late 1995.

Related experiments LAMPF-032

E-mail contact pocanic@virginia.edu

WWW Home-page http://psicla.psi.ch/www_lke_hn/r8901.html

PSI-R-89-06

(Proposed Mar 1990, Approved Apr 1990, Began data-taking Jul 1992, In progress)

SEARCH FOR SPONTANEOUS CONVERSION OF MUONIUM TO ANTIMUONIUM

HEIDELBERG U, PHYS INST – A Fachat, M Gabrysch, U Gottwald, K Jungmann (√ Spokesperson), B E Matthias, V Meyer, T Prokscha, I Reinhard, P V Schmidt, L Willmann, L Zhang, G zu Putlitz
ZURICH U – R Engfer, A Leuschner, R Menz, H S Pruys, W Reichart
PSI, VILLIGEN – R Abela, W Bertl (√ Spokesperson), D Renker, H K Walter
AACHEN, TECH HOCHSCH, III PHYS INST – D Kampmann, A Klaas, G Otter, R Seeliger
DUBNA – V Baranov, V Karpuchin, I Kisel, S Korentschenko, N Kuchinsky
TBILISI STATE U – J Bagaturia, D Mzavia, T Sakelashvili
YALE U – V W Hughes

Accelerator PSI *Detector* SINDRUM

Reactions

$\mu^+\, e^- \rightarrow \mu^-\, e^+$	20 MeV/c (P_{lab})

Particles studied μ^-, muonium

Brief description Studies lepton number violation. The μ^- is detected by its decay electron, the atomic e^+ is directly detected after acceleration by 10 kV. The reaction $\mu^+ \rightarrow e^+ e^- e^+ \nu\bar{\nu}$ is also studied. Target is the SiO_2 powder. First data were taken in 1992/93. Expected to run till 1996.

Related experiments LAMPF-1073

E-mail contact bertl@cvax.psi.ch

SUMMARIES OF PSI EXPERIMENTS

PSI-R-91-08

(Proposed Jun 1991, Approved Jul 1991, Began data-taking 1992, Completed data-taking Jul 1993)

MEASUREMENT OF THE STOPPING POWER FOR MUONS (μ^-, μ^+) AT ENERGIES BETWEEN 2 AND 40 keV

MUNICH, TECH U – P Baumann, H Daniel, F J Hartmann (Spokesperson), M Muehlbauer, R Schmidt, W Schott, P Wojciechowski
PSI, VILLIGEN – A Fuchs, P Hauser, K Lou, C Petitjean, D Taqqu (Spokesperson)
ZURICH, ETH – F Kottmann

Accelerator PSI *Detector* Combination

Reactions

μ^+ C	0.6–3.0 MeV/c
μ^- C	"

Particles studied μ^+, μ^-

Brief description The aim is to achieve stopping of muons in very-low-density targets by applying the phase space compression (PSC) method. The apparatus consists of a solenoid, parallel plate avalanche counter (PPAC), detector and target foils, and a micro-channel plate (MCP). Muon energy before and after crossing the target is determined by time-of-flight. Uses ultra-thin carbon foil and other various targets.

E-mail contact taqqu@cvax.psi.ch

PSI-R-92-08

(Proposed Dec 1991, Approved Jan 1992, Began data-taking Sep 1992, Completed data-taking Sep 1992)

MEASUREMENT OF THE PRODUCTION OF THERMAL MUONIUM IN VACUUM FROM SILICA AEROGELS

HEIDELBERG U, PHYS INST – B Braun, H Geerds, K Jungmann (Spokesperson), F Maas, B Matthias (Spokesperson), I Reinhard, W Schwarz, M Springer, L Willmann, L Zhang, G zu Putlitz
PSI, VILLIGEN – E Morenzoni
YALE U – V W Hughes

Accelerator PSI *Detector* Wire chamber

Particles studied μ^+

Brief description Studies the formation of thermal muonium in vacuum from targets of SiO_2 aerogels. Muonium atoms (μ^+e^-) are formed inside grains of the material and then diffuse to the surface and emerge from targets into the surrounding vacuum with thermal energies. The goal is to clarify the production process and develop more stable muonium production targets for future laser experiments and rare decays searches.

PSI-R-93-06

(Proposed May 1993, Approved Jun 1993, In preparation)

MEASUREMENT OF THE $3d - 3p$ TRANSITION IN MUONIC HYDROGEN WITH A COMPACT WAVEGUIDE FREE-ELECTRON LASER

MUH COLLABORATION
TRIESTE U – F Della Valle, E Milotti, C Rizzo, A Vacchi, E Zavattini (✓ Spokesperson)
ENEA, FRASCATI – F Ciocci, A Doria, G P Gallerano, L Giannessi, E Giovenale, G Messina, L Picardi, A Renieri, C Ronsivalle, A Vignati
NEUCHATEL U – D Chatellard, J P Egger, E Jeannet
ZURICH, ETH – F Kottmann
PSI, VILLIGEN – E C Aschenauer, P Hauser, C Petitjean, L M Simons, D Taqqu

Accelerator PSI *Detector* Counter

Particles studied μ^-

Brief description The main contribution to the QED corrections of binding energies in muonic atoms comes from the vacuum polarization. The goal is to test theoretical calculations by measuring the $3d$–$3p$ resonance in (μp). The final beam momentum, after slowdown in the cyclotron trap, is approximately 20 KeV/c. The reaction studied is the radiative cascade of the excited muonic hydrogen. In preparation (May 94).

Related experiments PSI-R-83-20-2

E-mail contact milotti@dfists.ts.infn.it

PSI-R-94-01

(Proposed Dec 1993, Approved Dec 1993, Began data-taking Jun 1994)

FEASIBILITY STUDY TO DETERMINE THE $\pi - \mu$ MASS RATIO

IOANNINA U – D F Anagnostopoulos
JULICH, FORSCHUNGSZENTRUM – G Borchert, H Gorke, D Gotta (✓ Spokesperson), S Lenz, O W B Schult
PARIS, CURIE UNIV VI, LPAN – D Belmiloud, P Indelicato
PSI, VILLIGEN – M Daum, R Frosch, P Hauser, L M Simons
NEUCHATEL U – D Chatellard, J P Egger, E Jeannet

Accelerator PSI *Detector* Spectrometer

Particles studied π^-, μ^-

Brief description Studies X-rays from muonic nitrogen, muonic oxygen, and pionic nitrogen. Uses a bent crystal spectrometer. Aims to determine the π^- mass to ± 1 ppm. Taking data (June 94).

PSI-Z-84-02

(Proposed Dec 1984, Approved Jan 1985, Began data-taking May 1986, Completed data-taking Jul 1988)

HIGH PRECISION ANALYZING POWER MEASUREMENTS OF PROTON–PROTON SCATTERING AT ENERGIES AROUND $E_p = 25$ MeV

ERLANGEN U – M Haller, W Kretschmer (Spokesperson), H Loeh, F Post, A Rauscher, R Schmitt, W Schuster, D Voetisch
ZURICH, ETH – M Bittcher, C Forstner, W Grueebler (Spokesperson), V Koenig, P A Schmelzbach, D Singy, J Ulbricht, B Vuaridel
BOSKOVIC INST, ZAGREB – I Šlaus

Accelerator PSI *Detector* Scintillator

Reactions Polarized beam

$p\,p \rightarrow p\,p$	25.68 MeV (T_{lab})

Particles studied p

Brief description Measures polarization transfer observables. Uses a windowless gas target. Data analysis in progress (May 94).

Journal papers NP A553 (1993) 661c. More publications to follow.

Related experiments PSI-Z-87-07

E-mail contact pi4kret@pkvx1.physik.uni-erlangen.de

PSI-Z-89-02

(Proposed Dec 1988, Approved Jan 1989, Began data-taking Sep 1989, Completed data-taking Jun 1991)

NEUTRON MAGNETIC FORM FACTOR

BASEL U – H Anklin, D Fritschi, J Jourdan (✓ Spokesperson), M Loppacher, G Masson, I Sick
UTRECHT U – E E W Bruins, F C P Joosse, H J J van Veen
TEL AVIV U – J Lichtenstadt
VIRGINIA U – D Day, B Groft, J Mitchell

Accelerator PSI *Detector* Plastic, Counter

Reactions

e^- deut $\rightarrow e^-$ n X	—
e^- deut $\rightarrow e^-$ p X	—

Particles studied n

Brief description Measures the ratio of cross sections $d(e,e'n)$ and $d(e,e'p)$. The neutron detector is calibrated with the $H(n,n'p)$ reaction. Aims at measurement of the form factor with an accuracy better than 2% at a momentum transfer of 1.69 fm^{-1}. Uses two plastic neutron detectors preceded by 3 ΔE plastic veto counters. Ran also at NIKHEF.

Journal papers PL B (accepted).

Related experiments PSI-R-91-13

E-mail contact jourdan@urz.unibas.ch

PSI-Z-89-06

(Proposed Dec 1988, Approved 1989, Began data-taking 1990, Completed data-taking 1991)

SPIN DEPENDENT TOTAL CROSS SECTION $\Delta\sigma_L$ IN np SCATTERING

BASEL U – J Goetz, C Gysin, P Haffter (Spokesperson), M Hammans, R Henneck, J Jourdan, S Robinson, I Sick
PSI, VILLIGEN – J A Konter, S Mango, B van den Brandt

Accelerator PSI *Detector* Counter

Reactions Polarized beam and target

n p	60 MeV (T_{lab})

Particles studied n, p

Brief description The transverse polarized proton beam is converted to a longitudinally polarized neutron beam.

Journal papers NP A548 (1992) 29.

Related experiments PSI-Z-91-02, SIN-Z-82-03

E-mail contact jourdan@urz.unibas.ch

PSI-Z-89-07

(Proposed Jan 1989, Approved Jan 1989, Began data-taking Jun 1989, Completed data-taking 1991)

$\vec{n}p$ RADIATIVE CAPTURE

BASEL U – P Haffter, M Hammans, R Henneck, J Jourdan, G S Masson (Spokesperson), S Robinson, I Sick

Accelerator PSI *Detector* Counter

Reactions Polarized beam

n $p \rightarrow$ deut γ	68 MeV (T_{lab})

Particles studied n, p

Brief description Studies analyzing power over a large angular range. NaI detectors measure the asymmetry of γ's observed in coincidence with deuterons.

Journal papers NP (accepted).

E-mail contact masson@urz.unibas.ch

PSI-Z-90-07

(Proposed Dec 1989, Approved Jan 1990, Began data-taking Jul 1991, In progress)

SEARCH FOR EXTENSIONS OF THE STANDARD MODEL BY A RELATIVE BETA POLARIZATION MEASUREMENT FROM POLARIZED NUCLEI

ZURICH, ETH – K Bodek, M Ferro-Luzzi, M Hadri, J Lang, S Navert, O Naviliat-Cuncic (√ Spokesperson), J Sromicki, E Stephan, J Zejma
LEUVEN U – J Camps, N Severijns
LOUVAIN U – J Deutsch, F Gimeno-Nogues, J Govaerts, I Pepe, R Prieels, E Thomas
WISCONSIN U – P A Quin

Accelerator PSI *Detector* Spectrometer

Reactions Polarized beam

p $^{12}C \rightarrow n$ ^{12}N	70 MeV/c

Brief description Measures the relative longitudinal polarization of positrons emitted from polarized $^{12}\vec{N}$ nuclei produced in the reaction $^{12}C(\vec{p},n)^{12}\vec{N}$. The detector is a beta spectrometer/polarimeter. In the first phase of the experiment, the 1% precision on the positron polarization ratio has been achieved. More data will be taken.

E-mail contact naviliat@imp.phys.ethz.ch

PSI-Z-90-12

(Proposed Jun 1990, Approved Jun 1990, Began data-taking 1989, In progress)

DEVELOPMENT OF A SUPERCONDUCTING NEUTRINO AND DARK MATTER DETECTOR

BERN U – M Abplanalp, K Borer, G Czapek, U Diggelmann, M Furlan, S Janos, U Moser, R Pozzi, K Pretzl (√ Spokesperson), K Schmiemann
ANNECY – D Perret-Gallix
PSI, VILLIGEN – J A Konter, S Mango, B van den Brandt

Accelerator PSI *Detector* Other

Brief description Uses 70 MeV neutrons to test a new detection method based on superheated superconducting granules (SSG). The experiment is a part of feasibility study of SSG devices for weakly interacting massive particle (WIMP) detection via elastic neutral scattering with nuclei. The detection principle is based on the phase transition from the metastable to the normal conducting state of a single granule due to a rise in temperature induced by the deposited energy of the recoiling nucleus.

Journal papers NIM A306 (1991) 572, NIM A330 (1993) 285, JLTP 93 (1993) 491, NIM A338 (1994) 544, and NIM A344 (1994) 239.

E-mail contact pretzl@cernvm.cern.ch

PSI-Z-91-02

(Proposed Dec 1990, Approved Dec 1990, Began data-taking Mar 1991, Completed data-taking 1992)

MEASUREMENT OF THE NEUTRON–PROTON SPIN CORRELATION PARAMETER AT FORWARD ANGLES

BASEL U – D Fritschi, J Goetz, P Haffter, M Hammans, R Henneck, J Jourdan, G Masson, M L Qin, S Robinson, I Sick, A Trzcinski, M Tuccillo, B Zihlmann (√ Spokesperson)
PSI, VILLIGEN – J A Konter, S Mango, B van den Brandt

Accelerator PSI *Detector* Counter

Reactions Polarized beam and target

p $n \rightarrow p$ n	72 MeV (T_{lab})

Particles studied n, p

Brief description Measures the spin correlation parameter A_{zz} in elastic $\vec{p}\vec{n}$ scattering over a wide range of forward angles. Uses plastic scintillator.

Related experiments PSI-Z-89-06

E-mail contact zihlmann@urz.unibas.ch

SATURNE Experiments

SATURNE-121

(Proposed Sep 1984, Approved Nov 1984, Began data-taking 1985, Completed data-taking 1991)

SEARCH FOR DIBARYONS OF STRANGENESS $S = -1$ BETWEEN THE ΛN AND ΣN THRESHOLDS

ORSAY, IPN – J P Didelez (√ Spokesperson), R Frascaria (√ Spokesperson), R Siebert, E Warde
SOUTH CAROLINA U – G Blanpied, G Pignault, B Preedom (√ Spokesperson)
NEUCHATEL U – E Bovet, J P Egger
CAEN U – J Yonnet
SACLAY – M Boivin, B Saghai
BONN U – J Ernst, T Mayer-Kuckuk

Accelerator SATURNE-II *Detector* SPES-IV, Counter

Reactions
$p\,p \rightarrow K^+\,X$ —

Particles studied dibaryon($S = -1$)

Journal papers NC 102A (1989) 561, NIM A333 (1993) 413, and NP A567 (1994) 819.

E-mail contact didelez@ipncls.in2p3.fr, frascaria@ipncls.in2p3.fr

SATURNE-129

(Proposed Nov 1985, Began data-taking 1985, Completed data-taking 1989)

EXCITATION FUNCTION OF THE REACTION $pp \rightarrow$ Dibaryon(2124) $\rightarrow \pi^0 pp$ AT 0°

ORSAY, IPN – J P Didelez (√ Spokesperson), M A Duval, R Frascaria (√ Spokesperson), G Rappenecker, T Reposeur, R Siebert, E Warde
SOUTH CAROLINA U – G Blanpied, B Preedom, M Rigney
NEUCHATEL U – E Bovet, J P Egger
FRASCATI – G Battistoni, C Bloise, L Satta
SACLAY – J M Laget, B Saghai
BONN U – F Hinterberger

Accelerator SATURNE-II *Detector* SPES-0

Reactions
$p\,p \rightarrow p\,p\,\pi^0$ 480–560 MeV (T_{lab})

Particles studied dibaryon, π^0

Brief description Measures total cross sections for proton incident energies in 20 MeV steps, by detecting the decay γ-rays of the π^0 at forward angles. Extracts isoscalar partial cross sections σ_{01} by comparison to the known total cross sections of the $np \rightarrow nn\pi^+$ measured at the same incident energies.

Journal papers NP A535 (1991) 445.

Related experiments SATURNE-134, SATURNE-209

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SATURNE-132

(Proposed Nov 1985, Approved Nov 1985, Began data-taking May 1986, Completed data-taking 1989)

STUDY OF CHARGED AND NEUTRAL PION PRODUCTION IN pp COLLISIONS AT 800 MeV

SACLAY – G Audit, R Babinet, F Brochard, J M Durand, Z Fodor, G Fournier, J Gosset (√ Spokesperson), D L'Hote, M C Lemaire, B Mayer, J Poitou, B Saghai (√ Spokesperson), J Yonnet
CLERMONT-FERRAND U – J Augerat, J Berthot, P Y Bertin, K Bouyakhlef, C Comptour, H Fonvieille

Accelerator SATURNE-II *Detector* DIOGENE

Reactions Polarized beam
$p\,p \rightarrow p\,p\,\pi^0$ 800 MeV (T_{lab})

Particles studied p

Brief description Studies total and partial cross sections, including σ_{01} (isoscalar cross section), and contributions of Δ resonance. Data analysis in progress (May 94).

Journal papers NP A (to be published).

Related experiments SATURNE-155, SATURNE-209

E-mail contact saghai@phnx7.saclay.cea.fr

SATURNE-134

(Proposed Oct 1985, Approved Nov 1985, Began data-taking Mar 1986, Completed data-taking 1989)

STUDY OF DEUTERON BREAKUP IN THE REACTION d Nucleus $\rightarrow pX$ AT 2.5 AND 3.72 GeV/c

ORSAY, IPN – J P Didelez, R Frascaria, E Warde
SACLAY – R Beurtey, M Boivin, F Plouin, J Yonnet (√ Spokesperson)
WILLIAM AND MARY COLL – C Lyndon, C F Perdrisat (√ Spokesperson), V Punjabi, P Ulmer
VIRGINIA U – P C Gugelot

Accelerator SATURNE-II *Detector* SPES-IV

Reactions Polarized beam
deut nucleus $\rightarrow p\,X$ 3.72 GeV/c

Particles studied p

Brief description Targets are H, He, C, Ti, and Sn. Measures the cross section and analyzing power T_{20} at 0°.

Journal papers PRL 59 (1987) 2840, PR C39 (1989) 608, and PR C42 (1990) 1899. No other papers expected.

Related experiments SATURNE-202

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SATURNE-140

(Proposed Oct 1985, Approved Nov 1985, Began data-taking Jul 1986, Completed data-taking 1989)

FIRST MEASUREMENT OF DIFFERENTIAL CROSS SECTIONS AND ANALYZING POWERS FOR THE REACTIONS $\vec{n}p \rightarrow pp\pi^-$ AND $\vec{n}p \rightarrow d\pi^+\pi^-$

SACLAY – R Beurtey, G Bruge, P Couvert, B Fabbro, J C Faivre, C Kerboul, J C Lugol, M Rouger, J Saudinos, B Silverman, Y Terrien (√ Spokesperson), F Wellers

Accelerator SATURNE-II *Detector* Combination

Reactions Polarized beam
$n\,p \rightarrow p\,p\,\pi^-$ 572–1134 MeV (T_{lab})
$n\,p \rightarrow$ deut $\pi^+\,\pi^-$ "

Particles studied p, $\pi^\pm$, deut

Brief description Uses 4π-acceptance detector. Studies asymmetries. Measures full kinematics, event by event.

Journal papers PL B294 (1992) 40. No further publications expected.

E-mail contact terrien@phnx7.saclay.cea.fr

SATURNE-144

(Proposed Oct 1985, Approved Nov 1985, Began data-taking Dec 1985, Completed data-taking Dec 1990)

NUCLEON–NUCLEON PROGRAM (PART II): np SCATTERING UP TO 1.2 GeV

SACLAY – J Ball, A de Lesquen, M de Mali, J M Fontaine, C D Lac, F Lehar (√ Spokesperson), F Perrot (√ Spokesperson), L van Rossum

GENEVA U – J Bach, G Gaillard, R Hess (Spokesperson), D Rapin, P Sormani
FREIBURG U – R Binz, A Klett, R Peschina, E Roessle, H Schmitt
DUBNA – L Barabash, Z Janout, B Khachaturov, Y Usov
ARGONNE – D Lopiano, H Spinka

Accelerator SATURNE-II *Detector* Combination

Reactions Polarized beam and target

$n\ p \rightarrow n\ p$	0.312–1.10 GeV (T_{lab})
$p\ p \rightarrow p\ p$	"

Particles studied p, n

Brief description Measures $np \rightarrow np$ and $pp \rightarrow pp$ using a polarized deuteron beam, and also $np \rightarrow np$ using a free polarized neutron beam (the polarized neutrons come from polarized deuteron breakup). Measures $\Delta\sigma_L$, $\Delta\sigma_T$, the correlation parameter, Wolfenstein parameters, and 3-spin index parameters. Compares results for free and quasifree scattering.

Journal papers PL B169 (1986) 241, JdeP 48 (1987) 985, NP B286 (1987) 635, PL B189 (1987) 241, NP B304 (1988) 673, ZPHY C40 (1988) 193, NP B358 (1991) 297, NIM A327 (1993) 308, NP A559 (1993) 477, NP A559 (1993) 489, NP A559 (1993) 511, and ZPHY C61 (1994) 53. Additional papers expected.

Related experiments SATURNE-225, PSI-R-87-12

E-mail contact lehar@frcpn11.in2p3.fr, hess@sc2a.unige.ch

SATURNE-145

(Proposed Jun 1987, Approved Nov 1987, Oct 1988, Began data-taking 1989, Completed data-taking 1990)

MEASUREMENTS OF A_{zz} AND P_z FOR THE REACTION $\vec{d}p \rightarrow \vec{p}pn$ IN COMPLETE KINEMATICS

ST PETERSBURG, INP – S L Belostotsky (Spokesperson), G A Korolev, O V Miklukho, V N Nikulin, M G Strikman, A A Vorobyov
BUDAPEST, CRIP – J Eroe
SACLAY – A Boudard (Spokesperson)

Accelerator SATURNE-II *Detector* SPES-IV

Reactions Polarized beam

deut $p \rightarrow p\ p\ n$	2 GeV (T_{lab})

Brief description A complete kinematics experiment to study the behavior of the s- and d-waves in the deuteron. Data analysis in progress (May 94).

E-mail contact boudard@phnx7.saclay.cea.fr

SATURNE-155

(Proposed Nov 1986, Approved Jun 1987, Completed data-taking Sep 1989)

ABNORMAL PRODUCTION OF LOW-ENERGY NEUTRAL PIONS IN THE REACTION $pA \rightarrow \pi^0 X$ BETWEEN 300 AND 420 MeV BEAM KINETIC ENERGY

SACLAY – D Bachelier, C Cerruti, J M Hisleur, J Julien (√ Spokesperson), B Saghai (√ Spokesperson)
GRENOBLE U – D Lebrun, V S Nguyen
KERNFORSCHUNGSANLAGE, JULICH – K Kilian
UPPSALA U – T Johansson
MOSCOW, INR – A Kurepin

Accelerator SATURNE-II *Detector* Counter, Spectrometer

Reactions

p nucleus $\rightarrow \pi^0$ X	300–420 MeV (T_{lab})

Brief description The goal is to check whether a structure observed in the charged pion production will also be found in the neutral pion production. Pions are detected by a lead glass Čerenkov telescope.

Journal papers ZPHY A347 (1994) 181.

Related experiments SATURNE-132, SATURNE-209

E-mail contact saghai@phnx7.saclay.cea.fr

SATURNE-166

(Proposed Feb 1988, Approved Jun 1988, Began data-taking Sep 1988, Completed data-taking 1991)

REACTION H$(d, 2p)n$ WITH POLARIZED DEUTERONS AT 200 MeV

GRENOBLE U – J P Bocquet, J Carbonell, L Ghedira, S Kox (Spokesperson), F Merchez, C Perrin, D Rebreyend
SACLAY – J Arvieux, A Boudard, M Garcon, J Yonnet
GENEVA U – G Gaillard
STRASBOURG, CRN – G Guillaume
RIKKYO U – T Motobayashi
UNIVERSITY COLL, LONDON – C Wilkin

Accelerator SATURNE-II *Detector* EMRIC

Reactions Polarized beam

deut $p \rightarrow p\ p\ n$	200, 350 MeV (T_{lab})

Brief description One of the aims is to demonstrate that the reaction ^{1}H$(d, 2p)n$ can be used to develop a new deuteron tensor polarimeter at intermediate energies. Measures the cross section and A_y, A_{xx}, and A_{yy}, with an upgraded EMRIC detector. The detector is composed of an array of 25 CsI crystals working in conjunction with two MWPC's.

Journal papers PL B233 (1989) 69, and PL B266 (1991) 264.

E-mail contact kox@frcpn11.in2p3.fr

SATURNE-173

(Proposed Oct 1987, Approved Jun 1987, Began data-taking Nov 1987, Completed data-taking Sep 1990)

SEARCH FOR DIBARYONIC STATES IN THE pp ANALYZING POWER EXCITATION FUNCTION

SACLAY – J Arvieux, R Beurtey (Spokesperson), M Boivin, J L Boyard, J C Duchazeaubeneix, J M Durand (Spokesperson), M Garcon, J Saudinos, J Yonnet
ORSAY, IPN – M P Combes-Comets, P Courtat, R Gacougnolle, Y Le Bornec, B Tatischeff, N Willis

Accelerator SATURNE-II *Detector* SPES-III

Reactions Polarized beam

$p\ p \rightarrow p\ p$	500–800 MeV (T_{lab})

Particles studied p

Brief description Uses the beam polarimeter of the SD2 extraction at SATURNE. The detector is a high-energy scintillator with a good angular resolution.

Journal papers PL B293 (1992) 27.

Related experiments KEK-174

E-mail contact yonnet@frcpn11.in2p3.fr

SATURNE-174

(Proposed 1987, Approved Oct 1987, Began data-taking May 1988, In progress)

PRODUCTION OF LIGHT MESONS X IN $pp \rightarrow ppX$ AT THRESHOLD AND IN NUCLEAR MATTER

STRASBOURG, CRN – A M Bergdolt, G Bergdolt, O Bing (√ Spokesperson), A Bouchakour, F Brochard, R Ernwein, F Hibou
ORSAY, IPN – M P Comets, P Courtat, Y Le Bornec, B Tatischeff, N Willis
SACLAY – M Boivin, B Nefkens, F Plouin
BEN GURION U – A Moalem

Accelerator SATURNE-II *Detector* SPES-III

Reactions

$p\ p \rightarrow p\ p\ \eta$	1256, 1258, 1260, 1265, 1300, 1350, 1450, 1550 MeV (T_{lab})

$p\ ^{12}C \rightarrow p\ p\ ^{11}B$	1260, 1450, 1550 MeV (T_{lab})
p deut $\rightarrow p$ deut X	905, 908 MeV (T_{lab})
$p\ p \rightarrow p\ p\ \eta'$	2420 MeV (T_{lab})

Particles studied η, η'

Brief description In the first phase of the experiment (1989), the η production near threshold in $pp \rightarrow pp\eta$, and bound states of η in $p\ ^{12}C \rightarrow pp(^{11}B\eta)$ were studied. The missing mass spectrum was reconstructed by detecting two protons in coincidence and at 0°. In 1990, the $\eta'(958)$ meson was analyzed, and the eta mass measured. In the 1994 run, measures the ω cross section in $pp \rightarrow pp\omega$ near threshold.

Journal papers PR D48 (1993) 2969.

Related experiments SATURNE-280

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SATURNE-177

(Proposed Oct 1988, Approved Jun 1988, Began data-taking 1989, Completed data-taking Oct 1989)

DEUTERON VECTOR POLARIZATION AND POLARIZATION TRANSFER COEFFICIENTS IN THE REACTION $\vec{p}\vec{p} \rightarrow d\pi^+$

SACLAY – M Boivin, B Bonin, A Boudard, G Bruge, P Couvert, J M Durand, M Garcon, C Kerboul, B Mayer (Spokesperson), Y Terrien, J Yonnet
ALBERTA U – R Abegg, L G Greeniaus, D A Hutcheon (Spokesperson), W J McDonald, G A Moss

Accelerator SATURNE-II *Detector* SPES-IV, POMME

Reactions Polarized beam

$p\ p \rightarrow$ deut π^+	1.2–2.9 GeV (T_{lab})

Particles studied deut

Brief description Measures analyzing power and angular distribution.

Journal papers NP A562 (1993) 352.

E-mail contact mayer@phnx7.saclay.cea.fr

SATURNE-186

(Proposed Oct 1987, Approved Dec 1987, Began data-taking 1988, In progress)

STUDY OF HEAVY MESON PRODUCTION IN REACTIONS $pd \rightarrow {}^3HeX$ AND $dd \rightarrow {}^4HeX$

STRASBOURG, CRN – O Bing, F Hibou
SACLAY – J Arvieux, M Boivin, J M Durand, F Plouin
ORSAY, IPN – L Bimbot, M P Comets, P Courtat, Y Le Bornec (Spokesperson), E Loireleux, F Reide, B Tatischeff, N Willis

Accelerator SATURNE-II *Detector* SPES-III

Reactions

p deut $\rightarrow {}^3$He X	900 – 2700 MeV (T_{lab})
deut deut $\rightarrow$ He X	1150 – 2150 MeV (T_{lab})

Particles studied deut, ^{3}He, He, meson

Brief description Studies the heavy meson production at proton energies between 900 and 2700 MeV, and deuteron energies 1150 and 2150 MeV. Measures the angular distribution.

Related experiments SATURNE-253

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SATURNE-190

(Proposed Mar 1988, Approved Dec 1988, Began data-taking 1989, Completed data-taking May 1991)

SPIN STRUCTURE OF THE Δ EXCITATION

ORSAY – D Bachelier, J C Jourdain
COPENHAGEN U – C Gaarde (Spokesperson)
SACLAY – P Zupranski (Spokesperson)

Accelerator SATURNE-II *Detector* SPES-IV

Reactions Polarized beam

deut $p \rightarrow {}^2$He $\Delta(1232\,P_{33})^0$	—

Brief description Measures T_{20} and T_{22}. A continuation of SATURNE-115. Data analysis in progress (May 94).

Related experiments SATURNE-115

E-mail contact gaarde@nbivax.nbi.dk, zupran@fuw.edu.pl

SATURNE-192

(Proposed Mar 1988, Approved Jun 1988, Began data-taking Jul 1988, Completed data-taking Sep 1988)

STUDY OF p Nucleus INTERACTIONS AT 0.8 AND 1.6 GeV

SACLAY – J Gosset, D L'Hote, M C Lemaire (✓ Spokesperson), B Lucas, J Poitou, O Valette
STRASBOURG, CRN – M P Gorodetzky (✓ Spokesperson)
CLERMONT-FERRAND U – J P Alard, J Augerat, N Bastid, P Charmensat, P Dupieux, J Marroncle, G Montarou (✓ Spokesperson), M J Parizet, D Quassoud, A Rahmani
ORSAY, IPN – D Bachelier, J L Boyard, B Faure, T Hennino, J C Jourdain, P Radvanyi, M Roy-Stephan
HEIDELBERG U, IHEP – D Pelte, M Trzaska

Accelerator SATURNE-II *Detector* Drift chamber

Reactions

p nucleus	0.8, 1.6 GeV (T_{lab})

Particles studied p, $\pi^{\pm}$

Brief description Charged pions and light nuclei have been measured in the interaction of proton beams with C, Nb, and Pb targets. A pictorial drift chamber of the DIOGENE large solid-angle detector has been used.

Journal papers PR C43 (1991) 2711.

E-mail contact lemaire@hep.saclay.cea.fr, goro@frcpn11.in2p3.fr, montarou@cernvm.cern.ch

SATURNE-197

(Proposed Mar 1988, Approved Jun 1988, Began data-taking Nov 1988, Completed data-taking 1988)

STUDY OF $pd \rightarrow {}^3$He X AT THRESHOLD FOR $X = \omega$ OR η' AND FOR $m_X = 1$–1.5 GeV/c^2

SACLAY – R Beurtey, M Boivin, W Briscoe, P Fleury, J Martino, B Mayer, A Moalem, F Plouin (Spokesperson)
ORSAY, IPN – D Bachelier, J L Boyard, T Hennino
UCLA – R Kessler, B M K Nefkens, J Price

Accelerator SATURNE-II *Detector* ?

Reactions

p deut $\rightarrow {}^3$He X	—

Particles studied ω, η', ϕ

Brief description A continuation of SATURNE-157.

Journal papers PL B276 (1992) 526

Related experiments SATURNE-157

E-mail contact plouin@frcpn11.in2p3.fr

SUMMARIES OF SACLAY EXPERIMENTS

SATURNE-198

(Proposed Mar 1988, Approved Dec 1988, Began data-taking Nov 1990, Completed data-taking 1991)

MEASUREMENTS OF SOME RARE DECAY MODES OF THE η

SACLAY – A Baldisseri, A Boudard, B Fabbro, M Garcon, W Jacobs, C Kerboul, B Mayer (√ Spokesperson), J Poitou, J Saudinos, E Tomasi, S Vigdor, F Wellers
UCLA – R Kessler, B M K Nefkens (√ Spokesperson), B Tippens, M Wang
ZURICH U – E A Hermes, C Niebuhr, A van der Schaaf
GEORGE WASHINGTON U – W Briscoe, A Petrov
TRIUMF – R Abegg, W T H van Oers
DUBNA – L Lytkin

Accelerator SATURNE-II *Detector* SPES-II

Reactions

p deut $\rightarrow {}^3$He η	> 896 MeV (T_{lab})

Particles studied η

Brief description Measures the η branching ratio to $\mu^+\mu^-$ with 12% accuracy. The muons are detected by a two-range telescope. Events are identified by using constraints like coplanarity, angular correlation, total energy conservation, and the invariant mass of the two muons.

Journal papers PRL 70 (1993) 892, and PR D50 (1994) 92.

E-mail contact mayer@phnx7.saclay.cea.fr, bnefkens@uclapp.physics.ucla.edu

SATURNE-202

(Proposed Oct 1988, Approved 1988, Began data-taking 1989, Completed data-taking 1992)

STUDY OF THE PROTON POLARIZATION IN $\vec{d}A \rightarrow \vec{p}X$ REACTION AT 0° AND 2.1 GeV

WILLIAM AND MARY COLL – E Cheung, C F Perdrisat (√ Spokesperson)
NORFOLK STATE U – V Punjabi
SACLAY – R Beurtey, M Boivin, F Plouin, J Yonnet (√ Spokesperson)
TRIUMF – R Abegg
VIRGINIA U – P C Gugelot
INDIANA U – W W Jacobs

Accelerator SATURNE-II *Detector* SPES-IV, POMME

Reactions Polarized beam

deut nucleus $\rightarrow p$ X	2.1 GeV (T_{lab})

Particles studied p

Brief description Measures the proton polarization and studies the d-state of the deuteron. This experiment required calibration of polarimeter POMME to 2.4 GeV. Data analysis in progress (May 94).

Journal papers PL B284 (1992) 210.

Related experiments SATURNE-249

E-mail contact yonnet@frcpn11.in2p3.fr, perdrisat@cebaf.gov

SATURNE-209

(Proposed Mar 1989, Approved 1989, Began data-taking 1990, Completed data-taking Nov 1991)

CROSS SECTION FOR THE REACTION $pp \rightarrow pp\pi^0$

BONN U – G Anton, J Arends, M Breuer, K Buchler, P Hoffmann-Rothe, G Noeldeke
SOUTH CAROLINA U – G Blanpied (√ Spokesperson), C Djalali, B Preedom, M Rigney
ORSAY, IPN – G Berrier-Ronsin, J P Didelez (√ Spokesperson), A Elayi, R Frascaria, E Hourani (√ Spokesperson), G Rappenecker, L Rosier, E Warde
FRASCATI – G Battistoni, C Bloise, L Satta
NEUCHATEL U – J P Egger
SACLAY – B Saghai

Accelerator SATURNE-II *Detector* SPES-0

Reactions Polarized beam

$p\,p \rightarrow p\,p\,\pi^0$	325–1000 MeV (T_{lab})

Particles studied π^0

Brief description Measures the differential and total cross sections for the reaction, from threshold to 1000 MeV. Uses the SPES0–2π detector and liquid H_2 target. Several publications in preparation (May 94).

Related experiments SATURNE-129, SATURNE-132, SATURNE-134, SATURNE-155

E-mail contact didelez@ipncls.in2p3.fr

SATURNE-212

(Proposed Feb 1989, Approved 1989, Began data-taking 1989, Completed data-taking 1990)

STUDY OF REACTIONS $\vec{p}p \rightarrow \Delta n$, AND $\vec{p}p \rightarrow \Delta\Delta$ AT 1500, 1800, AND 2100 MeV

ORSAY, IPN – M P Comets (Spokesperson), P Courtat, R Gacougnolle, Y Le Bornec, E Loireleux, F Reide (Spokesperson), B Tatischeff, N Willis
SACLAY – M Boivin

Accelerator SATURNE-II *Detector* SPES-III

Reactions Polarized beam

$p\,p \rightarrow \Delta(1232\,P_{33})^{++}\,n$	1.5, 1.8, 2.1 GeV (T_{lab})
$p\,p \rightarrow \Delta(1232\,P_{33})^{++}\,\Delta(1232\,P_{33})^0$	"

Particles studied $\Delta(1232\,P_{33})^{++}$

Brief description The Δ^{++} is detected by its decay products, p and π^+. Data analysis in progress (May 94).

SATURNE-213

(Proposed 1989, Approved 1989, Began data-taking 1994, In progress)

MEASUREMENT OF SPIN-DEPENDENT OBSERVABLES IN THE REACTION $pp \rightarrow pK^+Y^*$

DISTO COLLABORATION
SACLAY – J Arvieux, R Bertini (Spokesperson)
TURIN U & INFN, TURIN – S Bossolasco, M P Bussa, S Costa, L Fava, L Ferrero, R Garfagnini, A Grasso, A Maggiora, D Panzieri, G Piragino, E Rossetto, F Tosello, G Zosi
CAGLIARI U & INFN, CAGLIARI – F Balestra
DUBNA – I V Falomkin, V I Lyascenko, G M Maneva, G B Pontecorvo, A M Rozhdestvensky, M G Sapozhnikov, P P Temnikov, V I Travkin, V I Tretyak
KIEV, INR – A Kobushkin
INDIANA U – L C Bland, W W Jacobs, S E Vigdor

Accelerator SATURNE-II *Detector* Scintillator, Wire chamber

Reactions

$p\,p \rightarrow p\,K^+\,\Lambda$	—
$p\,p \rightarrow p\,K^+\,\Sigma^0$	—
$p\,p \rightarrow p\,K^+\,Y^*$(unspec)	—

Particles studied p, strange

Brief description The experiment measures differential cross sections and spin-dependent observables (analyzing power, asymmetry, and depolarization) between the threshold and the highest energy available at SATURNE-II. Studies a correlation between the measured observables and N^* and Y^* resonances. Uses a liquid hydrogen target. The detector, DISTO, consists of a magnet, MWPC's, and scintillation counters.

E-mail contact bertini@frcpn11.in2p3.fr

SUMMARIES OF SACLAY EXPERIMENTS

SATURNE-220

(Proposed Jun 1990, Approved Dec 1990, Began data-taking Mar 1991, Completed data-taking 1991)

SEARCH FOR THE EXCITATION OF THE ROPER RESONANCE (1440) BY INELASTIC SCATTERING OF α PARTICLES

SACLAY – M Boivin, H P Morsch (✓ Spokesperson), F Plouin, B Saghai, J Yonnet, P Zupranski
ORSAY, IPN – J P Didelez, R Frascaria (✓ Spokesperson), M Morlet, R Siebert, E Warde
JULICH, FORSCHUNGSZENTRUM & STOCKHOLM U – P E Tegner

Accelerator SATURNE-II *Detector* SPES-IV

Reactions

He $p \rightarrow$ He X	4.2 GeV (T_{lab})

Brief description Studies the baryon excitation in the αp system, from the pion threshold up to the Roper resonance. Uses the α beam up to 7 GeV/c. Inelastically scattered alpha particles are detected by the SPES-IV spectrometer. Uses LH2 target.

Journal papers PRL 69 (1992) 1336

Related experiments SATURNE-251

E-mail contact morsch@frcpn11.in2p3.fr

SATURNE-222

(Proposed Nov 1989, Approved 1989, Began data-taking 1990, Completed data-taking 1993)

MESON PRODUCTION NEAR THRESHOLD FROM THE ϕ TO THE $f_1(1285)$

ORSAY, IPN – J P Didelez, M A Duval, R Frascaria, M Morlet, R Siebert (Spokesperson), E Warde
SACLAY – J Arvieux, F Plouin
BONN U – J Bisplinghoff, J Ernst, F Hinterberger, R Jahn (Spokesperson), R Joosten, U Lahr, C Lippert, A Marx, R Wurzinger

Accelerator SATURNE-II *Detector* SPES-IV

Reactions

p deut $\rightarrow$ ^{3}He X	—

Particles studied ϕ, $f_1(1285)$

Brief description Extends and refines existing measurements of the threshold excitation curve of meson production. An increasing degree of exclusivity is achieved by adding scintillator arrays to the SPES-IV detector. In the second phase, during 1992/93, the regions around the K^+K^0 threshold, and above 1.9 GeV, are explored in 100 MeV steps.

E-mail contact siebert@ipncls.in2p3.fr

SATURNE-225

(Proposed Dec 1989, Approved Jun 1991, Began data-taking Nov 1991, In progress)

DETERMINATION OF THE NUCLEON–NUCLEON SCATTERING AMPLITUDES IN THE ENERGY REGION FROM 1.1 TO 2.7 GeV AND A SEARCH FOR A STRUCTURE AROUND T_{kin} = 2.1 GeV

SACLAY – J Ball (✓ Spokesperson), J Bystricky, P A Chamouard, M Combet, A de Lesquen, M de Mali, J M Fontaine (✓ Spokesperson), R Kunne, J M Lagniel, F Lehar, J L Lemaire, G Milleret, J L Sans
GENEVA U – P Demierre, R Hess (✓ Spokesperson), Z Janout, Jr , D Rapin, B Vuaridel
ARGONNE – C Allgower, M Beddo, D Grosnick, D Hill, T Kasprzyk, D Lopiano, H Spinka (✓ Spokesperson)
DUBNA – L S Barabash, E I Bunyatova, V A Kalinnikov, Y M Kazarinov, B A Khachaturov (✓ Spokesperson), V N Matafonov, I L Pisarev, A A Popov, Y A Usov
DUBNA & PRAGUE, TECH U – Z F Janout
ST PETERSBURG, INP – A N Prokofiev, V Vikhrov, A A Zhdanov
UCLA – A Boutefnouchet, V Ghazikhanian, S Trentalange, C A Whitten
MIT, LNS – E L Lomon

Accelerator SATURNE-II *Detector* Combination

Reactions Polarized beam and target

$p\,p \rightarrow p\,p$	1.1 – 2.7 GeV (T_{lab})
$p\,n \rightarrow p\,n$	"

Particles studied p, n

Brief description Uses a polarized proton beam and polarized proton and deuteron targets. Measures complete sets of spin-dependent observables in pn quasielastic scattering between 1.1 and 2.7 GeV. Dedicated pp spin-dependent observables are measured between 1.8 and 2.7 GeV in small steps of energy. The measuring apparatus consists of a two-arm spectrometer, one arm being a polarimeter, and two large neutron-counter hodoscopes. The direction of beam polarization is measured by three additional beam polarimeters. Taking data (May 94).

Journal papers NIM A327 (1993) 308, and PL B320 (1994) 206.

Related experiments SATURNE-144, SATURNE-216

E-mail contact ball@frcpn11.in2p3.fr, jmfont@frcpn11.in2p3.fr, hess@sc2a.unige.ch, hms@hep.anl.gov, khachaturov@main1.jinr.dubna.su

SATURNE-235

(Proposed Jan 1991, Approved Jan 1991, Dec 1991, Began data-taking Jul 1991, Completed data-taking 1993)

CALIBRATION OF POLDER, A NEW DEUTERON TENSOR POLARIMETER AT INTERMEDIATE ENERGIES

GRENOBLE U – J P Bocquet, C Furget, S Kox (Spokesperson), C Perrin, J S Real, D Rebreyend, E Voutier
SACLAY – M Garcon, E Tomasi-Gustafsson
ORSAY – L Bimbot, C Djalali, M Morlet, L Rosier, A Willis
RUTGERS U – G Edwards, C Glasshauser
SOUTH CAROLINA U – B Johnson

Accelerator SATURNE-II *Detector* POLDER

Reactions Polarized beam

deut $p \rightarrow p\,p\,n$	200 – 400 MeV (T_{lab})

Brief description Dedicated to the calibration of a new tensor polarimeter based on the H$(d, 2p)n$ reaction. The polarimeter is to be operated in the deuteron energy range between 200 and 400 MeV. POLDER is particularly well designed for the T_{20} measurement of the recoiling deuteron in $(e, e'd)$ scattering at large momentum transfers.

E-mail contact kox@frcpn11.in2p3.fr

SATURNE-237

(Proposed Nov 1990, Approved Jan 1991, Began data-taking Jul 1991, In progress)

STUDY OF THE $pp \rightarrow pp\eta$ AND (p, η) REACTIONS ON NUCLEI AT $T_p > 1.26$ GeV

PINOT COLLABORATION
TURIN U & INFN, TURIN – E Chiavassa, N De Marco (✓ Spokesperson), C De Oliveira Martins, G Dellacasa, F Ferrero, M Gallio, P Guaita, A Musso, A Piccotti, E Scomparin, E Vercellin (✓ Spokesperson)
SACLAY – J M Durand, G Milleret

Accelerator SATURNE-II *Detector* PINOT

Reactions

$p\ p \rightarrow p\ p\ \eta$	>1.26 GeV (T_{lab})
p nucleus $\rightarrow \eta$ X	"
p deut $\rightarrow \eta$ X	"

Particles studied η

Brief description The aim is to study the first two reactions near threshold by detecting η mesons with the two-arm neutral meson spectrometer, PINOT. For the first reaction the total and doubly differential cross section $d^2\sigma/d\Omega dT$ is measured. The (p, η) reaction on nuclei is studied at the same incident energies by measuring the η kinetic energy distributions for η's emitted forward in the laboratory. Also investigates the $pd \rightarrow \eta X$ reaction in order to extract information on the $pn \rightarrow \eta X$ elementary process, by comparing pd and pp induced reactions. Uses the following targets: liquid H_2 and D_2, C, Al, Cu, Mo, W, Au, and Ti. Taking data (May 94).

Journal papers NP A538 (1992) 121c, ZPHY A342 (1992) 107, JPHY G19 (1993) L51, NC 106A (1993) 861, ZPHY A344 (1993) 345, and PL B322 (1994) 270.

Related experiments SATURNE-125

E-mail contact demarco@to.infn.it, vercellin@to.infn.it

SATURNE-244

(Proposed Apr 1991, Approved Jun 1991, Began data-taking 1991, Completed data-taking Sep 1991)

STUDY OF THE REACTION $\vec{p}p \rightarrow \pi^-\pi^- X$

ORSAY, IPN – L Bimbot, M P Comets, P Courtat, R Gacougnolle, T Kirchner, Y Le Bornec, F Reide, B Tatischeff (√ Spokesperson), N Willis
SACLAY – M Boivin, J Yonnet
STRASBOURG, CRN – A M Bergdolt, G Bergdolt, O Bing, F Hibou, A Taleb

Accelerator SATURNE-II *Detector* SPES-III

Reactions Polarized beam

$p\ p \rightarrow \pi^-\ \pi^-$ X	2.7 GeV (T_{lab})

Particles studied dibaryon

Brief description Studies the two-pion invariant mass and production of high isospin dibaryons, particularly exploiting the mass region around 2.156 GeV/c^2. Analysis in progress (April 94).

E-mail contact tati@frcpn11.in2p3.fr

SATURNE-246

(Proposed May 1991, Approved Jun 1991, Began data-taking 1992, Completed data-taking 1992)

π^0 PRODUCTION IN THE REACTION $dp \rightarrow {}^3He\ \pi^0$ NEAR THRESHOLD

SACLAY – A Baldisseri, A Boudard, B Fabbro, M Garcon, B Mayer (√ Spokesperson), F Plouin, J Poitou, J Saudinos, E Tomasi
UCLA – B M K Nefkens (√ Spokesperson), B Tippens, M Wang
DUBNA – L Lytkin
ZURICH U – C Niebuhr, A van der Schaaf
GEORGE WASHINGTON U – W Briscoe
TRIUMF – R Abegg, W T H van Oers

Accelerator SATURNE-II *Detector* SPES-II

Reactions Polarized beam

deut $p \rightarrow {}^3$He π^0	0.4 GeV (T_{lab})

Particles studied π^0

E-mail contact mayer@phnx7.saclay.cea.fr, bnefkens@uclapp.physics.ucla.edu

SATURNE-249

(Proposed Oct 1991, Approved Dec 1991, Began data-taking 1992, Completed data-taking 1993)

POLARIZATION TRANSFER IN ELASTIC BACKWARD DEUTERON PROTON SCATTERING

SACLAY – J Arvieux, M Boivin, A Boudard, E Thomasi-Gustaffson
WILLIAM AND MARY COLL – E Cheung, C F Perdrisat (√ Spokesperson), R Pourang
NORFOLK STATE U – V Punjabi (√ Spokesperson)
DUBNA – V Ladygin, L Penchev, N Piskunov, I Sitnik (√ Spokesperson), E Strokovsky
ST PETERSBURG, INP – S Belostotsky, V Vikhrov
KIEV, ITF – A Kobushkin

Accelerator SATURNE-II *Detector* SPES-IV

Reactions Polarized beam

deut $p \rightarrow$ deut p	300–2300 MeV (T_{lab})

Particles studied deut, p

Brief description Studies the structure of deuteron at high energies, in kinematics in which the nucleon–pion picture of nuclei fails and manifestations of quark–gluon degrees of freedom might be already significant. Measures the vector polarization transferred to the proton and the tensor analyzing power T_{20} of the reaction. Data analysis in progress (May 94).

Related experiments SATURNE-202

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SATURNE-251

(Proposed Nov 1992, Approved Dec 1992, Began data-taking Mar 1993, Completed data-taking Oct 1993)

SEARCH FOR THE EXCITATION OF THE ROPER RESONANCE (1440) IN NUCLEI

SACLAY – M Boivin, J L Boyard (√ Spokesperson), F Fuchs, R Kunne, H P Morsch (√ Spokesperson), F Plouin, P Radvanyi, W Spang
ORSAY, IPN – T Hennino, J C Jourdain, B Ramstein, M Roy-Stephan, S Rusteau
JULICH, FORSCHUNGSZENTRUM – V Jaeckle
WARSAW U – P Zupranski
STOCKHOLM U – P E Tegner
RENSSELAER POLY – L Murphy, P Stoler

Accelerator SATURNE-II *Detector* SPES-IV

Reactions

He deut $\rightarrow$ He X	4.2 GeV/c
He ^{12}C $\rightarrow$ He X	"

Brief description Studies the spectrum of alpha particles. Searches for the excitation of the Roper resonance. Uses LD2, solid C, and CH_2 targets. Data analysis in progress (June 94).

Related experiments SATURNE-220

E-mail contact morsch@frcpn11.in2p3.fr

SATURNE-253

(Proposed Nov 1991, Approved Dec 1991, Began data-taking Mar 1992, Completed data-taking 1992)

MEASUREMENTS OF THE POLARIZATION TENSOR AND THE PROBABILITY OF THE SPIN-FLIP IN THE REACTION $^{12}C(d, d')^{12}C$ AT 400 MeV

GRENOBLE U – J P Bocquet, C Furget, S Kox (Spokesperson), C Perrin, J J Real, E Voutier
SACLAY – J C Duchazeaubeneix, E Tomasi-Gustaffson (Spokesperson)
ORSAY, IPN – B W Johnson, N Marty, M Morlet (Spokesperson), A Willis

RUTGERS U – G Edwards, C Glasshauser, A Green
GEORGIA U – F T Baker

Accelerator SATURNE-II *Detector* SPES-I, POLDER

Reactions

deut C → deut C	400 MeV/c

Particles studied deut

Brief description Uses the polarimeter POLDER to measure observables related to the polarization of recoil deuterons.

Related experiments SATURNE-186, SATURNE-290

E-mail contact kox@frcpn11.in2p3.fr

SATURNE-258

(Proposed Nov 1992, Approved Dec 1992, Began data-taking 1993, Completed data-taking 1993)

DIRECT MEASUREMENT OF THE BRANCHING RATIO IN THE $\eta \to \gamma\gamma$ DISINTEGRATION

ETA COLLABORATION
SACLAY – A Boudard, J M Durand, B Fabbro, M Garcon (√ Spokesperson), B Mayer, J F Pillot, E Thomasi-Gustaffson
DUBNA – A Efendeev, L Lytkin (√ Spokesperson)
UCLA – M Clajus (√ Spokesperson), B Nefkens, D White
PSI, VILLIGEN – R Abela
TRIUMF – R Abegg, P Fuchs, W T H van Oers
GEORGE WASHINGTON U – W Briscoe, T Morrisson

Accelerator SATURNE-II *Detector* Calorimeter, SPES-II

Reactions

p deut → ^{3}He η	894 MeV (T_{lab})

Particles studied η, γ

Brief description The first direct measurement of the branching ratio $\Gamma(\eta \to \gamma\gamma)/\Gamma_{tot}$. Expected to achieve an accuracy of 1 to 2%. Uses two BGO photon calorimeters and SPES-II.

Related experiments SATURNE-198, SATURNE-284

E-mail contact garcon@phnx7.saclay.cea.fr

SATURNE-280

(Proposed Apr 1993, Approved Dec 1993, Began data-taking Mar 1994, In progress)

STUDY OF THE REACTION $dd \to \alpha\eta$ CLOSE TO THE THRESHOLD OF η PRODUCTION

STRASBOURG, CRN – A M Bergdold, O Bing, F Hibou, A Zghiche (Spokesperson)
SACLAY – M Boivin, F Plouin, R Wurzinger (Spokesperson), J Yonnet
DUBNA – A Efendeev, L Lytkin (Spokesperson)
ORSAY, IPN – P Courtat, R Gacougnolle, Y Le Bornec (Spokesperson), J M Martin, B Tatischeff, N Willis (Spokesperson)

Accelerator SATURNE-II *Detector* SPES-III

Reactions

deut deut → He η	—

Particles studied η

Brief description Measures the total cross section of the reaction, close to the threshold of η production.

Related experiments SATURNE-133, SATURNE-174, SATURNE-258

E-mail contact le_bornec@ipncls.in2p3.fr, willis@ipncls.in2p3.fr

SATURNE-290

(Proposed Oct 1993, Approved Dec 1993, In preparation)

MEASUREMENT OF TENSOR OBSERVABLES RELATED TO THE POLARIZATION OF RECOIL DEUTERON IN THE REACTION $pp \to d\pi^+$

GRENOBLE U – C Furget (Spokesperson), S Kox (Spokesperson), E Voutier
SACLAY – E Tomasi-Gustaffson
ORSAY, IPN – M Morlet, A Willis

Accelerator SATURNE-II *Detector* SPES-I, POLDER

Reactions

$p\,p \to$ deut π^+	550, 800, 2100 MeV/c

Particles studied deut, π^+

Brief description Uses the polarimeter POLDER, calibrated between 175 and 500 MeV, for a measurement of observables related to the polarization of recoil deuterons. Determines the partial amplitudes. Scheduled to run in November 94.

Related experiments SATURNE-253

E-mail contact kox@frcpn11.in2p3.fr

SERPUKHOV Experiments

SERPUKHOV-112

(Proposed Jan 1976, Approved Jun 1976, Began data-taking Apr 1979, Completed data-taking 1989)

POLARIZATION MEASUREMENT IN CHARGE-EXCHANGE REACTIONS AT 40 GeV/c

SERPUKHOV – V D Apokin, B N Chuyko, A A Derevshchikov, V A Krendelev, Y A Matulenko, A P Meschanin, A I Misnic, S B Nurushev (√ Spokesperson), V I Rykalin, V G Rykov, L F Soloviev, V L Solovyanov, A N Vasiliev
DUBNA – N S Borisov, E I Bunyotova, Y M Kazarinov (√ Spokesperson), B A Khachaturov, R K Kutuev, M Y Liburg, A B Neganov, B S Neganov, I K Potashnikova, Y A Usov, R Y Zulkarneev

Accelerator SERPUKHOV *Detector* PROZA

Reactions Polarized target

$\pi^- p \to n \pi^0$	40 GeV/c
$\pi^- p \to n 2\pi^0$	"
$\pi^- p \to n \eta$	"
$\pi^- p \to n \eta'$	"
$\pi^- p \to n \omega$	"
$\pi^- p \to n f_2(1270)$	"
$K^- p \to n K_L$	"
π^- nucleus $\to$ nucleus π^0	"
K^- nucleus $\to$ nucleus π^0	"

Brief description Ran for 4968 hours.

Journal papers YF 35 (1982) 382 = SJNP 35 (1982) 219, YF 35 (1982) 1465 = SJNP 35 (1982) 857, ZPHY C15 (1982) 293, YF 36 (1982) 1191 = SJNP 36 (1982) 694, YF 41 (1985) 116 = SJNP 41 (1985) 74, NP B255 (1985) 253, YF 42 (1985) 1146 = SJNP 42 (1985) 725, YF 42 (1985) 1152 = SJNP 42 (1985) 729, PTE 5 (1987) 46, ZPHY C35 (1987) 173, YF 45 (1987) 1355 = SJNP 45 (1987) 840, YF 46 (1987) 1108, YF 46 (1987) 1482, YF 47 (1988) 727 = SJNP 47 (1988) 465, YF 47 (1988) 1644 = SJNP 47 (1988) 1041, and YF 49 (1989) 445 = SJNP 49 (1989) 278.

E-mail contact nurushev@mx.ihep.su

SERPUKHOV-115

(Proposed Nov 1975, Approved Jan 1976, Began data-taking 1982, Completed data-taking 1988)

STUDY OF CHARGED PARTICLE RARE DECAYS

MOSCOW, INR – V N Bolotov (Spokesperson), R M Dzhilkibaev, S N Grinenko, V V Isakov, Y M Klubakov, V D Laptev, V M Lobashov, V I Marin, A A Poblagrev, V E Postoev, A N Toropin

Accelerator SERPUKHOV *Detector* Counter

Reactions

$\pi^- \to e^- \bar{\nu}_e \gamma$	—
$K^- \to \pi^- \pi^0 \gamma$	—
$K^- \to \pi^- 3\gamma$	—
$K^- \to \pi^- \pi^0 \pi^0 (\gamma)$	—
$K^- \to \pi^0 e^- \bar{\nu}_e (\gamma)$	—
$K^- \to \pi^0 \pi^0 e^- \bar{\nu}_e \gamma$	—

Particles studied π^-, K^-

Journal papers ZETFP 42 (1985) 390 = JETPL 42 (1985) 481, ZETFP 43 (1986) 405 = JETPL 43 (1986) 520, YF 44 (1986) 108 = SJNP 44 (1986) 68, YF 44 (1986) 117 = SJNP 44 (1986) 73, YF 45 (1987) 1652 = SJNP 45 (1986) 1023, ZETFP 47 (1988) 8 = JETPL 47 (1988) 7, YF 51 (1990) 717, and PL B243 (1990) 308. No other papers expected.

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SERPUKHOV-119

(Proposed Dec 1976, Approved Jul 1977, Began data-taking May 1981)

RELATIVISTIC POSITRONIUM PHYSICS

DUBNA – L G Afanasyev, G D Alekseev, V V Karpukhin, D M Khazins, V V Kruglov, A V Kuptsov, L L Nemenov (√ Spokesperson), M V Nikitin
SERPUKHOV – K I Gubrienko, V I Kotor
MOSCOW STATE U – O E Gorchakov, A V Kulikov, S V Trusov

Accelerator SERPUKHOV *Detector* Combination

Reactions

$p n \to \pi^0$ X	< 70 GeV/c
$p n \to$ positronium X	"

Particles studied positronium

Brief description A test of special relativity. Studies $\pi^0 \to \gamma +$ positronium decay, positronium oscillations, and interactions of relativistic positronium with matter. Measures cross section of positronium interactions with carbon. Ran for 800 hours.

Journal papers YF 40 (1984) 139 = SJNP 40 (1984) 87, YF 50 (1989) 7, YF 50 (1989) 936, PL B236 (1990) 116, and YF 51 (1990) 1040. For the theory see YF 15 (1972) 1047 = SJNP 15 (1972) 582.

SERPUKHOV-120

(Proposed 1977, Approved Jul 1977, Began data-taking 1985, Completed data-taking 1990)

EXPERIMENTS WITH HYPERON BEAMS

SERPUKHOV – Y B Bushnin, A F Dunaitsev, R I Dzhelyadin, S V Golovkin, A K Konoplyannikov, V F Konstantinov, V P Kubarovsky, L G Landsberg (Spokesperson), V M Leontiev, V A Mukhin, T I Petrunina, N S Pokrovsky, V G Rybakov, V A Senko, V A Sergeev, Y N Simonov, A N Sytin, A M Zaitsev
MOSCOW, ITEP – M V Gritsuk, V M Guzhavin, B L Ioffe, G K Kliger, V Z Kolganov, V L Krylov, V F Kuzichev, V L Laponov, A V Lebedev, G S Lomkatsi, A F Nilov, O I Pogorelko, N V Rabin, V T Smolyankin (Spokesperson), D D Tokarev, A V Turbiner, G N Tyapkina, I A Vetlitsky

Accelerator SERPUKHOV *Detector* SPHINX

Reactions

p nucleus $\to \Lambda$ X	70 GeV (E_{lab})
p nucleus $\to \Sigma^-$ X	"
p nucleus $\to \Sigma^+$ X	"
p nucleus $\to \Sigma^0$ X	"
p nucleus $\to \Xi^0$ X	"
p nucleus $\to \Xi^-$ X	"
p nucleus $\to \Omega^-$ X	"
$\Lambda p \to$ X	30–60 GeV/c
$\Lambda p \to p \Lambda$(unspec)	"
$\Sigma^- p \to$ X	"
$\Sigma^- p \to p \Sigma(\text{unspec})^-$	"
$\Sigma^+ p \to$ X	"
$\Sigma^+ p \to p \Sigma(\text{unspec})^+$	"
$\Xi^0 p \to$ X	"
$\Xi^0 p \to p \Xi(\text{unspec})^0$	"
$\Xi^- p \to$ X	"
$\Xi^- p \to p \Xi(\text{unspec})^-$	"
$\Omega^- p \to$ X	"
$\Omega^- p \to p \Omega^*(\text{unspec})^-$	"
Λ deut $\to$ X	"
Σ^- deut $\to$ X	"
Σ^+ deut $\to$ X	"
Ξ^0 deut $\to$ X	"
Ξ^- deut $\to$ X	"

Ω^- deut $\rightarrow$ X	"
$\Omega^- \rightarrow \Lambda\ K^-$	—
$\Omega^- \rightarrow \Xi^0\ \pi^-$	—
$\Omega^- \rightarrow \Xi^-\ \pi^0$	—
$\Omega^- \rightarrow \Lambda\ \pi^-$	—
$\Omega^- \rightarrow n\ \pi^-$	—
$\Omega^- \rightarrow \Xi^0\ e^-\ \overline{\nu}_e$	—
$\Xi^0 \rightarrow \Sigma^+\ e^-\ \overline{\nu}_e$	—
$\Xi^0 \rightarrow \Sigma^-\ e^+\ \nu_e$	—
$\Xi^0 \rightarrow \Lambda\ \gamma$	—
$\Xi^0 \rightarrow \Lambda\ \pi^0$	—
$\Sigma^- \rightarrow \Lambda\ e^-\ \overline{\nu}_e$	—
$\Sigma^- \rightarrow n\ e^-\ \overline{\nu}_e$	—
$\Sigma^+ \rightarrow \Lambda\ e^+\ \nu_e$	—
$\Sigma^+ \rightarrow n\ e^+\ \nu_e$	—
$\Sigma^+ \rightarrow p\ \gamma$	—
$\Lambda \rightarrow p\ e^-\ \overline{\nu}_e$	—

Particles studied Ω^-, Σ^-, Σ^+, Ξ^-, Ξ^0, Λ, $\Sigma(\text{unspec})^+$, $\Sigma(\text{unspec})^-$, $\Xi(\text{unspec})^-$, $\Xi(\text{unspec})^0$, $\Omega^*(\text{unspec})^-$, $\Lambda(\text{unspec})$, charm

Brief description For continuation of this experiment, see SERPUKHOV-169.

Journal papers YF 52 (1990) 494.

Related experiments SERPUKHOV-169

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SERPUKHOV-128

(Proposed 1977, Approved 1984, Began data-taking 1987)

SEARCH FOR NEW SHORT-LIVED PARTICLES IN NEUTRINO INTERACTIONS

SERPUKHOV – V V Ammosov, V I Baranov, A A Ivanilov, P V Ivenov, V M Korablev, V A Korotkov, V V Makeev, A G Myagkov, P V Pitukhin, A Y Polyarush, A A Sokolov
MOSCOW PHYS ENG INST – E Gushchin, A I Lebedev, S V Somov (Spokesperson), G I Tipografshchik
MOSCOW, ITEP – Y A Aleshin, O K Egorov, E D Kolganova, A N Maksimov, I A Melnichenko, E A Pozharova, V I Silaev, V A Smirnitsky, V A Smotryaev, I S Trostin
LEBEDEV INST – S I Kotelnikov, E P Kuznetsov, B I Lomonosov, L I Pervov, V A Ryabov, P S Vasiliev
MOSCOW STATE U – P F Ermolov, V S Murzin, S I Sivoklokov
DUBNA – Y A Batusov, S A Bunyatov, O M Kuznetsov, V V Lyukov, V I Tretyak

Accelerator SERPUKHOV *Detector* Combination

Reactions

ν_μ nucleon $\rightarrow \mu^-$ charm X	3–30 GeV/c
ν_μ nucleon $\rightarrow \Lambda_c^+\ \mu^-$ X	"
ν_μ nucleon $\rightarrow \Sigma_c(2455)^+\ \mu^-$ X	"
ν_μ nucleon $\rightarrow \Sigma_c(2455)^{++}\ \mu^-$ X	"
ν_μ nucleon $\rightarrow \mu^-$ charmed-meson X	"
ν_μ nucleon $\rightarrow D_s^\pm\ \mu^-$ X	"

Particles studied charm

Brief description The detector is a wide-angle spectrometer with a streamer chamber and emulsions. 2×10^{18} protons on target were taken.

SERPUKHOV-136

(Proposed 1978, Approved Apr 1978, Began data-taking 1988, In progress)

NEUTRINO DETECTOR

SERPUKHOV – A A Borisov, N I Bozhko, S K Chernichenko, G L Chukin, V N Goryachev, M M Kirsanov, A I Kononov, A S Kozhin, V I Kravtsov, A V Kulikov, A I Mukhin, V N Rychenkov, Y I Salomatin, V A Tumakov, A S Vovenko (✓ Spokesperson)
DUBNA – L S Barabash, S A Baranov, Y A Batusov, S A Bunjatov (✓ Spokesperson), M Y Kazarinov, O L Klimov, V V Lyukov, Y A Nefedov, B A Popov, V I Snyatkov, V Y Valuev

Accelerator SERPUKHOV *Detector* Calorimeter

Reactions

p nucleon $\rightarrow$ charm X	70 GeV/c
p nucleon $\rightarrow e^\pm$ X	"
ν_μ nucleon $\rightarrow \mu^-$ X	5–30 GeV/c
ν_μ nucleon $\rightarrow \mu^+\ \mu^-$ X	"
ν_μ nucleon $\rightarrow$ charm X	"
$\overline{\nu}_\mu$ nucleon $\rightarrow \mu^+$ X	"
$\overline{\nu}_\mu$ nucleon $\rightarrow \mu^+\ \mu^-$ X	"
$\overline{\nu}_\mu$ nucleon $\rightarrow$ charm X	"
ν_e nucleon $\rightarrow e^\pm$ X	"
$\overline{\nu}_e$ nucleon $\rightarrow e^\pm$ X	"
charm $\rightarrow \mu^+$ X	—
charm $\rightarrow e^\pm$ X	—

Particles studied charm

Brief description Searches for $\nu_e \leftrightarrow \nu_x$ oscillations. Running (May 94).

Journal papers YF 30 (1979) 702 = SJNP 30 (1979) 362, YF 33 (1981) 715 = SJNP 33 (1981) 371, YF 40 (1984) 739 = SJNP 40 (1984) 475, YF 49 (1989) 172, ZPHY C51 (1991) 341, IJMP A7 (1992) 3835, YF 55 (1992) 2092, and PL B279 (1992) 405.

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SERPUKHOV-145

(Proposed 1981, Approved 1984, Began data-taking 1987, Completed data-taking 1992)

STUDY OF THE PRODUCTION AND DECAY PROPERTIES OF THE CHARMED BARYONS IN NEUTRINO INTERACTIONS WITH THE BUBBLE CHAMBER SKAT

SERPUKHOV – V V Ammosov (✓ Spokesperson), E N Ardashev (✓ Spokesperson), Y V Bardin, A P Bugorsky, N A Chabrov, V I Ermolaev, V S Fillipov, A A Ivanilov, V I Khleborad, V I Konyushko, V M Korablev, V A Korotkov, V V Makeev, G Y Mitrofanov, A G Myagkov, N A Netyaga, A A Sokolov, I L Vasiliev

Accelerator SERPUKHOV *Detector* HLBC-SKAT

Reactions

$\nu_\mu\ p \rightarrow \Sigma_c(2455)^{++}\ \mu^-$	5–20 GeV/c
$\nu_\mu\ n \rightarrow \Lambda_c^+\ \mu^-$	"

Particles studied $\Sigma_c(2455)^{++}$, Λ_c^+

Brief description The chamber fill is a light freon–propane mix. 4×10^{18} protons on target were taken.

Journal papers ZETFP 58 (1993) 241.

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SERPUKHOV-147

(Proposed 1982, Approved Mar 1982, Began data-taking 1984, Completed data-taking 1991)

STUDY OF REACTIONS WITH STRANGE PARTICLE PRODUCTION IN THE π^- AND K^- MESON BEAM OF THE IHEP ACCELERATOR

MOSCOW, ITEP – B P Barkov, B V Bolonkin, I A Erofeev, O N Erofeeva, V K Grigoriev, A P Grishin, Y V Katinov, I Y Korolkov, V N Luzin, V V Miller, V N Nozdrachev,

Y P Shkurenko, V V Sokolovsky (√ Spokesperson), A I Sutormin, G D Tikhomirov, V V Vladimirsky

Accelerator SERPUKHOV *Detector* MIS

Reactions

$\pi^- p \to n \Lambda \overline{\Lambda}$	40 GeV/c
$\pi^- p \to n \Lambda \overline{\Lambda} \pi^0$	"
$\pi^- p \to p \Lambda \overline{\Lambda} \pi^-$	"
$\pi^- p \to n 2K_S$	"
$\pi^- p \to n K_S K_L$	"
$\pi^- p \to n 2K_S \pi^0$	"
$\pi^- p \to n K_S K_L \pi^0$	"
$\pi^- p \to p 2K_S \pi^-$	"
$\pi^- p \to p K_S K_L \pi^-$	"
$\pi^- p \to n \Sigma^0 \overline{\Sigma}^0$	"
$\pi^- p \to$ glueball X	"
$\pi^- p \to f_2(1720)$ X	"
$\pi^- p \to$ X $C(1480)^-$	"
$K^- p \to \Lambda \overline{\Lambda} Y^*$(unspec)	"
$K^- p \to K_S K_L Y^*$(unspec)	"
glueball $\to 2K_S$	—
$f_2(1720) \to 2K_S$	—
$C(1480)^- \to K_S K_L \pi^-$	—

Particles studied $f_0(975)$, $a_0(980)^0$, $f_2(1720)$, glueball, $C(1480)^-$, Y^*(unspec)

Journal papers YF 43 (1986) 1211, YF 43 (1986) 1487 = SJNP 43 (1986) 959, YF 46 (1987) 799, NP B309 (1988) 426, and YF 48 (1988) 1213 = SJNP 48 (1988) 770.

Related experiments SERPUKHOV-173

SERPUKHOV-148

(Proposed Feb 1982, Approved Mar 1982, Began data-taking 1984, Completed data-taking 1990)

STUDY OF EXCLUSIVE RESONANCE PRODUCTION IN RARE PROCESSES

SERPUKHOV – Y M Antipov (√ Spokesperson), V A Batarin, V A Bezzubov, N P Budanov, V S Datsko, D S Denisov, Y P Gorin, V G Kartasheva, I V Kotov, V G Lapshin, I V Mandrichenko, Y M Melnik, A I Petrukhin, S A Polovnikov, V I Rykalin, D A Stoyanova
TBILISI STATE U – R B Pirtskhalava, V N Roinishvili
DUBNA – M S Bilenky, R S Galperina, I A Golutvin, Y A Gorkushkin, V S Habarov, D M Hazins, V Y Karzhavin, Y T Kiryushin, P A Kulinich, R Leitner, G V Mitselmakher, A A Nozdrin, A G Olshevsky, M Sedlak, V A Sviridov, V I Travkin, N V Vinogradova, A V Vishnevsky
INFN, BOLOGNA – P L Frabetti
INFN, MILAN – F Palombo

Accelerator SERPUKHOV *Detector* SIGMA-AYAKS

Reactions

$\pi^- p \to \pi^- p$	40–50 GeV/c
$\pi^- p \to p n \overline{p}$	"
$K^- p \to K^- p$	"
$\overline{p} p \to \overline{p} p$	"
π^- nucleus $\to \pi^- \mu^- \mu^+$ X	"
π^- nucleus $\to p p$ X	"
π^- nucleus $\to p p \pi^-$ X	"
π^- nucleus $\to$ dibaryon X	"
π^- nucleus $\to$ deut π^- X	"
π^- nucleus $\to$ deut π^+ X	"
π^- nucleus $\to \pi^-$ X	40 GeV/c
π^- nucleus $\to K^-$ X	"
π^- nucleus $\to p$ X	"
K^- nucleus $\to p p$ X	40–50 GeV/c
K^- nucleus $\to \pi^-$ X	40 GeV/c
K^- nucleus $\to K^-$ X	"
K^- nucleus $\to p$ X	"
$\overline{p}$ nucleus $\to p p$ X	40–50 GeV/c
$\overline{p}$ nucleus $\to \pi^-$ X	40 GeV/c
$\overline{p}$ nucleus $\to K^-$ X	"
$\overline{p}$ nucleus $\to p$ X	"
$\rho^0 \to \mu^+ \mu^-$	—
$a_1(1260)^- \to \pi^- \mu^- \mu^+$	—
$\pi_2(1670)^- \to \pi^- \mu^- \mu^+$	—
meson$^- \to \pi^- \mu^- \mu^+$	—

Particles studied ρ^0, $f_0(1300)$, $f_2(1270)$, $a_1(1260)^-$, $\pi_2(1670)^-$, meson$^-$, dibaryon

Brief description Nuclear targets are Be, C, Al, Cu, and Pb. Exclusive dibaryon decays are also studied. Ran for 1500 hours. SIGMA-AYAKS is the new name for the modified spectrometers SIGMA and SIGMA-M.

Journal papers YF 37 (1983) 113 = SJNP 37 (1983) 63, EPL 4 (1987) 403, ZETFP 48 (1988) 519 = JETPL 48 (1988) 561, YF 48 (1988) 138 = SJNP 48 (1988) 85, YF 48 (1988) 471 = SJNP 48 (1988) 297, YF 48 (1988) 1041, ZPHY C42 (1989) 185, EPL 11 (1990) 725, NIM A295 (1990) 81, YF 51 (1990) 705, YF 53 (1991) 439, YF 53 (1991) 1314, YF 53 (1991) 1324, and YF 57 (1994) 106.

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SERPUKHOV-149

(Proposed 1982, Approved 1984, Began data-taking 1986)

STUDY OF ASYMMETRY IN INCLUSIVE REACTIONS $\pi^- p \to \pi^{\pm 0} X$ AND $\pi^- p \to K_L X$ AT 40 GeV/c, AND $pp \to \pi^0 X$ AT 70 GeV/c

SERPUKHOV – V D Apokin, Y I Arestov, N I Belikov, B N Chuyko, A A Derevshchikov, G V Dzholobov, O A Grachev, V Y Khodyrev, Y A Matulenko, A P Meshchanin, N G Minaev, A I Misnic, V V Mochalov, A A Morozov, V G Myalitsin, S B Nurushev (√ Spokesperson), D I Patalakha, A F Prudkoglyad, V I Rykalin, V L Rykov, L F Soloviev, V L Solovyanov, A N Vasiliev
DUBNA – N S Borisov, E I Bunyatova, Y M Kazarinov (√ Spokesperson), B A Khachaturov, R K Kutuev, M Y Liburg, V N Matafonov, A B Neganov, Y A Usov, R Y Zulkarneev
TBILISI STATE U – N S Amaglobeli, Y S Bagaturiya, B G Chiladze, L N Glonti, G G Macharashvili, A Ocharashvili, R M Sakandelidze, T M Sakhelashvili
MICHIGAN U – C M Chu, R S Raymond, J A Stewart

Accelerator SERPUKHOV *Detector* PROZA-M

Reactions Polarized target

$\pi^- p \to \pi^-$ X	40 GeV/c
$\pi^- p \to \pi^0$ X	"
$\pi^- p \to \eta$ X	"
$\pi^- p \to \pi^+$ X	"
$\pi^- p \to K_L$ X	"
π^- deut $\to \pi^0$ X	"
π^- deut $\to \eta$ X	"
$K^- p \to \pi^0$ X	"
$\pi^- p \to \eta$ X	"
K^- deut $\to \pi^0$ X	"
$p p \to \pi^-$ X	70 GeV/c
$p p \to \pi^0$ X	"
$p p \to \eta$ X	"
$p p \to \pi^+$ X	"
$p p \to K_L$ X	"
$p p \to \eta$ X	"
p deut $\to \pi^0$ X	"
p deut $\to \eta$ X	"

Brief description Requested time is 2000 hours.

Journal papers PTE 5 (1987) 46, YF 45 (1987) 1355 = SJNP 45 (1987) 840, YF 46 (1987) 1108 = SJNP 46 (1987) 644, YF 46 (1987) 1482 = SJNP 46 (1987) 877, ZPHY C35 (1987) 173, YF 47 (1988) 727, YF 49 (1989) 156 = SJNP 49 (1989) 97, YF 49 (1989) 165 = SJNP 49 (1989) 103, YF 49 (1989) 445, YF 50 (1989) 695, PL B243 (1990) 461, PL B261 (1991) 197, PL B261 (1991) 201, PL B264 (1991) 462, YF 56-3 (1993) 82, and NIM A330 (1993) 39.

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SERPUKHOV-152

(Proposed 1983, Approved Aug 1984)

NEUTRINO EXPERIMENT USING A TAGGED NEUTRINO BEAM

SERPUKHOV – V V Ammosov, V B Anykeyev, A A Bel'kov, S V Belikov, A P Bugorsky, A Chesnokov, A G Denisov, S P Denisov (√ Spokesperson), A Y Dushkin, N N Fedyakin, A N Galyaev, N A Galyaev, S S Gershtein, Y V Gilitsky, S N Gurzhiev, V I Kochetkov, V I Kotov, A V Kozelov, V P Kryuchkov, V I Kurbakov, A A Lebedev, V N Lebedev, V V Lipajev, A Y Maslov, S A Medved, V N Mikhailin, Y V Mikhailov, V A Onuchin, Y M Pishchalnikov, A V Schukin, I V Shein, A P Soldatov, A A Spiridonov, A P Starkov, D A Stoyanova, A V Uzunyan, V P Zhigunov
INFN, PISA – C Cerri, G Gennaro, F Sergiampietri, G Spandre
INFN, FLORENCE – G Conforto, A Marchionni
BERLIN-ZEUTHEN ADW – J Baehr, G Bohm, R Nahnhauer, S Nowak, A Schwind
DUBNA – J Cvach, V K Dodokhov, N G Fadeev, V Genchev, I A Golutvin, J Hladky, V G Kadykov, V Y Karzhavin, V S Khabarov, Y T Kiryushin, V G Krivokhizhin, V V Kukhtin, V N Lysyakov, P K Markov, S Nemecek, A A Popov, D Pose, A Prokes, P Reimer, S Riman, I A Savin, G I Smirnov, D A Smolin, J Strachota, G Sultanov, L V Svetov, V A Sviridov, P Todorov, M Vinde, J Zacek, N I Zamyatin

Accelerator SERPUKHOV *Detector* Combination

Reactions

$\nu_e\ e^- \rightarrow e^-\ \nu_e$	< 70 GeV (E_{lab})
$\nu_\mu\ e^- \rightarrow e^-\ \nu_\mu$	"
ν_e nucleon $\rightarrow e^-$ X	"
ν_e nucleon $\rightarrow \nu_e$ X	"
ν_e nucleon $\rightarrow \tau^-$ X	"
ν_e nucleon $\rightarrow e^-\ \mu^+$ X	"
ν_μ nucleon $\rightarrow \mu^-$ X	"
ν_μ nucleon $\rightarrow \nu_\mu$ X	"
ν_μ nucleon $\rightarrow \mu^+\ \mu^-$ X	"
charmed-meson $\rightarrow \mu^+$ X	—

Particles studied ν_e, ν_μ, τ^-, charmed-meson

Brief description Studies ν_e–ν_μ universality, $\nu_e \rightarrow \nu_\mu \rightarrow \nu_\tau$ oscillations, the ratio of charged to neutral currents, *etc.*

Journal papers YF 52 (1990) 1040.

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SERPUKHOV-155

(Proposed 1983, Approved 1985, Began data-taking 1987, Completed data-taking 1992)

SINGLE AND PAIR HADRON PRODUCTION WITH LARGE MOMENTUM TRANSFER IN PROTON AND π^- MESON BEAMS

SERPUKHOV – V V Abramov, A F Buzulutskov, A S Dyshkant, A O Efimov, V N Evdokimov, A N Gurzhiev, Y P Korneev, A V Kostritski, A N Krinitsyn, V I Kryshkin (√ Spokesperson), Y M Melnik, V M Podstavkov, S I Tereshchenko, L K Turchanovich, A A Zaichenko

Accelerator SERPUKHOV *Detector* FODS-2

Reactions

$p\ p \rightarrow$ hadron(s) X	70 GeV/c
p nucleus $\rightarrow$ hadron(s) X	"
$\pi^-\ p \rightarrow$ hadron(s) X	40 GeV/c
π^- nucleus $\rightarrow$ hadron(s) X	"

Journal papers YF 45 (1987) 1362, and PTE 6 (1992) 75.

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SERPUKHOV-157

(Proposed 1983, Approved Mar 1983, Began data-taking 1986)

NEW RESONANCES SEARCH IN DIFFRACTIVE PROCESSES ON NUCLEI WITH THE MIS-2 DETECTOR

DUBNA – V V Antipov, L P Chernenko, N D Dikusar, A A Efendiev, A G Galperin, Y I Ivanshin, V I Komarov, L K Lytkin, E I Maltsev, V A Moiseenko, V I Moroz, V I Nikanorov, V A Petrov, I L Pisarev, S Y Sychkov, A A Tyapkin (Spokesperson), I M Vasilevsky, V V Vishnyakov, O A Zaymidoroga, V P Zrelov
MOSCOW STATE U – K P Vishnevskaya
CRACOW – M Sheptitska, R Sosnovsky
BRATISLAVA, INST PHYS – S Usachev, R Yanik
MILAN U – P L Frabetti, P F Manfredi, F Palombo

Accelerator SERPUKHOV *Detector* MIS-2

Reactions

π^- Si $\rightarrow$ 3pion X	40 GeV/c
K^- Si $\rightarrow$ kaon 2pion X	"

Particles studied meson

Brief description Uses the modified spectrometer MIS, with additional spark chamber. Looking for new radial excitations of π, A_1, A_2, A_3, and K mesons. Requested 4720 hours.

Journal papers YF 43 (1986) 917 = SJNP 43 (1986) 585.

SERPUKHOV-159

(Proposed 1983, Approved May 1986, Began data-taking 1992, In progress)

SEARCH FOR EXOTIC STATES WITH STRANGE QUARKS AND STUDY OF PRODUCTION AND DECAYS OF PARTICLES CONTAINING HEAVY QUARKS

DUBNA – A N Aleev, V P Balandin, A Bragadireanu, V P Dzhordzhadze, I I Evsikov, P Hristov, I M Ivanchenko, A M Kalinin, A F Kamburyan, M N Kapishin, N N Karpenko, V D Kekelidze (√ Spokesperson), D A Kirillov, I G Kosarev, Y A Kozhevnikov, N A Kuz'min, G A Kvirikashvili, A L Lyubimov, A S Mestvirishvili, P V Moisenz, A N Morozov, A K Odishvili, V V Pal'chik, Y K Potrebenikov, T G Progulova, V A Sashin, V E Siminov, L A Slepets, V N Spaskov, G T Tatishvili, A A Vovenko, A I Zinchenko
LEBEDEV INST – A S Belousov, M V Belov, E G Devitsin, A M Fomenko, A A Komar, V A Kozlov, S Y Potashev, S V Rusakov, L N Shtarkov, P A Smirnov, Y V Soloviev, Y A Vazdyk, M V Zavertyaev
ALMA ATA, PHYS INST – G A Aralbaeva, A A Loktionov
BYELORUSSIAN STATE U – A S Kurilin
BRATISLAVA, INST PHYS – C Koka, T Ponta, A Roshka
SERPUKHOV – S S Gershtein, A A Likhoded
MOSCOW, ITEP – A B Kaidalov
MOSCOW STATE U – E A Chudakov
SOFIYA, INST NUCL RES – I M Geshkov, P K Markov, A Z Vylov
SOFIYA, INST CHEM TECH – V Zayachki
PRAGUE, INST PHYS – J Hladky, M Novak, A Prokes, M Smizanska, M Vecko
TBILISI, INST PHYS – T S Grigalashvili
TBILISI STATE U – N S Amaglobeli, R A Kvatadze, N L Lomidze, M D Mosidze, T G Pitskhelelauri, R G Shanidze

Accelerator SERPUKHOV *Detector* EXCHARM

Reactions

n nucleus → $X(3100)$ X	< 70 GeV (E_{lab})
n nucleus → $X(3250)$ X	"
n nucleus → $N\phi(1950)$ X	"
n nucleus → $\bar{D}^0$ X	"
n nucleus → $\Sigma_c(2455)^{++}$ X	"
n nucleus → $\Sigma_c(2455)^0$ X	"
n nucleus → Λ_c^+ X	"
n nucleus → Ξ_c^+ X	"
n nucleus → Ξ_c^0 X	"

Particles studied $X(3100)$, $X(3250)$, $N\phi(1950)$, $\bar{D}^0$, Λ_c^+, $\Sigma_c(2455)^{++}$, $\Sigma_c(2455)^0$, Ξ_c^+, Ξ_c^0

Brief description Uses the new EXCHARM detector, a major upgrade of the older BIS-2M.

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SERPUKHOV-161

(Proposed 1983, Approved 1985, Began data-taking 1991, In progress)

STUDY OF CHARMED PARTICLE PRODUCTION AT IHEP ACCELERATOR ENERGIES

SERPUKHOV – E A Ardashev, M Y Bogolyubsky, S V Chekulaev, N A Galyaev, V A Khmelnikov, A E Kiryunin, A I Kotova, L L Kurchaninov, M S Levitsky, V V Maksimov, A A Minaenko, G Y Mitrofanov, A M Moiseev (√ Spokesperson), E A Parshin, A V Pleskach, S R Slabospitsky, V V Tikhonov, V N Zapolsky
MOSCOW STATE U – S G Basiladze, G A Bogdanova, P F Ermolov (√ Spokesperson), Y V Grishkevich, A N Larichev, A K Leflat, S N Orfanitsky, V P Rukovichkin, S M Ruzin, L A Tikhonova, A M Vishnevskaja, V Y Volkov, S A Zotkin
DUBNA – I V Boguslavsky (√ Spokesperson), I M Gramenitsky, V I Kireev, V D Kravtsov, A Y Kutov, K S Medved, M D Shafranov, V T Tolmachev
TBILISI, INST PHYS – N S Amaglobeli, V A Davitashvili, V F Tchunikhin, T P Topuria

Accelerator SERPUKHOV *Detector* Combination

Reactions

$\pi^+ p \rightarrow D^+ D^-$ X	60–70 GeV/c
$\pi^+ p \rightarrow$ charmed-baryon D^- X	"
$\pi^- p \rightarrow D^+ D^-$ X	"
$\pi^- p \rightarrow$ charmed-baryon D^- X	"
$p p \rightarrow D^+ D^-$ X	"
$p p \rightarrow$ charmed-baryon D^- X	"

Brief description Studies all charmed mesons and Λ and Σ charmed baryons.

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SERPUKHOV-163

(Proposed 1985, Approved 1985, Began data-taking 1985, Completed data-taking Dec 1988)

STUDY OF EXCLUSIVE GLUEBALL PRODUCTION IN THE CENTRAL REGION OF HADRON COLLISIONS

SERPUKHOV – S V Donskov, A V Inyakin, V A Kachanov, G V Khaustov, A V Kulik, V G Lapshin, A A Lednev, Y D Prokoshkin (Spokesperson), V I Rykalin, S A Sadovsky, V D Samoylenko, P M Shagin, A V Shtannikov, A V Singovsky, V P Sugonyaev
LOS ALAMOS – D Alde, E A Knapp, T Lopez
BRUSSELS U, IISN & CERN – F Binon, C Bricman, D Michotte, J P Stroot
ANNECY – M Gouanere, J P Peigneux

Accelerator SERPUKHOV *Detector* GAMS-2000, Calorimeter

Reactions

π^- nucleon → nucleon $\eta\,\eta\,\pi^-$	40 GeV/c
π^- nucleon → nucleon $\eta\,\pi^-$	"
π^- nucleon → nucleon $\eta\,\pi^0\,\pi^-$	"
π^- nucleon → nucleon $\pi^0\,\pi^-$	"
π^- nucleon → nucleon $2\pi^0\,\pi^-$	"
glueball → 2η	—

Particles studied glueball

Brief description Looks for glueballs, particularly in final states with $\eta\eta$. Ran for 1300 hours.

Journal papers ECHAYA 16 (1985) 584, NIM A256 (1987) 444, NIM A268 (1988) 112, and NIM A269 (1988) 101.

Related experiments BNL-852

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SERPUKHOV-164

(Proposed 1980, Approved May 1986, Began data-taking 1988, In progress)

INVESTIGATIONS OF THE $\pi^- p \rightarrow n\pi^+\pi^-\pi^+\pi^-(\gamma's)$ REACTION AT 40 GeV/c USING THE VERTEX SPECTROMETER

SERPUKHOV – D V Amelin, E B Berdnikov, S I Bityukov, G V Borisov, V A Dorofeev, R I Dzhelyadin, Y P Gouz, Y M Ivanyushenkov, I A Kachaev, A N Karyukhin, Y A Khokhlov, G A Klyuchnikov, V F Konstantinov, S V Kopikov, M E Kostrikov, V V Kostyukhin, A A Kriushin, M A Kulagin, V V Lapin, V D Matveev, A P Ostankov, D I Ryabchikov, E A Starchenko, N K Vishnevsky, E A Vlasov, A M Zaitsev (√ Spokesperson)
TBILISI INST PHYS – T A Lomtadze, E G Tskhadadze

Accelerator SERPUKHOV *Detector* VES

Reactions

$\pi^- p \rightarrow n\,2\pi^+\,2\pi^-$ (γ's)	37 GeV/c
$\pi^- p \rightarrow n\,2\pi^+\,2\pi^-$	"
$\pi^- p \rightarrow n\,2\rho^0$	"
$\pi^- p \rightarrow n\,\rho^0\,\eta$	"
$\pi^- p \rightarrow n\,f_2(1270)\,\eta$	"
$\pi^- p \rightarrow n\,\rho_3(1690)^0\,\eta$	"
$\pi^- p \rightarrow n\,2\eta$	"
$\pi^- p \rightarrow n\,\eta'\,\rho^0$	"
$\pi^- p \rightarrow n\,f_2(1270)\,\eta'$	"
$\pi^- p \rightarrow n\,\rho_3(1690)^0\,\eta'$	"
$\pi^- p \rightarrow n\,2\eta'$	"
$\pi^- p \rightarrow n\,f_1(1285)$	"
$\pi^- p \rightarrow n\,\eta'\,\eta$	"
$\pi^- p \rightarrow n\,\omega\,\eta$	"
$\pi^- p \rightarrow n$ meson (mesons)	"
$\pi^- p \rightarrow p$ meson (mesons)	"

Particles studied ρ^0, η, η', ω, $f_2(1270)$, $\rho_3(1690)^0$, glueball, meson

Brief description Uses a wide aperture magnetic spectrometer VES (VErtex Spectrometer) together with lead glass γ-detector and Čerenkov identifiers.

Journal papers PL B268 (1991) 137, ZPHY C54 (1992) 235, ZPHY C54 (1992) 367, YF 55 (1992) 2460, ZPHY C57 (1992) 13, PL B313 (1992) 276.

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SUMMARIES OF SERPUKHOV EXPERIMENTS

SERPUKHOV-166

(Proposed 1987, Approved 1987, Began data-taking 1987)

STUDY OF RARE DECAYS WITH THE ISTRA-M DETECTOR

MOSCOW, INR – V N Bolotov (√ Spokesperson), E N Gushchin, V V Isakov, O V Karavichev, V A Lebedev, V N Marin, Y V Musienko, A A Poblaguev, V E Postoev, G N Semenuk, S A Volkov
SERPUKHOV – V F Konstantinov
DUBNA – G Kalmar, A Z Kitikyan, E V Komissarov, V S Kurbatov, V Z Serdyuk, V V Sidorov, A D Volkov, B Z Zalikhanov

Accelerator SERPUKHOV *Detector* ISTRA-M

Reactions

$K^- \to \pi^- \nu_e \bar{\nu}_e$	25 GeV/c
$K^- \to \pi^- \nu_\mu \bar{\nu}_\mu$	"
$K^- \to e^- \bar{\nu}_e \gamma$	"
$K^- \to \pi^- e^- e^+$	"
$K^- \to \pi^- \mu^- \mu^+$	"

Particles studied π^-, K^-

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SERPUKHOV-167

(Proposed 1975, Approved 1987, Began data-taking 1987, In progress)

STUDY OF RARE KAON DECAYS

SERPUKHOV – A M Blick, V N Kolosov, V M Kutjin (√ Spokesperson), V I Romanovsky, A S Soloviev
DUBNA – A G Asmolov, Y A Budagov, I E Chirikov-Zorin, Y I Davydov, V B Flyagin (√ Spokesperson), V V Glagolev, V V Liba, Y F Lomakin, S N Malyukov, N L Rusakovich, A A Semenov, V B Vinogradov, A G Volodko
TBILISI STATE U – A I Dzindzaradze, I Minashvili
SOFIYA U – A B Jordanov, L Litov, G V Velev
MINSK, INST PHYS – Y A Kulchitsky, A S Kurilin

Accelerator SERPUKHOV *Detector* HYPERON-II

Reactions

$K^+ \to \pi^+ 2\pi^0$	10 GeV/c
$K^+ \to \pi^+ \pi^0 \gamma$	"
$K^+ \to \pi^+ 2\gamma$	"
$K^+ \to \pi^+ e^- e^+$	"
$K^+ \to \pi^0 e^+ \nu_e$	"
$K^+ \to \pi^0 e^+ \nu_e \gamma$	"
$K^+ \to \pi^+ \pi^+ \pi^- \gamma$	"
$K_S \to e^- e^+$	"
$K_S \to 2\gamma$	"
$K_S \to e^- e^+ \gamma$	"
$K_S \to \pi^0 e^- e^+$	"

Particles studied K^+, K_S

Journal papers PL B259 (1991) 225.

SERPUKHOV-168

(Proposed 1987, Approved Jun 1987, Began data-taking Feb 1988, Completed data-taking Jun 1990)

K^- MASS MEASUREMENT THROUGH KAONIC ATOMS USING THE CRYSTAL-DIFFRACTION METHOD

ST PETERSBURG, INP – A S Denisov, O L Fedin, M P Guriyev, Y M Ivanov, P M Levchenko, V D Malakhov, A A Petrunin, Y P Platonov, A G Sergeev, A I Smirnov (√ Spokesperson), V M Suvorov, A V Zhelamkov
SERPUKHOV – I S Baishev, S N Lapitsky, N V Mokhov, R A Rzaev, V P Sakharov, V S Seleznev, S I Striganov, V I Terekhov

Accelerator SERPUKHOV *Detector* QUARTZ

Reactions

p C $\to K^-$ X	70 GeV/c
p Mg $\to K^-$ X	"
p Cu $\to K^-$ X	"

Particles studied K^-

Brief description QUARTZ is a crystal diffraction spectrometer for hadronic X-rays with a semiconductor detector.

Journal papers ZETFP 54 (1991) 557 = JETPL 54 (1991) 558, ZETFP 57 (1993) 389 = JETPL 57 (1993) 400, and ZETFP 58 (1993) 69 = JETPL 58 (1993) 71.

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SERPUKHOV-169

(Proposed 1977, Approved Jul 1977, Began data-taking 1985, In progress)

INVESTIGATIONS OF HADRONIC SPECTROSCOPY WITH THE DETECTOR SPHINX

SERPUKHOV – R Y Elokhiv, S V Golovkin, A P Kozhevnikov, V P Kubarovsky, N Y Kulman, A I Kulyavtsev, V F Kurshetsov, A E Kushnerenko, L G Landsberg (√ Spokesperson), V V Molchanov, V A Mukhin, I N Nikitin, A V Sklezney, V I Solyanik, M Y Vavilov, V A Viktorov
MOSCOW, ITEP – M Y Balatz, I M Belyaev, G B Dzyubenko, A D Kamenskii, G K Kliger, V Z Kolganov, Y V Korchagin, V S Lakaev, G S Lomkatzi, A F Nilov, V A Prutskoi, A V Sitnikov, V T Smolyankin (√ Spokesperson), V E Vishnyakov

Accelerator SERPUKHOV *Detector* SPHINX

Reactions

p nucleon $\to$ nucleon DD $< p\, K^+\, K^- >$	70 GeV (E_{lab})
p nucleon $\to$ nucleon DD $< p\, \phi >$	"
p nucleon $\to$ nucleon DD $< \Lambda\, K^+ >$	"
p nucleon $\to$ nucleon DD $< \Lambda(1405\, S_{01})\, K^+ >$	"
p nucleon $\to$ nucleon DD $< \Lambda(1520\, D_{03})\, K^+ >$	"
p nucleon $\to$ nucleon DD $< \Sigma^0\, K^+ >$	"
p nucleon $\to$ nucleon DD $< \Sigma(1385\, P_{13})^0\, K^+ >$	"
p nucleon $\to$ nucleon DD $< p\, \pi^+\, \pi^-$ (γ's) $>$	"
p nucleon $\to$ nucleon DD $< p\, \omega >$	"
p nucleon $\to$ nucleon DD $< p\, \eta >$	"
p nucleon $\to$ nucleon DD $< p\, \eta' >$	"
p nucleon $\to$ nucleon DD $< p\, p\, \bar{p} >$	"
p nucleon $\to$ (neutrals) X	"
$\phi \to K^+\, K^-$	—
$\Lambda \to p\, \pi^-$	—
$\Lambda(1405\, S_{01}) \to \Sigma^+\, K^-$	—
$\Sigma^+ \to p\, \pi^0$	—
$\Lambda(1520\, D_{03}) \to p\, K^-$	—
$\Sigma^0 \to \Lambda\, \gamma$	—
$\Sigma(1385\, P_{13}) \to \Lambda\, \pi^0$	—
$\omega \to \pi^+\, \pi^-\, \pi^0$	—
$\eta \to \pi^+\, \pi^-\, \pi^0$	—
$\eta' \to \pi^+\, \pi^-\, \eta$	—

Particles studied baryon, $N\phi(1950)$, $\Sigma(3170\,\mathrm{B})^+$

Brief description Studies the baryon diffractive production and searches for exotic baryons including pentaquark cryptoexotic baryon resonances with hidden strangeness in the mass region up to 4.5 GeV/c^2. Uses Be and C as nuclear targets. SPHINX consists of a wide aperture magnetic spectrometer with proportional and drift chambers working in combination with a multichannel γ-spectrometer and a system of Čerenkov detectors

for the identification of charged secondary particles. Running (May 94).

Journal papers YF 57 (1994) 47, YF 57 (1994) 241, and YF 57 (1994) 253.

Related experiments SERPUKHOV-120

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SERPUKHOV-170

(Proposed 1985, Approved 1985, Began data-taking 1985, Completed data-taking 1990)

QUANTUM ELECTRODYNAMIC IN THE STRONG FIELDS OF ORIENTED CRYSTALS

LEBEDEV INST – V A Baskov, B B Govorkov, V A Khablo, V V Kim, V I Sergienko (√ Spokesperson)
KHARKOV, FTI – V B Ganenko, L Y Kolesnikov, A L Rubashkin, P V Sorokin, Y V Zebrovsky
SERPUKHOV – V I Maisheev, V N Zapolsky
MOSCOW PHYS ENG INST – B I Luchkov, V Y Tugaenko
NOVOSIBIRSK, IYF – V N Baier, V M Katkov, V M Strakhovenko

Accelerator SERPUKHOV *Detector* KASKAD

Reactions

e^- nucleus → nucleus e^- γ (γ's)	30 GeV (E_{lab})
γ nucleus → nucleus e^- e^+	5–25 GeV (E_{lab})
γ nucleus → nucleus e^- e^+ γ (γ's)	"

Brief description A study of electromagnetic interactions, including γ elastic and inelastic scattering on nucleons and nuclei. The detector consists of a single crystal target, a goniometer, and a magnetic spectrometer.

Journal papers ZETFP 49 (1989) 533, ZETFP 50 (1989) 395, ZETFP 52 (1990) 740, NIM A297 (1990) 329, PTE 5 (1990) 58, PTE 6 (1990) 69, PTE 6 (1990) 73, PTE 5 (1992) 52, ZETF 101 (1992) 1351, ZETFP 56 (1992) 233, and ZETFP 57 (1993) 282.

SERPUKHOV-171

(Proposed 1987, Approved 1987, Began data-taking 1987, In progress)

DETERMINATION OF ENERGY DEPOSITION IN THICK TARGETS FROM CONSTRUCTION MATERIALS EXPOSED TO PROTONS WITH KINETIC ENERGIES OF 0.8–1.2 GeV/c

MOSCOW, ITEP – V I Belyakov-Bodin (√ Spokesperson)

Accelerator SERPUKHOV *Detector* Calorimeter

Reactions

p nucleus → shower X	0.8–1.2 GeV (T_{lab})

Journal papers NIM A295 (1990) 140, AEU 70 (1991) 339, NIM A314 (1992) 508, and NIM A335 (1993) 30.

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SERPUKHOV-172

(Proposed 1988, Approved May 1988)

STUDY OF MESONS WITH AN ENHANCED GLUON COMPONENT (GLUEBALLS INCLUDED) AND MESONS WITH HIGH SPINS USING THE MULTIPHOTON 4π SPECTROMETER

SERPUKHOV – A V Dolgopolov, S V Donskov, A V Inyakin, G V Khaustov, A A Kondashov, A K Konoplyannikov, A V Kulik, V G Lapshin, A A Lednev, V A Lishin, Y M Melnik, V K Myalitsin, S A Polovnikov, V A Polyakov, Y D Prokoshkin (√ Spokesperson), V B Rakhmatova, V I Rykalin, S A Sadovsky, V D Samoylenko, P M Shagin, A V Shtannikov, A V Singovsky, V P Sugonyaev
MOSCOW PHYS ENG INST – A M Baranov, A N Kalinovsky, Z Khorguashvili, S Y Smirnov
TBILISI STATE U – N S Amaglobeli, M D Tabidze
TBILISI, INST PHYS – A K Djavrishvili, D B Kapanadze, I Z Khalvashi, T A Lomtadze, G G Sekhneaidze
LOS ALAMOS – D Alde, E A Knapp, T Lopez
BRUSSELS U, IISN – F Binon, J P Stroot
ANNECY – J P Peigneux, M Poulet
KEK – S Inaba, M Kobayashi, K Takamatsu, T Tsuru
MIYAZAKI U – T Nakamura

Accelerator SERPUKHOV *Detector* GAMS-4PI

Reactions

$\pi^- p \to n\, 2\pi^0$	32 GeV/c
$\pi^- p \to n\, 2\eta$	"
$\pi^- p \to n\, \eta'\, \eta$	"
$\pi^- p \to n\, \eta\, \pi^0$	"
$\pi^- p \to n\, \eta\, 2\pi^0$	"
$\pi^- p \to n\, 2\omega$	"
$\pi^- p \to n\, K^0\, \overline{K}^0$	"
$\pi^- p \to n$ 2meson^0	"
$\pi^- p \to$ meson^0 X	"
$\pi^- p \to$ glueball X	"
$\pi^- p \to J/\psi(1S)$ X	"
$\pi^- p \to \psi(2S)$ X	"
$\pi^- p \to \eta_c(1S)$ X	"
$\pi^- p \to \chi_c$(unspec) X	"
$K^- p \to$ meson^0 X	"
glueball → $4\pi^0$	—
glueball → 2η	—
glueball → $\eta'\, \eta$	—
glueball → $2\eta'$	—
meson^0 → $2\pi^0$	—
meson^0 → 2η	—
meson^0 → $\eta'\, \pi^0$	—
$\eta_c(1S) \to \eta\, 2\pi^0$	—
$\pi^0 \to 2\gamma$	—
$\eta \to 2\gamma$	—

Particles studied glueball, meson^0

Journal papers NIM A268 (1988) 112, NIM A276 (1989) 652, PTE 1 (1990) 68, PTE 2 (1990) 90, PTE 5 (1991) 55, and NIM A302 (1991) 443.

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SERPUKHOV-173

(Proposed 1991, Approved 1992, Began data-taking 1992)

STUDY OF STRANGE PARTICLE RESONANT STATES USING HADRON BEAMS WITH MOMENTA OF 40–70 GeV/c AT THE IHEP ACCELERATOR

MOSCOW, ITEP – B P Barkov, B V Bolonkin, I A Erofeev, O N Erofeeva, V K Grigoriev, A P Grishin, Y V Katinov, I Y Korolkov, V I Lisin, V N Luzin, V V Miller, V N Nozdrachev, Y P Shkurenko, V V Sokolovsky (√ Spokesperson), G D Tikhomirov, V V Vladimirsky

Accelerator SERPUKHOV *Detector* MIS

Reactions

$\pi^- p \to n\, 2K_S$	40 GeV/c
$\pi^- p \to n\, 2K_S\, \pi^0$	"
$\pi^- p \to n\, K_S\, K_L\, \pi^+\, \pi^-$	"
$\pi^- p \to n\, K_S\, K_L\, \pi^0$	"
$\pi^- p \to K_S\, \pi^+\, \pi^-\, Y^*$(unspec)	"
$\pi^- p \to p\, K_S\, K_L\, \pi^-$	"
$\pi^- p \to n\, \Lambda\, \overline{\Lambda}$	"

$K^- p \rightarrow 2K_S Y^*$(unspec)	"
$K^- p \rightarrow n K_S \pi^+ \pi^-$	"
$K^- p \rightarrow \Lambda \overline{\Lambda} Y^*$(unspec)	"

Particles studied $C(1480)^-$, $C(1480)^0$, $\rho(1700)^0$, $X(3100)$, $\phi(1680)$, $\phi_3(1850)$, $f_2(1720)$, $f_2(1810)$, $f_2(2010)$, $f_4(2050)$, $f_4(2220)$, $K_2^*(1430)^-$

Brief description Extends an earlier $K_S K_S$ and $\Lambda\overline{\Lambda}$ finite states study (SERPUKHOV-147) to the range of masses between 1.8 and 2.5 GeV/c^2. Investigates the $K_S K_L$ system using π^- and K^- beams with the momentum of 40 GeV/c. Studies baryon-antibaryon and $\phi\phi$ states. Searches for $C(1480)$ mesons by detecting $K^0 K^*$ pairs. Uses two charge-particle triggers. Requested 2100 hours.

Related experiments SERPUKHOV-147

SERPUKHOV-174

(Proposed 1986, Approved Apr 1986, Began data-taking May 1986)

PHYSICS OF RELATIVISTIC DIMESON ATOMS

DUBNA – L G Afanasyev, A S Chvyrov, M A Ivanov, V V Karpukhin, A V Kolomyichenko, V I Komarov, V V Kruglov, A V Kuptsov, L L Nemenov (√ Spokesperson), M V Nikitin, Z P Pustylnik
SERPUKHOV – A P Kurov
MOSCOW STATE U – O E Gorchakov, A V Kulikov, S V Trusov, V V Yazkov

Accelerator SERPUKHOV *Detector* Combination

Reactions

$p n \rightarrow$ X	< 70 GeV/c

Brief description Studies Coulomb interaction of π^+ and π^- mesons in final state to estimate the lifetime of $(\pi^+\pi^-)$ atoms.

Journal papers YF 41 (1985) 980, YF 52 (1990) 1046, PL B255 (1991) 146, and PL B308 (1993) 200.

SERPUKHOV-175

(Proposed 1992, Approved 1992)

SINGLE AND PAIR HADRON PRODUCTION WITH LARGE MOMENTUM TRANSFER IN POLARIZED PROTON BEAM

SERPUKHOV – V V Abramov, A F Buzulutskov, A S Dyshkant, A O Efimov, V N Evdokimov, A N Gurzhiev, Y P Korneev, A V Kostritski, A N Krinitsyn, V I Kryshkin (√ Spokesperson), Y M Melnik, V M Podstavkov, S I Tereshchenko, L K Turchanovich, A A Zaichenko

Accelerator SERPUKHOV *Detector* FODS-2

Reactions Polarized beam

$p p \rightarrow$ hadron X	40 GeV/c
$p p \rightarrow \pi^+ \pi^-$ X	"
p nucleus $\rightarrow$ hadron X	"

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SERPUKHOV-177

(Proposed 1990, Approved Jul 1993)

MEASUREMENT OF THE MASS OF THE Σ^- HYPERON

ST PETERSBURG, INP – A S Denisov, O L Fedin, M P Guriyev, Y M Ivanov, P M Levchenko, A A Petrunin, Y P Platonov, A G Sergeev, A I Smirnov (√ Spokesperson), V M Suvorov, A V Zhelamkov

Accelerator SERPUKHOV *Detector* QUARTZ

Reactions

p C $\rightarrow \Sigma^-$ X	70 GeV/c
p Mg $\rightarrow \Sigma^-$ X	"
p Cu $\rightarrow \Sigma^-$ X	"
p Pb $\rightarrow \Sigma^-$ X	"

Particles studied Σ^-

Brief description Approved for 360 hours. QUARTZ is a crystal diffraction spectrometer for hadronic X-rays with a semiconductor detector.

E-mail contact yumi@lnpi.spb.su

SERPUKHOV-UNK-001

(Proposed 1988, Approved Apr 1988, In preparation)

STUDY OF SPIN EFFECTS AT 400 TO 3000 GeV USING AN INTERNAL JET TARGET AT UNK

SERPUKHOV – G A Alekseev, V D Apokin, Y I Arestov, N I Belikov, V V Borog, O V Buyanov, B V Chujko, V V Churakov, V S Datsko, A A Derevshchikov, A M Gorin, O A Grachev, V N Grishin, V A Kachanov, Y V Kharlov, V Y Khodyrev, V G Lapshin, V M Leontiev, I V Manujlov, Y A Matulenko, V A Medvedev, Y M Melnik, A P Meschanin, N G Minaev, V V Mochalov, A A Morozov, V K Myalitsyn, A I Mysnik, S B Nurushev, D I Patalakha, V A Polyakov, A F Prudkoglyad, A I Ronzhin, V I Rykalin, V V Rykalin, V L Rykov, V L Solovianov (√ Spokesperson), L F Soloviev, S M Troshin, M N Ukhanov, A N Vasiliev, A E Yakutin, S V Yerin, A A Zajchenko, G V Zholobov
DUBNA – L S Barabash, S I Bilenkaya, N S Borisov, V A Budilov, V V Fimushkin, M Finger, N V Gorbunov, N L Gorshkova, V A Kalinnikov, A G Karev, Y M Kazarinov, B A Khachaturov, V S Kiselev, B Z Kopeliovich, M I Kulikov, R H Kutuev, E A Ladygin, A B Levkovich, M Y Liburg, V G Luppov, V N Matafonov, A B Neganov, V A Nikitin, P V Nomokonov, V P Obudkovsky, Y K Pilipenko, I L Pisarev, Y A Pliss, A A Popov, I K Potashnikova, M G Shafranova, V V Shutov, V I Snyatkov, Y A Usov, A I Valevich, V P Yershov, N K Zhydkov, I V Zhygulin, R Y Zulkarneev
TBILISI STATE U – N S Amaglobeli, Y S Bagaturia, B G Chiladze, G A Dzhambazishvili, L N Glonty, G G Macharashvili, A I Ocherashvili, R M Sakandelidze, T M Sakhelashvili
MOSCOW STATE U – L I Belzer, A I Demianov, A M Gribushkin, N A Kruglov, A S Proskuryakov, L I Sarycheva, N B Sinev, A A Yershov
MICHIGAN U – V A Anferov, R Baiod, J A Bywater, C M Chu, D G Crabb, D B Crandell, Y S Derbenev, W A Kaufman, A D Krisch (√ Spokesperson), A M T Lin, D C Peaslee, R A Phelps, R S Raymond, D S Shoumkin, D P Stewart, J A Stewart, V K Wong
BROOKHAVEN – L G Ratner
MIT – G R Court, D Kleppner, A Yu

Accelerator SERPUKHOV-UNK *Detector* NEPTUN

Reactions Polarized target

$p p \rightarrow p p$	400–3000 GeV/c
$p p \rightarrow \gamma$ X	"
$p p \rightarrow e^- e^+$ X	"
$p p \rightarrow \mu^- \mu^+$ X	"
$p p \rightarrow$ pion X	"
$p p \rightarrow K^{\pm}$ X	"
$p p \rightarrow \eta$ X	"
$p p \rightarrow \eta'$ X	"
$p p \rightarrow \omega$ X	"
$p p \rightarrow f_2(1270)$ X	"
$p p \rightarrow$ jet X	"
$p p \rightarrow \gamma$ jet X	"
$p p \rightarrow \Lambda$ X	"
$p p \rightarrow \overline{\Lambda}$ X	"

$p\,p \to p\,X$	"
$p\,p \to \bar{p}\,X$	"
$p\,p \to$ hyperon X	"
$p\,p \to \Sigma^+\,X$	"
$p\,p \to \Sigma^-\,X$	"
$p\,p \to \Xi^-\,X$	"
$p\,p \to \Lambda_c^+\,X$	"
p nucleus $\to \gamma\,X$	"
p nucleus $\to e^-\,e^+\,X$	"
p nucleus $\to \mu^-\,\mu^+\,X$	"
p nucleus $\to$ pion X	"
p nucleus $\to K^{\pm}\,X$	"
p nucleus $\to \eta\,X$	"
p nucleus $\to \eta'\,X$	"
p nucleus $\to \omega\,X$	"
p nucleus $\to f_2(1270)\,X$	"
p nucleus $\to$ jet X	"
p nucleus $\to \gamma$ jet X	"
p nucleus $\to \Lambda\,X$	"
p nucleus $\to \overline{\Lambda}\,X$	"
p nucleus $\to p\,X$	"
p nucleus $\to \bar{p}\,X$	"
p nucleus $\to$ hyperon X	"
p nucleus $\to \Sigma^+\,X$	"
p nucleus $\to \Xi^-\,X$	"
p nucleus $\to \Lambda_c^+\,X$	"

Brief description Studies spin effects when the 400 GeV and then 3 TeV protons in the UNK rings collide with a spin-polarized ultra-cold atomic-hydrogen internal jet target. Five different spectrometers will observe spin phenomena in various hadron–hadron reactions at small, medium, and large transverse momenta.

Journal papers PTE 3 (1991) 52, and PTE 4 (1991) 57.

Related experiments BNL-794

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SLAC Experiments

SLAC-E-140X

(Proposed Apr 1988, Approved Jul 1988, Began data-taking Aug 1991, Completed data-taking Sep 1991)

MEASUREMENT OF THE x, Q^2, AND HYDROGEN–DEUTERIUM DEPENDENCE OF $R = \sigma_L/\sigma_T$

AMERICAN U – L Andivahis, R G Arnold, P E Bosted, J Dunne, C E Keppel, A Lung, S E Rock (✓ Spokesperson), M Spengos, Z M Szalata, L H Tao, J White
CEBAF – J Gomez
LIVERMORE – P L Anthony, F Dietrich, L Stuart, K van Bibber
MASSACHUSETTS U, AMHERST – J Button-Shafer, R Hicks, G A Peterson, K Wang
PENN U – A Banerjee, K A Griffioen
ROCHESTER U – A Bodek (✓ Spokesperson), P De Barbaro, R Walker, U K Yang
STANFORD U – S Kuhn
SLAC – S Dasu, R A Gearhart, G M Petratos, E M Riordan, S H Rokni
WASHINGTON U, SEATTLE – M Frodyma, C Hyde-Wright

Accelerator SLAC *Detector* Spectrometer

Reactions

e^- p	3–10 GeV/c
e^- deut	"
e^- Be	"

Brief description Measures the ratio $R = \sigma_L/\sigma_T$ and F_2 in the range $0.1 < x < 0.7$ and $0.5 < Q^2 < 7.0$ (GeV/c)^2. Looks for higher twist contributions beyond the next-to-leading order in QCD and target mass effects. Measures also cross sections and R in the resonance region. Beams from the Nuclear Physics Injector (NPI) in the SLED and the 'normal mode' were used.

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SLAC-E-142

(Proposed Oct 1989, Approved May 1990, Began data-taking Nov 1992, Completed data-taking Dec 1992)

MEASUREMENT OF THE NEUTRON SPIN DEPENDENT STRUCTURE FUNCTION

AMERICAN U – R G Arnold, P E Bosted, J Dunne, C E Keppel, S E Rock, M Spengos, Z M Szalata, J L White
BONN U – W Meyer
CLERMONT-FERRAND U – V Breton, H Fonvieille
HARVARD U – A K Thompson
LBL – G Shapiro
LIVERMORE – P L Anthony, F Dietrich, K van Bibber
MICHIGAN U – T E Chupp
PRINCETON U – G Cates, H L Middleton, N Newbury
SACLAY – H Borel, R Lombard-Nelsen, J Marroncle, J Morgenstern, F M Staley, Y D Terrien
SLAC – R A Gearhart, E W Hughes (✓ Spokesperson), T Maruyama, G M Petratos, R Pitthan, L S Rochester, S H Rokni, M B Woods, C C Young
STANFORD U – D M Kawall, S Kuhn, Z E Meziani
SYRACUSE U – R Holmes, P A Souder, J Xu
WISCONSIN U – H Band, J R Johnson, R A Mair, R Prepost, G H Zapalac

Accelerator SLAC *Detector* Double-arm spectrometer

Reactions Polarized beam and target

e^- ^{3}He	22.66 GeV/c (P_{lab})

Particles studied n

Brief description Studies a polarized electron beam scattering off a polarized ^{3}He gas target. The scattered electrons are detected by a two-arm fixed spectrometer. Tests the Bjorken polarization sum rule and nucleon spin models. Run for 400 hours.

Journal papers PRL 71 (1993) 959.

Related experiments SLAC-E-154

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SLAC-E-143

(Proposed Nov 1991, Approved Dec 1991, Began data-taking Nov 1993, Completed data-taking Feb 1994)

MEASUREMENTS OF THE NUCLEON SPIN STRUCTURE AT SLAC IN END STATION A

E143 COLLABORATION
AMERICAN U – R G Arnold (✓ Spokesperson), P E Bosted, J Dunne, J Fellbaum, D Reyna, S E Rock, M Spengos, Z M Szalata, J L White
BASEL U – A Feltham, I Sick, P Steiner, B Zihlmann
CLERMONT-FERRAND U – V Breton, C Comptour, H Fonvieille, Y Roblin
CEBAF – J Gomez, J H Mitchell
DAPNIA, SACLAY – H Borel, P Grenier, R Lombard-Nelsen, J Marroncle, J Morgenstern, F M Staley, Y D Terrien
LIVERMORE – F Dietrich
MASSACHUSETTS U, AMHERST – J Bauer, J Button-Shafer
MICHIGAN U – T E Chupp, K P Coulter, T B Smith
OLD DOMINION U – C E Hyde-Wright, A Klein, S Kuhn, B Raue
PENN U – R Antonov, K A Griffioen, P Raines
SLAC – P L Anthony, J Clendenin, M Daoudi, H Dutz, R Erbacher, R A Gearhart, E W Hughes, T Maruyama, W Meyer, G M G Petratos, R Pitthan, C Prescott, L S Rochester, S J St Lorant, L M Stuart, H Tang, T Usher, D R Walz, K Witte, C C Young, B Youngman
STANFORD U – D M Kawall
TEMPLE U – Z E Meziani
TOHOKU U – K Abe, T Akagi, M Kuriki, F Suekane, H Yuta
VIRGINIA U – T Averett, J P Chen, D G Crabb, D B Day, E Frlež, R A Lindgren, T J Liu, J S McCarthy (✓ Spokesperson), R C Minehart, D Počanić, O A Rondon (✓ Spokesperson), L C Smith, D Zimmerman
WISCONSIN U – H Band, J R Johnson, R Prepost, G H Zapalac

Accelerator SLAC *Detector* Spectrometer

Reactions Polarized beam and target

e^- deut	9.7, 16.2, 29.1 GeV (E_{lab})
e^- p	"

Particles studied p, n

Brief description Uses high-energy polarized electron beams and a set of ammonia based polarized proton and deuteron targets. Studies the proton and neutron spin structure over the range $0.03 \leq x \leq 0.8$ at momentum transfers greater than 1 (GeV/c)^2. Data analysis in progress (June 94).

Related experiments SLAC-E-142, SLAC-E-154, SLAC-E-155, CERN-NA-037, CERN-NA-047

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SLAC-E-144

(Proposed Oct 1991, Approved Dec 1991, Began data-taking May 1994, In progress)

STUDY OF QED AT CRITICAL FIELD STRENGTH IN INTENSE LASER – HIGH-ENERGY ELECTRON COLLISIONS AT SLAC

E144 COLLABORATION
PRINCETON U – C Bula, K T McDonald (✓ Spokesperson), E Prebys
ROCHESTER U – C Bamber, S Boege, T Kotseroglu, A C Melissinos (✓ Spokesperson), D Meyerhofer, W Ragg
SLAC – D L Burke (✓ Spokesperson), P Chen, R C Field, G Horton-Smith, A C Odian, J E Spencer, D R Walz, M B Woods
TENNESSEE U – S Berridge, W Bugg, A Weidemann

Accelerator SLAC *Detector* Calorimeter, Spectrometer

Reactions Polarized beam

$e^- \gamma$	47 GeV (T_{lab})

Brief description Studies interactions of electrons and photons in collisions of a 47 GeV electron beam and focused picosecond pulses of laser light. In the frame of the electron beam the laser field strength is on the order of the QED critical field strength: $m^2c^3/e\hbar = 1.6 \times 10^{16}$ V/cm. Accessible phenomena include nonlinear Compton scattering, trident production, and Breit-Wheeler pair production. Measures the invariant-mass spectrum of e^+e^- pairs to clarify whether the positron peaks seen at Darmstadt in heavy ion collisions are a strong-field QED effect. Accelerator physics studies include: (a) beamstrahlung effects in which the laser pulse simulates the intense field of a positron bunch, (b) demonstration of a low-emittance positron source, (c) demonstration of laser acceleration of electrons with a gradient of 100 GeV/m. Taking data (May 94).

Related experiments NONE

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SLAC-E-146

(Proposed Jun 1992, Approved Dec 1992, Began data-taking Mar 1993, Completed data-taking Apr 1993)

STUDY OF THE INTERFERENCE BETWEEN MULTIPLE SCATTERING AND BREMSSTRAHLUNG (LPM EFFECT)

AMERICAN U – P E Bosted, J White
LIVERMORE & SLAC – P Anthony
UC, SANTA CRUZ – M Cavalli-Sforza, L A Kelly, S R Klein (√ Spokesperson)
SLAC – R Becker-Szendy, L P Keller, G Niemi, M L Perl, L S Rochester

Accelerator SLAC *Detector* Calorimeter, Wire chamber

Reactions

$e^\pm$ C	8, 25 GeV (E_{lab})
$e^\pm$ Fe	"
$e^\pm$ Wt	"
$e^\pm$ Au	"
$e^\pm$ Pb	"
$e^\pm$ U	"

Particles studied e^-, γ

Brief description Measures the magnitude of the suppression of bremsstrahlung by multiple scattering for high-energy electrons in dense media (known as the Landau-Pomeranchuk-Migdal effect). Studies also the suppression of low-energy photon bremsstrahlung due to dielectric suppression. An End Station A experiment.

Journal papers IEEE TNS (to be published).

Related experiments NONE

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SLAC-E-154

(Proposed Oct 1993, Approved Nov 1993, In preparation)

PRECISION MEASUREMENT OF THE NEUTRON SPIN STRUCTURE FUNCTION USING A POLARIZED ^3He TARGET

AMERICAN U – R Arnold, P Bosted, S Rock, Z Szalata, J White
CLERMONT-FERRAND U – V Breton, H Fonvieille, Y Roblin
UC, BERKELEY & LBL – R Fuzesy, D Pripstein, G Shapiro
SACLAY – H Borel, R Lombard-Nelson, J Marroncle, F Staley, Y Terrien
KENT STATE U – B D Anderson, R Madey, D M Manley, G G Petratos, J W Watson
LIVERMORE – F S Dietrich
MICHIGAN U – T Chupp, K Coulter, T Smith
NIST, WASH, DC – A K Thompson
OLD DOMINION U – S Kuhn
PRINCETON U – G D Cates, K Kumar, H Middleton
SLAC – P Anthony, H Dutz, R Gearhart, E W Hughes (√ Spokesperson), D Kawall, W Meyer, T Murayama, R Pitthan, S H Rokni, L M Stuart, M Woods, C Young
SYRACUSE U – R Holmes, P A Souder, J Xu
TEMPLE U – L Auerbach, J Margulies, J Martoff, Z E Meziani
WISCONSIN U – H Band, J Johnson, R Prepost, G Zapalac

Accelerator SLAC *Detector* Spectrometer

Reactions Polarized beam and target

e^- ^{3}He	48.6 GeV (E_{lab})

Particles studied n

Brief description Measures the neutron spin structure function g_1^n over x ranging from 0.015 to 0.7 and Q^2 ranging from 1 to 16 (GeV/c)^2. Provides also a precision test of the Bjorken sum rule at high average Q^2 at about 5 (GeV/c)^2, and allows an extraction of the quark parton model parameters, Δs and Δq. In preparation (May 94).

Related experiments SLAC-E-142

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SLAC-E-155

(Proposed Oct 1993, Approved Nov 1993, In preparation)

MEASUREMENTS OF NUCLEON SPIN STRUCTURE AT SLAC IN END STATION A

AMERICAN U – R G Arnold (√ Spokesperson), P E Bosted, J Dunne, J Fellbaum, D Reyna, S E Rock, M Spengos, Z M Szalata, J L White
BASEL U – A Feltham, I Sick, P Steiner, B Zihlmann
BONN U – W Meyer
CEBAF – J Gomez
CLERMONT-FERRAND U – V Breton, C Comptour, H Fonvieille, Y Roblin
LIVERMORE – P L Anthony, F Dietrich
MASSACHUSETTS U, AMHERST – J Bauer, J Button-Shafer
MICHIGAN U – T E Chupp, K P Coulter, T B Smith
NAVAL POSTGRADUATE SCHOOL – D Garvey, X K Maruyama
OLD DOMINION U – C E Hyde-Wright, A Klein, B Raue
PENN U – R Antonov, K A Griffioen, P Raines
DAPNIA, SACLAY – T Akagi, H Borel, R Erbacher, P Grenier, R Lombard-Nelsen, J Marroncle, J Morgenstern, F M Staley, Y D Terrien
SLAC – J Clendenin, G Court, M Daoudi, H Dutz, R A Gearhart, E W Hughes, T Maruyama, G M G Petratos, R Pitthan, C Prescott, A Rijllart, L S Rochester, S J St Lorant, L M Stuart, H Tang, T Usher, D R Walz, K Witte, C C Young, B Youngman
STANFORD U – D M Kawall, S Kuhn, Z E Meziani
TOHOKU U – K Abe, M Kuriki, F Suekane, H Yuta
VIRGINIA U – T Averett, J P Chen, D G Crabb, D B Day, E Frlež, S Hoibraten, R A Lindgren, T J Liu, J S McCarthy (√ Spokesperson), R C Minehart, J H Mitchell, D Počanić, O A Rondon, L C Smith, D Zimmerman
WISCONSIN U – H Band, J R Johnson, R Prepost, G H Zapalac

Accelerator SLAC *Detector* Spectrometer

Reactions Polarized beam and target

e^- n	48.55 GeV (E_{lab})
e^- p	"

Particles studied n, p

Brief description Measures the deep inelastic scattering of polarized electrons from polarized ammonia targets, NH_3 and ND_3, to determine the spin structure functions g_1 and g_2 over x ranging from 0.015 to 0.85 and Q^2 ranging from 1 to 17 (GeV/c)^2. The data will double the Q^2 range of precision measurements and allow a search for nonscaling higher twist contributions to the spin structure functions. Uses a new pair

of focussing magnetic spectrometers instrumented with shower counters, Cerenkov counters, and scintillator hodoscopes to measure scattered electrons and reject pions. In preparation (May 94).

Related experiments SLAC-E-142, SLAC-E-143, CERN-NA-037, CERN-NA-047

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SLAC-NE-11

(Proposed Oct 1987, Approved Apr 1987, Began data-taking Jan 1989, Completed data-taking Feb 1989)

A PROPOSAL TO SEPARATE THE CHARGE AND MAGNETIC FORM FACTORS OF THE NEUTRON AND PROTON AT LARGE MOMENTUM TRANSFER

AMERICAN U – L Andivahis, R G Arnold, D Benton, P E Bosted (√ Spokesperson), C E Keppel, A Lung, S E Rock, M Spengos, Z M Szalata, L H Tao
CEBAF – J Gomez
UC, DAVIS – L Stuart
LIVERMORE – F Dietrich, K van Bibber
MARYLAND U – G C C Chang
MASSACHUSETTS U, AMHERST – R Hicks, R Miskimen, G A Peterson, S Rokni
NIST, WASH, DC – W R Dodge
PENN U – K A Griffioen
ROCHESTER U – G M Petratos, W Sakumoto
SLAC – R Gearhart
STANFORD U – S Kuhn
TEL AVIV U – J Alster, J Lichtenstadt
WASHINGTON U, SEATTLE – C E Hyde-Wright, K Swartz

Accelerator SLAC *Detector* Spectrometer

Reactions

e^- p	1.5 – 10 GeV (E_{lab})
e^- deut	"
e^- Al	"

Particles studied p, n

Brief description Measures elastic and inelastic scattering from the proton and quasielastic and inelastic scattering from deuteron and aluminum. The principal aim is to separate the charge and magnetic form factors of proton and neutron at momentum transfers from 1.75 to 7 $(GeV/c)^2$. Uses the 8-GeV/c Spectrometer to detect electrons at forward angles and the 1.6-GeV/c Spectrometer for electrons scattered at 90°. Uses beam from the Nuclear Physics Injector (NPI). Ran for six weeks. Data analysis in progress (May 94).

Journal papers NP A527 (1991) 339c, PR C46 (1992) 2505, PRL 68 (1992) 3841, NP A553 (1993) 713c, and PRL 70 (1993) 718.

Related experiments SLAC-E-136

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SLAC-NE-17

(Proposed Nov 1989, Approved Jun 1991, Began data-taking Aug 1991, Completed data-taking Oct 1991)

TWO-BODY PHOTODISINTEGRATION OF THE DEUTERON AT FORWARD ANGLES BETWEEN 1.0 AND 3.0 GeV

ARGONNE – K P Coulter, D F Geesaman, R J Holt (√ Spokesperson), H E Jackson, V Papavassiliou, D H Potterveld, B Zeidman
AMERICAN U – R G Arnold, P E Bosted, C E Keppel, A Lung, S E Rock, M Spengos, Z M Szalata, L H Tao, J White
CAL TECH – J Arrington, E Beise, E Belz, B W Filippone, H Gao, W Lorenzon, R D McKeown, B Mueller, T O'Neill
CAL STATE, LA – M Epstein, D Margaziotis
COLORADO U – E R Kinney
CEBAF – J Napolitano
ILLINOIS U, URBANA – D Beck
LIVERMORE – P Anthony, F Dietrich, K van Bibber
MIT, LNS – M Chapman, R Ent, O Hansen, K Lee, N Makins, R G Milner, J Nelson
NORTHWESTERN U – R E Segel
STANFORD U – S Kuhn, Z E Meziani
SLAC – G M Petratos
WISCONSIN U – H Bulten, C Jones, J F J van den Brand

Accelerator SLAC *Detector* Spectrometer

Reactions

γ deut $\rightarrow p\,n$	1.0 – 3.0 GeV (E_{lab})

Particles studied deut

Brief description An extension of the SLAC-NE-08 experiment at higher momentum transfers. Makes use of bremsstrahlung photons produced by the SLAC electron beam. Uses the 8-GeV/c Spectrometer instrumented to detect protons.

Related experiments SLAC-NE-08, CEBAF-89-012

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SLAC-NE-18

(Proposed Dec 1989, Approved Feb 1990, Began data-taking Aug 1991, Completed data-taking Oct 1991)

MEASUREMENT OF THE NUCLEAR DEPENDENCE AND MOMENTUM TRANSFER DEPENDENCE OF QUASIELASTIC $(e, e'p)$ SCATTERING AT LARGE MOMENTUM TRANSFER

MIT, LNS – M Chapman, R Ent, O Hansen, K Lee, N Makins, R G Milner (Spokesperson), J Nelson
CAL TECH – E Beise, J E Belz, B W Filippone (Spokesperson), W Lorenzon, R D McKeown, T O'Neill, C Woodward
ARGONNE – K P Coulter, D F Geesaman, R J Holt, H E Jackson
AMERICAN U – R G Arnold, P E Bosted, C E Keppel, S E Rock, M Spengos, Z M Szalata, L H Tao, J White
CAL STATE, LA – M Epstein, D Margaziotis
COLORADO U – E R Kinney
STANFORD U – S Kuhn
SLAC – G M Petratos
WISCONSIN U – H Bulten, C Jones, J F J van den Brand

Accelerator SLAC *Detector* Spectrometer

Reactions

e^- nucleon	1.9 – 5.1 GeV (E_{lab})

Brief description Makes coincidence measurements of the quasielastic $(e, e'p)$ cross section on several nuclei, from carbon to gold, in the Q^2 range of 1 to 7 $(GeV/c)^2$. One of the aims is to look for evidence of color transparency. Uses the 1.6-GeV/c Spectrometer for detection of electrons, and the 8-GeV/c Spectrometer for recoil proton detection.

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SLAC-PEP-04-09

(Proposed Dec 1976, Approved Jan 1977, Began data-taking Oct 1982, Completed data-taking Oct 1990)

THE TIME PROJECTION CHAMBER AND 2-GAMMA DETECTOR AT PEP

TPC/TWO GAMMA COLLABORATION
LBL – A R Clark, O Dahl, D Lambert, G Lynch, R Madaras, N A Nicol, D R Nygren, M Pripstein, M Ronan (Spokesperson), R R Ross, G Shapiro, M L Stevenson, W A Wenzel
UC, BERKELEY – H H Bingham, J Lys, G P Yost
UC, DAVIS – D Pellett
UC INTERCAMPUS INST – A M Eisner, M K Sullivan, Y X Wang
UC, SAN DIEGO – G Masek, W Vernon
UC, SANTA BARBARA – D A Bauer, D O Caldwell, A Lu, S Yellin
UCLA – R Berg, C D Buchanan, S B Chun, S Khacheryan, Y T Oyang, H Yamamoto

AMES LAB – J M Hauptman
HEIDELBERG, MAX PLANCK INST – W Hofmann, K T Knopfle, M F Spahn
MASSACHUSETTS U, AMHERST – R Belcinski, R R Kofler (Spokesperson), M G Strauss
SLAC – E Bloom, K Ecklund, K H Fairfield, G L Godfrey, R Holtzapple, H Marsiske, G H Zapalac

Accelerator SLAC-PEP *Detector* TPC, 2-GAMMA

Reactions
$e^+ e^-$ 29 GeV (E_{cm})

Brief description Physics objectives include the study of (1) hadronization of quarks into jets of hadrons, (2) particle composition of jets, (3) correlations in meson and baryon production, (4) properties of τ lepton decays, and (5) two-photon processes. The detection apparatus consists of a time projection chamber (TPC), superconducting solenoid magnet, electromagnetic calorimeter, muon detector, and a forward detector for 2γ studies.

Journal papers IEEE TNS 30 (1983) 63, IEEE TNS 30 (1983) 67, IEEE TNS 30 (1983) 76, IEEE TNS 30 (1983) 117, IEEE TNS 30 (1983) 153, IEEE TNS 30 (1983) 162, NIM 217 (1983) 259, PRL 52 (1984) 168, PRL 52 (1984) 577, PRL 52 (1984) 2201, PRL 52 (1984) 2332, PRL 53 (1984) 130, PRL 53 (1984) 2199, PRL 53 (1984) 2378, PRL 53 (1984) 2465, PR D30 (1984) 2436, ZPHY C27 (1985) 39, ZPHY C27 (1985) 187, ZPHY C27 (1985) 495, PRL 54 (1985) 270, PRL 54 (1985) 274, PRL 54 (1985) 763, PR D31 (1985) 996, PRL 54 (1985) 2564, PR D31 (1985) 2719, PRL 55 (1985) 1047, ZPHY C28 (1985) 31, PR D33 (1986) 844, PRL 57 (1986) 51, PRL 57 (1986) 404, PRL 57 (1986) 945, PRL 57 (1986) 1836, PRL 57 (1986) 2500, PRL 57 (1986) 3140, PRL 57 (1986) 3245, PR D34 (1986) 1945, PL B184 (1987) 114, PL B184 (1987) 299, PRL 58 (1987) 97, PR D35 (1987) 1553, PR D35 (1987) 2650, ZPHY C34 (1987) 1, PRL 59 (1987) 751, PR D36 (1987) 3506, PRL 60 (1988) 2355, PR D37 (1988) 28, PR D38 (1988) 1, PL B209 (1988) 107, PRL 61 (1988) 1263, ZPHY C44 (1989) 357, PR D40 (1989) 2772, PRL 64 (1990) 172, PL B252 (1990) 499, PR D41 (1990) 2667, PR D43 (1991) 29, PL B302 (1993) 345, PR D48 (1993) 3976, and PR D50 (1994) 13.

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SLAC-SLC-SLD

(Proposed 1983, Approved May 1984, Began data-taking Apr 1991, In progress)

THE SLD DETECTOR FOR THE SLC

SLD COLLABORATION
ADELPHI U – R Steiner
BOSTON U – J A Coller, J T Shank, J S Whitaker
BRUNEL U – N J Allen, S Hedges, A K McKemey, S J Watts
CINCINNATI U – A D'Oliveira, B T Meadows, M Nussbaum
COLORADO U – G J Baranko, C G Fan, N M Krishna, U Nauenberg
COLORADO STATE U – M Dima, R J Wilson
COLUMBIA U – S Ghosh, B E Nachumi, P C Rowson, M H Shaevitz
FERRARA U & INFN, FERRARA – E Mazzucato, L Piemontese
FRASCATI – A Calcaterra, R De Sangro, I Peruzzi, M Piccolo
ILLINOIS U, URBANA – B I Eisenstein, G Gladding, I Karliner
LBL – B A Schumm, G Shapiro, H Steiner
MASSACHUSETTS U, AMHERST – S S Hertzbach, R R Kofler, M G Strauss
MIT – O Bardon, P N Burrows, R F Cowan, M J Fero, H W Kendall, A Lath, L S Osborne, J Quigley, F E Taylor, E Torrence, R Verdier, D C Williams, R K Yamamoto, Z Zhang
NAGOYA U – R Kajikawa, Y Ohnishi, A Sugiyama, S Suzuki
OREGON U – J E Brau, R Frey, K Furuno, J Huber, H Hwang, M Langston, H Park, K T Pitts, N B Sinev, X Yang, J Zhou
PERUGIA U & INFN, PERUGIA – D Falciai, G Mancinelli, G Mantovani, R Massetti
RUTGERS U – K G Baird, P Jacques, M Kalelkar, R J Plano, P Stamer
RUTHERFORD – C J S Damerell, T Gillman, D J Jackson, F J Wickens
SLAC – T Akagi, D Aston, T L Barklow, J R Bogart, G R Bower, M Breidenbach (✓ Spokesperson), D Burke, D H Calloway, R Cassell, M Daoudi, R Dubois, R D Elia, M D Hildreth, M E Huffer, E W Hughes, J A Jaros, C P Jessop, A S Johnson, T Junk, H Kawahara, M E King, R King, D W G Leith, H L Lynch, T W Markiewicz, T Maruyama, H Masuda, T S Mattison, R Messner, K C Moffeit, D Muller, T Nagamine, H Neal, T J Pavel, C Y Prescott, G D Punkar, B N Ratcliff, P E Rensing, L S Rochester, J J Russell, O H Saxton, S F Schaffner, R H Schindler, C Simopoulos, S R Smith, D Su, M Swartz, A Tolstykh, T Usher, J Va'vra, E N Vella, S R Wagner, A P Waite, S H Williams, W J Wisniewski, M B Woods, C C Young
SOGANG U – C J Ahn, H J Kang, Y Kim
TENNESSEE U – B Bugg, H O Cohn, P Du, E L Hart, R S Kroeger, A W Weidemann, S L White
TOHOKU U – K Abe, Y Hasegawa, Y Iwasaki, F Suekane, H Yuta
UC, SANTA BARBARA – A Lu, S J Yellin
UC, SANTA CRUZ – G Blaylock, D G Coyne, X Liu, T Schalk, D A Williams
VANDERBILT U – R S Panvini, T W Reeves, J P Venuti
WASHINGTON U, SEATTLE – T H Burnett, E Church, V Cook, J K Eisenberg, J Ma, P M Mockett, A Szumilo, E R Weiss
WISCONSIN U – H R Band, J R Johnson, R Prepost, V V Serbo, G Zapalac
YALE U – C Baltay (✓ Spokesperson), M B Barakat, W T Emmet, G Grigoryev, M X Liu, S Manly, S Sen, J A Snyder, S Willocq

Accelerator SLAC-SLC *Detector* SLD

Reactions Polarized beam
$e^+ e^-$ <100 GeV (E_{cm})

Particles studied Z^0

Brief description Studies include (1) precision tests of the Standard Model of the electroweak interactions and the Z partial width to bottom states, particularly by measuring the left–right polarization asymmetry A_{LR}, (2) heavy quark physics of the B system, (3) $B\,\bar{B}$ mixing with polarized beams, (4) tests of QCD in multi-jets, and (5) a search for new phenomena. The detector system consists of a high-precision CCD vertex detector, a cylindrical central drift chamber with four circular endcap drift chambers, a Čerenkov ring-imaging detector, finely segmented projective tower geometry calorimetry, and a muon tracking system. Taking data (June 94).

Journal papers NIM A238 (1985) 489, IEEE TNS 33 (1986) 46, IEEE TNS 33 (1986) 65, IEEE TNS 33 (1986) 81, IEEE TNS 33 (1986) 113, IEEE TNS 33 (1986) 167, IEEE TNS 33 (1986) 176, IEEE TNS 33 (1986) 194, IEEE TNS 33 (1986) 197, IEEE TNS 33 (1986) 201, IEEE TNS 33 (1986) 261, NIM A252 (1986) 295, NIM A257 (1987) 139, NIM A257 (1987) 625, IEEE TNS 35 (1988) 231, IEEE TNS 35 (1988) 282, IEEE TNS 35 (1988) 311, IEEE TNS 35 (1988) 398, NIM A264 (1988) 219, NIM A265 (1988) 99, NIM A273 (1988) 858, IEEE TNS 36 (1989) 23, IEEE TNS 36 (1989) 276, IEEE TNS 36 (1989) 339, IEEE TNS 36 (1989) 595, IEEE TNS 36 (1989) 675, IEEE TNS 36 (1989) 751, IEEE TNS 36 (1989) 822, IEEE TNS 36 (1989) 1657, NIM A275 (1989) 484, NIM A276 (1989) 94, NIM A277 (1989) 222, NIM A283 (1989) 582, NIM A283 (1989) 590, NIM A284 (1989) 339, IEEE TNS 37 (1990) 1132, IEEE TNS 37 (1990) 1191, NIM A288 (1990) 236, NIM A289 (1990) 449, NIM A289 (1990) 463, NIM A289 (1990) 577, NIM A290 (1990) 353, NIM A293 (1990) 136, IEEE TNS 38 (1991) 348, NP (PROC SUPPL) B23 (1991) 219, NP (PROC SUPPL) B23 (1991) 227, NIM A300 (1991) 501, NIM A328 (1993) 472, MPL A8 (1993) 2237, PRL 70 (1993) 2515, PRL 71 (1993) 2528, and PRL 73 (1994) 25.

E-mail contact mib@slac.stanford.edu, mib@slacsld.bitnet, baltay@yalehep.bitnet

Related experiments CERN-LEP-ALEPH, CERN-LEP-DELPHI, CERN-LEP-L3, CERN-LEP-OPAL

WWW Home-page
http://www-sld.slac.stanford.edu/sldwww/sld.html

SLAC-SLC-6

(Proposed Apr 1983, Approved May 1983, Began data-taking Apr 1989, Completed data-taking 1990)

MARK-II AT THE SLC

CAL TECH – B C Barish, M Kuhlen, J McKenna, B Milliken, C Peck, F Porter, R Stroynowski, A Weinstein, A Weir
CERN – J F Kral
COLORADO U – D D Durrett, W T Ford, D Hinshaw, P Rankin, J G Smith, P Weber
FERMILAB – J Hylen, E Wicklund
HAWAII U – A M Breakstone, R Cence, F Harris, C Kenney, S Parker
INDIANA U – D A Averill, D Blockus, B Brabson, G G Hanson, W N Murray, H Ogren, D Rust, M Yurko
IOWA STATE U – J Hill, F K Wohn
JOHNS HOPKINS U – B A Barnett, P Dauncey, D Drewer, B D Harral, J Matthews
LBL – G S Abrams, S Bethke, G Gidal, G Goldhaber (Spokesperson), R Harr, C Hearty, J A Kadyk, M Levi, F Rouse, M Schaad, B A Schumm, G Trilling
MICHIGAN U – J Chapman, M Chmeissani, E C Gero, S J Hong, W Koska, R P Thun, D Wu
OREGON U – R E Frey
SLAC – C Adolphsen, J Ballam, T L Barklow, A M Boyarski, F Bulos, D L Burke, D Cords, H DeStaebler, J Dorfan, R Elia, G Feldman (Spokesperson), R C Field, B H Fong, D H Fujino, T Glanzman, T M Himel, D P Hutchinson, W Innes, J A Jaros (Spokesperson), M E King, D S Koetke, L A Kowalski, W Kozanecki, V G Luth, T Mattison, K C Moffeit, C T Munger, K O'Shaughnessy, M L Perl, M G Petradza, R Pitthan, A E Snyder, E J Soderstrom, D P Stoker, M Swartz, R E Taylor, E L Veum, S R Wagner, M B Woods
SSCL – D P Coupal
UC, SANTA CRUZ – P Burchat, D E Dorfan, C Gatto, J Gomez-Cadenas, G Gratta, C A Heusch, J Kent, L Labarga, A Litke, H Sadrozinski, A Seiden, C Von Zanthier, S Watson, C Zaccardelli
VANDERBILT U – J E Bartelt

Accelerator SLAC-SLC *Detector* MARK-II

Reactions

$e^+ e^-$	<100 GeV (E_{cm})

Particles studied Z^0, B, higgs, top, τ

Brief description Studies include (1) measurement of Z^0 mass and width and determination of the number of light neutrinos, (2) tests of standard-model electroweak predictions in dilepton final states, (3) a search for new heavy quarks and leptons, (4) a search for Higgs particles, (5) tests of QCD in multi-jets, (6) measurement of b-fractions and properties of b events, and (7) a search for new phenomena. Uses an existing PEP detector, the MARK-II. A high resolution vertex detector system was installed in December 1989 and successfully operated in 1990.

Journal papers PRL 63 (1989) 724, PRL 63 (1989) 1558, PRL 63 (1989) 2173, PRL 63 (1989) 2447, PRL 63 (1989) 2780, PRL 64 (1990) 987, PRL 64 (1990) 1091, PRL 64 (1990) 1211, PRL 64 (1990) 1334, PRL 64 (1990) 2877, PRL 64 (1990) 2881, PRL 64 (1990) 2980, PRL 64 (1990) 2984, PR D41 (1990) 3542, PRL 67 (1991) 3347, and PR D46 (1992) 453.

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SLAC-SP-032

(Proposed May 1981, Approved May 1981, Began data-taking Apr 1982, Completed data-taking Dec 1988)

MARK-III AT SPEAR

MARK-III COLLABORATION
CAL TECH – G P Dubois, G Eigen, D G Hitlin, C Matthews, A Weinstein, W Wisniewski
SLAC – K O Bunnell, R E Cassell, D H Coward, J Labs, A C Odian, R H Schindler (Spokesperson), W H Toki (Spokesperson), F Villa
UC, SANTA CRUZ – M Burchell, D Dorfan, C A Heusch, W Lockman, H Sadrozinski, T Schalk, A Seiden, R C Xu
ILLINOIS U, URBANA – B I Eisenstein, G E Gladding, J Izen, G Stewart
IOWA U – U Mallik, M Z Wang
WASHINGTON U, SEATTLE – T H Burnett, V Cook, A D Li, P Mockett, L W H Parrish

Accelerator SLAC-SPEAR *Detector* MARK-III

Reactions

$e^+ e^-$	3.097, 3.686, 3.770, 4.14 GeV (E_{cm})

Particles studied D^0, D^+, D^-, D_s^+, $\psi(3770)$, $J/\psi(1S)$, $\psi(2S)$, $\eta_c(1S)$

Brief description MARK-III is a general purpose detector for the study of hadronic final states in e^+e^- annihilation. It is optimized for the reconstruction of exclusive decays of charmed particles. The trigger chamber was replaced in 1986 by a new high resolution vertex detector. The physics program is focused on detailed studies of the J/ψ system and higher ψ states, D mesons (branching fractions, rare decays, mixing, dynamical features of decays), and the τ lepton.

Journal papers PRL 52 (1984) 2126, PRL 54 (1985) 1976, PR D32 (1985) 566, PR D32 (1985) 2883, PRL 55 (1985) 150, PRL 55 (1985) 1723, PRL 55 (1985) 1842, PR D33 (1986) 629, PR D33 (1986) 1222, PRL 56 (1986) 107, PRL 56 (1986) 2136, PRL 56 (1986) 2140, PR D35 (1987) 2077, PRL 58 (1987) 2171, PL B193 (1987) 147 [erratum: PL B198 (1987) 590], PR D36 (1987) 2185, PL B196 (1987) 107, PRL 59 (1987) 186, PRL 59 (1987) 1527, PR D37 (1988) 2023 [erratum: PR D40 (1989) 3788], PRL 60 (1988) 89, PRL 60 (1988) 1375 [erratum: PRL 63 (1989) 1658], PR D38 (1988) 2695 [erratum: PR D40 (1989) 3788], PL B208 (1988) 152 [erratum: PL B227 (1989) 501], PRL 62 (1989) 1821, PR D40 (1989) 906, PRL 63 (1989) 1211 [erratum: PRL 63 (1989) 2858], PRL 64 (1990) 169, PR D41 (1990) 1410, PRL 64 (1990) 2615, PRL 65 (1990) 686, PRL 65 (1990) 1309, PRL 65 (1990) 2507, PL B263 (1991) 135, PRL 66 (1991) 1011, NP A527 (1991) 753, PRL 68 (1992) 282 [erratum: PRL 69 (1992) 3689], and PR D45 (1992) 2196.

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TRIUMF Experiments

TRIUMF-298

(Proposed Dec 1984, Approved Dec 1984, Completed data-taking Nov 1989)

RESONANT STRUCTURE IN $Cu(p,\pi^+)X$: A POSSIBLE DIBARYON SIGNAL

TRIUMF – R Abegg, S Burzynski, A Celler, D Frekers, R Helmer, K P Jackson, J Lu, C A Miller, R Schubank, A Trudel, M C Vetterli, Y S Wu, S Yen (✓ Spokesperson)
ST PETERSBURG, INP – I I Strakovsky
WESTERN ONTARIO U – W P Alford

Accelerator TRIUMF *Detector* Spectrometer

Reactions

p Cu $\rightarrow \pi^+$ X	341–376 MeV (T_{lab})
p Cu $\rightarrow \pi^-$ X	"

Particles studied dibaryon

Brief description No resonant structure observed in the π^+ or π^- yields.

Journal papers PL B269 (1991) 59. No other papers expected.

E-mail contact stan@triumf.ca

TRIUMF-304

(Proposed Oct 1984, Approved Dec 1984, Began data-taking Jul 1985, Completed data-taking Aug 1988)

MUONIUM–ANTIMUONIUM CONVERSION

VICTORIA U – G A Beer, A C Janisson, G R Mason, A Olin (✓ Spokesperson)
BRITISH COLUMBIA U – J B Warren
ARIZONA U – T Bowen, P G Halverson
WYOMING U – T Huber, A R Kunselman
TRIUMF – K Kendall, G M Marshall
SIMON FRASER U – B Heinrich, K Myrtle

Accelerator TRIUMF *Detector* Wire chamber, Counter

Reactions

$\mu^+ e^- \rightarrow \mu^- e^+$	20–29 MeV/c

Journal papers PRL 57 (1986) 611, PRL 61 (1988) 2189, PR D41 (1990) 2709, and PR A42 (1990) 161.

E-mail contact olin@triumf.ca

TRIUMF-332

(Proposed Oct 1984, Approved 1984, Completed data-taking 1988)

RATIO OF SPIN TRANSFER PARAMETERS D_t/R_t

DT/RT COLLABORATION
MANITOBA U – D Bandgopadhyoy, J Birchall, N E Davison, S A Page, W D Ramsey, W T H van Oers
MANITOBA U & TRIUMF – C A Davis (✓ Spokesperson)
ALBERTA U – P W Green, C Lapointe, G A Moss, R R Tkachuk
ALBERTA U & TRIUMF – R Abegg, L G Greeniaus, C A Miller

Accelerator TRIUMF *Detector* Counter

Reactions Polarized beam

p deut $\rightarrow n\ p\ p$	220, 325, 425, 495 MeV (T_{lab})

Brief description Measures the ratio of the Wolfenstein parameters D_t and R_t in the quasielastic nucleon scattering from deuteron. Studies the charge exchange, $\vec{p} \rightarrow \vec{n}$. Uses a scintillator and DLC's.

Journal papers PR C38 (1988) 2173. No other papers expected.

Related experiments TRIUMF-182, TRIUMF-498, TRIUMF-565

E-mail contact cymru@triumf.ca

TRIUMF-360

(Proposed Nov 1985, Approved Dec 1985)

POLARIZATION TRANSFER IN $\pi\vec{d}$ ELASTIC SCATTERING

TRIUMF – P Dehij, D Gill, D Healey, D Ottewell, G Wait
BRITISH COLUMBIA U – A Altman
SASKATCHEWAN U – I Chun, K Itoh, Y M Shin (Spokesperson), N Stevenson
TORONTO U – T Drake, R Schubank

Accelerator TRIUMF *Detector* ?

Reactions Polarized target

π^+ deut $\rightarrow \pi^+$ deut	160 MeV (T_{lab})

E-mail contact shin@skyblu.usask.ca, shin@triumf.ca

TRIUMF-369

(Proposed Dec 1985, Approved Dec 1985, Began data-taking 1991, Completed data-taking Mar 1993)

CHARGE SYMMETRY BREAKING IN np ELASTIC SCATTERING AT 350 MeV

TRIUMF – R Abegg, P P J Delheij, P W Green, D C Healey, R Helmer, C D P Levy, C A Miller, A N Zelenski
DELFT UNIV TECH – H Postma
MANITOBA U –A R Berdoz, J Birchall, J R Campbell, C A Davis, L P Gan, L Lee, S A Page, W D Ramsay, W T H van Oers (✓ Spokesperson), J G Zhao
ALBERTA U – L G Greeniaus (✓ Spokesperson), N Kolb, E Korkmaz, J Li, A K Opper, J Soukup, G M Stinson

Accelerator TRIUMF *Detector* Counter, Wire chamber

Reactions Polarized beam and target

$n\ p \rightarrow n\ p$	350 MeV (T_{lab})

Particles studied n, p

Brief description Studies the isospin-mixing component of the np interaction by measuring the analyzing power differences. Uses a frozen spin target. Data analysis in progress (June 94).

Related experiments TRIUMF-121, TRIUMF-704, IUCF-E-080

E-mail contact gree@phys.ualberta.ca, vanoers@triumf.ca

TRIUMF-372

(Approved Dec 1985, Completed data-taking Feb 1991)

SINGLE PION PRODUCTION IN np SCATTERING

MANITOBA U –A R Berdoz, J Birchall, J R Campbell, C A Davis, N E Davison (Spokesperson), W R Falk, S A Page, W D Ramsay, W T H van Oers
TRIUMF – P W Green, D A Hutcheon, C A Miller
TEXAS U – P J Riley
HOUSTON U – B W Mayes, L Pinsky
RICE U – D L Adams, G W Mutchler
CAL STATE, LA – M Epstein, D J Margaziotis

Accelerator TRIUMF *Detector* Wire chamber, Counter

Reactions Polarized beam

$n\ p \rightarrow p\ p\ \pi^-$	450 MeV (T_{lab})

Brief description Data analysis in progress (May 94).

E-mail contact davison@umphys.physics.umanitoba.ca

TRIUMF-375

(Completed data-taking 1988)

FEW-BODY PHYSICS VIA THE PION–DEUTERON BREAKUP REACTION

REGINA U – G Huber, G J Lolos, E L Mathie (Spokesperson), S I H Naqvi, V Pafilis, Z Papandreou
BRITISH COLUMBIA U – G Jones, M E Sevior, P Trelle
TRIUMF – P Delheij, D R Gill, D Healey, D Ottewell, G R Smith, G Wait

Accelerator TRIUMF *Detector* Counter

Reactions Polarized target

pion deut → pion p n	134, 180, 228 MeV (T_{lab})

Brief description The experiment has two distinct parts. TRIUMF-375A measures unpolarized cross sections with a liquid target. Data taking for this phase was completed in 1986. TRIUMF-375B studies analyzing powers with a polarized target. Data taking was completed in 1988. Pions and protons are detected by measuring the time of flight.

Journal papers PR C41 (1990) 193.

E-mail contact mathie@meena.cc.uregina.ca, mathie@triumf.ca

TRIUMF-399

(Proposed 1987, Approved 1987, Began data-taking 1987, Completed data-taking Jul 1990)

MEASUREMENT OF $\pi^{\pm}d$ ELASTIC SCATTERING DIFFERENTIAL CROSS SECTIONS AT T_π = 30, 50, AND 65 MeV

COLORADO U – B Clausen, M D Kohler, J J Kraushaar, B J Kriss, R A Ristinen (√ Spokesperson), K Vaziri
TRIUMF – J T Brack, D F Ottewell, G R Smith (√ Spokesperson)
BRITISH COLUMBIA U – M Kermani, M E Sevior, R P Trelle
KARLSRUHE U – J Jaki, M Metzler
CAL STATE, SACRAMENTO – E F Gibson
SASKATCHEWAN U – N R Stevenson

Accelerator TRIUMF *Detector* Counter

Reactions

π^+ deut → π^+ deut	30, 50, 65 MeV (T_{lab})
π^- deut → π^- deut	"

Brief description An active deuterated target (CD scintillator) was used to detect recoil deuterons in coincidence with scattered pions. Absolute differential cross sections and charge asymmetries were calculated.

Journal papers PR C44 (1991) 15, and PR C48 (1993) 1884.

Related experiments TRIUMF-377, TRIUMF-399, TRIUMF-502

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TRIUMF-445

(Completed data-taking 1993)

POLARIZATION MEASUREMENT IN THE ^{3}He$(\pi^+, \vec{p}p)p$ REACTION

TEL AVIV U – J Aclander, A Altman, D Ashery (Spokesperson), H Hahn, S MayTal-Beck (Spokesperson), M A Moinester, A Rahav
BRITISH COLUMBIA U – A Feltham, G Jones, M Pavan, M Sevior
TRIUMF – D Hutcheon, D Ottewell, G R Smith
HELSINKI U – J A Niskanen

Accelerator TRIUMF *Detector* Drift chamber, Scintillator

Reactions

π^+ ^{3}He → p p p X	120, 165, 250 MeV (T_{lab})

Brief description Uses liquid ^{3}He and solid CD_2 targets, the latter providing free deuterons for the $\pi^+ d \rightarrow \vec{p}p$ reaction with which the system could be checked and calibrated. Protons are detected in coincidence by a two-arm detection system. One arm consists of a proton polarimeter and the second is an array of plastic scintillators.

Journal papers PRL 68 (1992) 3012, and PL B300 (1993) 19.

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TRIUMF-452

(Proposed Nov 1986, Approved Jul 1987, Began data-taking Aug 1990, Completed data-taking Feb 1994)

RADIATIVE MUON CAPTURE ON HYDROGEN

RMC COLLABORATION
BRITISH COLUMBIA U – C Q Chen, P Gumplinger, M D Hasinoff (√ Spokesperson), A J Larabee, E Saettler, D G Sample, S Veillette, N S Zhang
VIRGINIA TECH – D S Armstrong, M Blecher, C M Sigler
TRIUMF – J A Macdonald, J M Poutissou, R Poutissou, T von Egidy, D H Wright
MELBOURNE U – R Henderson, S C McDonald, M Munro, G N Taylor
MONTREAL U – G Azuelos (√ Spokesperson), P Depommier, B Doyle, G Jonkmans
PSI, VILLIGEN – W Bertl
KENTUCKY U – T P Gorringe
QUEENS U, KINGSTON – B C Robertson

Accelerator TRIUMF *Detector* Drift chamber

Reactions

μ^- p → n ν_μ γ	0 MeV (T_{lab})

Brief description Extracts the induced pseudoscalar coupling constant g_p of the weak hadronic current. Target is isotopic liquid hydrogen. Data analysis in progress (May 94).

Journal papers IEEE TNS 37 (1990) 1116, IEEE TNS 37 (1990) 1200, NIM A320 (1992) 249, ZPHY C56 (1992) 515, and PR C46 (1992) 1094.

Related experiments TRIUMF-592, TRIUMF-670

E-mail contact miha@triumf.ca, azuelos@lps.umontreal.ca

TRIUMF-460

(Proposed 1989, Began data-taking 1987, Completed data-taking 1989)

A MEASUREMENT OF THE CROSS SECTION AND ANALYZING POWER OF THE $pn \rightarrow pp(^1S_0)\pi^-$ REACTION AT TRIUMF ENERGIES

TEL AVIV U – D Ashery, H Hahn, M A Moinester
BRITISH COLUMBIA U – E G Auld, F Duncan, G Jones, M E Sevior
TRIUMF – D A Hutcheon, P L Walden (Spokesperson)
BRITISH COLUMBIA U & TRIUMF – R R Johnson
ALBERTA U – E Korkmaz

Accelerator TRIUMF *Detector* Spectrometer, Counter

Reactions Polarized beam

p n → p p π^-	345–495 MeV (T_{lab})

Brief description The target is liquid deuterium. Uses the QQD spectrometer and a counter hodoscope. Ran in September 87 and August 89.

Journal papers PRL 63 (1989) 1792.

E-mail contact mrspi@triumf.ca

SUMMARIES OF TRIUMF EXPERIMENTS

TRIUMF-466

(Proposed May 1987, Completed data-taking 1988)

MEASUREMENT OF $np \rightarrow d\pi^0$ CROSS SECTIONS NEAR THRESHOLD

TRIUMF – R Abegg, L G Greeniaus, D A Hutcheon (✓ Spokesperson), C A Miller
MANITOBA U – N E Davison
ALBERTA U – G W R Edwards, G A Moss, W C Olsen, Y L Ye
WESTERN CAPE U – I J van Heerden

Accelerator TRIUMF *Detector* Spectrometer

Reactions

$n\ p \rightarrow$ deut π^0	276, 277, 279, 283, 291 MeV (T_{lab})

Brief description Measured total and differential cross sections.

Journal papers PRL 64 (1990) 176, and NP A535 (1991) 618. No other papers expected.

Related experiments IUCF-CE-31

E-mail contact smurf@triumf.ca

TRIUMF-471

(Proposed 1988, Approved 1988, Began data-taking 1990, Completed data-taking 1990)

FORWARD ANGLE $\pi^{\pm}p$ DIFFERENTIAL CROSS SECTIONS AT 87 TO 143 MeV

TRIUMF – P A Amaudruz, J T Brack (✓ Spokesperson), D F Ottewell, G R Smith (✓ Spokesperson)
COLORADO U – S Hoibraten, M D Kohler, J J Kraushaar, B J Kriss, R A Ristinen
BRITISH COLUMBIA U – M Kermani, M M Pavan, D Vetterli
KARLSRUHE U – J Jaki, M Metzler
CAL STATE, SACRAMENTO – E F Gibson

Accelerator TRIUMF *Detector* ?

Reactions

$\pi^+\ p \rightarrow \pi^+\ p$	87–139 MeV (T_{lab})
$\pi^-\ p \rightarrow \pi^-\ p$	"

Brief description An active target (CH scintillator) is used to detect recoil protons in coincidence with scattered pions. Pion scattering is limited to forward angles where the low-energy recoil protons stop in the target. Data analysis in progress (May 94).

Related experiments TRIUMF-322, TRIUMF-394, TRIUMF-399, TRIUMF-625

E-mail contact brack%spectr@vaxf.colorado.edu, smith@erich.triumf.ca

TRIUMF-478

(Proposed Oct 1987, Completed data-taking 1989)

PROTON INDUCED πNN RESONANCES

TRIUMF – R Abegg, D Frekers (Spokesperson), K H Hicks, J Iqbal, B Jennings, C A Miller, P Trelle, P L Walden, S Yen
SASKATCHEWAN U – R Schubank
TORONTO U – R Azuma, C Chan

Accelerator TRIUMF *Detector* Spectrometer

Reactions

$^{12}C\ p \rightarrow p\ p\ \pi^-$ X	500 MeV (T_{lab})

Brief description Results were negative.

E-mail contact frekers@triumf.ca

TRIUMF-482

(Proposed Oct 1987, Completed data-taking Sep 1991)

MEASUREMENTS OF SPIN TRANSFER COEFFICIENTS IN *pd* ELASTIC SCATTERING

TRIUMF – R Abegg (Spokesperson), D A Hutcheon, J Iqbal
TRIUMF & ALBERTA U – P W Green
ALBERTA U – G A Moss, W C Olsen, N Rodning
SASKATCHEWAN U – R Schubank, Y M Shin, N Stevenson
TRIUMF & TORONTO U – D Frekers

Accelerator TRIUMF *Detector* Spectrometer

Reactions Polarized beam

p deut $\rightarrow p$ deut	200, 290, 400 MeV (T_{lab})

Brief description Measures the spin transfer coefficients D_{NN}, D_{SS}, D_{LS}, and D_{LL}.

E-mail contact abegg@triumf.ca

TRIUMF-496

(Proposed Oct 1987, Completed data-taking Oct 1989)

MEASUREMENTS OF THE ANGULAR DISTRIBUTION OF THE SPIN TRANSFER PARAMETER D_{LS} IN $pp \rightarrow d\pi^+$

TRIUMF – R Abegg (Spokesperson), L G Greeniaus, D A Hutcheon
ALBERTA U – D Mack, G A Moss, Y Ye
TRIUMF & ALBERTA U – P W Green

Accelerator TRIUMF *Detector* Spectrometer, Counter

Reactions

$p\ p \rightarrow$ deut π^+	507 MeV (T_{lab})

Brief description Measures the spin transfer coefficient D_{LS}.

Journal papers NP A (to be published).

E-mail contact abegg@triumf.ca

TRIUMF-497-287

(Proposed Oct 1987, Approved Dec 1987, In progress)

MEASUREMENT OF THE FLAVOR-CONSERVING HADRONIC WEAK INTERACTION

MANITOBA U – J Birchall (✓ Spokesperson), J R Campbell, A Hamian, L R Lee, S A Page (✓ Spokesperson), W D Ramsay, S D Reitzner, W T H van Oers (✓ Spokesperson)
LOS ALAMOS – J D Bowman, R E Mischke
TRIUMF – C A Davis, D C Healey, R Helmer, P Levy, P W Schmor
ALBERTA U – P W Green, E Korkmaz, G Roy, J Soukup, G M Stinson
CARNEGIE MELLON U – A Berdoz
MOSCOW, INR – N Titov, A Zelenskii

Accelerator TRIUMF *Detector* Ionization

Reactions Polarized beam

$p\ p \rightarrow p\ p$	222 MeV (T_{lab})

Brief description Measures the parity-violating longitudinal analyzing power A_z and the weak meson–nucleon coupling constant h_ρ. In the first phase, data taking is performed in the transmission mode. In progress (June 94).

Journal papers PR D37 (1988) 1769, NIM A307 (1991) 26, and NP A553 (1993) 823c.

E-mail contact birchall@physics.umanitoba.ca, shelley@triumf.ca, vanoers@triumf.ca

TRIUMF-498

(Proposed Oct 1987, Approved 1987, Began data-taking 1992, Completed data-taking 1993)

ANALYZING POWER ZERO CROSSING ANGLES IN *np* ELASTIC SCATTERING BELOW 300 MeV

MANITOBA U – A Berdoz, J Birchall, J Campbell, N E Davison, L Gan, S A Page, W D Ramsay, W T H van Oers

TRIUMF – C A Davis (✓ Spokesperson), L G Greeniaus
ALBERTA U – P W Green

Accelerator TRIUMF *Detector* Counter

Reactions Polarized beam

$n\ p \rightarrow n\ p$	180, 230, 290 MeV (T_{lab})

Brief description Neutrons are detected in scintillator counter arrays, protons with scintillators and DLC's. Data analysis in progress (May 94).

Related experiments TRIUMF-121, TRIUMF-369

E-mail contact cymru@triumf.ca

TRIUMF-502

(Proposed Nov 1988, Completed data-taking 1992)

MEASUREMENT OF ANALYZING POWERS IN LOW ENERGY πd ELASTIC SCATTERING

COLORADO U – M Kohler, R A Ristinen
SIMON FRASER U – B E King
SASKATCHEWAN U – R B Schubank, Y M Shin, N R Stevenson (✓ Spokesperson)
TRIUMF – P Amaudruz, J T Brack, P P J Delheij, D C Healey, B K Jennings, D F Ottewell, G Sheffer, G R Smith, G D Wait
BRITISH COLUMBIA U – A Feltham, M Hanna, R R Johnson, F M Rozon, V Sossi, D Vetterli, P Weber
TRIESTE U – N Grion, R Rui
REGINA U – E L Mathie, R Tacik, M Yeomans
WASHINGTON U, SEATTLE – C A Gossett
TUBINGEN U – G J Wagner
YONSEI U – K S Chung, J M Lee

Accelerator TRIUMF *Detector* Spectrometer

Reactions Polarized target

π^+ deut $\rightarrow \pi^+$ deut	49 MeV (T_{lab})
π^- deut $\rightarrow \pi^-$ deut	"

Brief description Measures the vector analyzing power iT_{11} at seven pion laboratory scattering angles between 50° and 130°. Uses a dynamically polarized target and a magnetic spectrometer.

Related experiments TRIUMF-360, PSI-R-87-04

TRIUMF-506

(Proposed Oct 1987, Completed data-taking 1991)

LOW ENERGY $\pi d \rightarrow pp$ ANALYZING POWERS

REGINA U – G J Lolos, E L Mathie (Spokesperson), S I H Naqvi, D M Yeomans
WESTERN KENTUCKY U – D Humphrey
TRIUMF – D Healey, D Ottewell, G R Smith
BRITISH COLUMBIA U – G Jones
SASKATCHEWAN U – N R Stevenson

Accelerator TRIUMF *Detector* Counter

Reactions Polarized target

π^+ deut $\rightarrow p\ p$	25, 45, 65 MeV (T_{lab})

Brief description Measures the vector analyzing power iT_{11} and the tensor analyzing power. Data taking at 25 and 65 MeV was completed in 1990.

Journal papers PR C49 (1994) 2898.

E-mail contact mathie@meena.cc.uregina.ca, mathie@triumf.ca

TRIUMF-508

(Proposed Oct 1987, Began data-taking 1993)

STUDY OF THE $\pi^+ d \rightarrow \pi^- \pi^+ pp$ REACTION AT $T = 240$ MeV

TRIESTE U – P Camerini, R Rui (Spokesperson)
INFN, TRIESTE – N Grion
BRITISH COLUMBIA U – M Hanna, R R Johnson, R Olszewski, F M Rozon, M E Sevior, G R Smith, V Sossi, P Trelle
VALENCIA U – E Oset, M J Vicente-Vacas

Accelerator TRIUMF *Detector* CHAOS

Reactions

π^+ deut $\rightarrow p\ p\ \pi^+\ \pi^-$	240 MeV (T_{lab})

Brief description Uses the magnetic pion spectrometer, CHAOS.

E-mail contact rui@triumf.ca

TRIUMF-530

(Proposed May 1988, Approved Jul 1988, Began data-taking Jul 1988, Completed data-taking Dec 1988)

$\pi^+ p$ TOTAL CROSS SECTIONS AT LOW ENERGIES

HEBREW U – E Friedman (✓ Spokesperson), A Goldring
TUBINGEN U – G Wagner
SOREQ NUCLEAR RES CTR – A Altman
BRITISH COLUMBIA U – R R Johnson, O Meirav
TRIUMF – B K Jennings

Accelerator TRIUMF *Detector* Counter

Reactions

$\pi^+\ p \rightarrow X$	51.5, 62.6, 66.8, 70.9, 91.5, 121.9, 125.9 MeV (T_{lab})

Brief description Measures integral cross sections by the transmission method. Targets are polyethylene and graphite.

Journal papers PL B231 (1989) 39, and NP A514 (1990) 601.

E-mail contact elifried@vms.huji.ac.il

TRIUMF-537

(Proposed May 1988, Completed data-taking Jun 1991)

RADIATIVE DECAY OF THE Δ RESONANCE

BRITISH COLUMBIA U – D F Measday (Spokesperson), S Stanislaus, P Weber
KENTUCKY U – M A Kovash
NEW MEXICO U – B Bassalleck
BOSTON U – E C Booth, J P Miller

Accelerator TRIUMF *Detector* Photon spectrometer

Reactions Polarized target

$\pi^-\ p \rightarrow n\ \gamma$	100–250 MeV (T_{lab})
$\pi^-\ p \rightarrow \pi^0\ n$	"

Brief description Measures Δ^0 radiative decay multipoles and differential cross sections. A polarized target has been successfully used in phase-II of the experiment. Data analysis in progress (May 94).

E-mail contact measday@triumf.ca

TRIUMF-541

(Proposed May 1988, Completed data-taking 1990)

SPIN–MOMENTUM CORRELATIONS OF NUCLEONS IN POLARIZED ^{3}He

SIMON FRASER U & TRIUMF – O F Haeusser (Spokesperson), A Rahav
TRIUMF – P P J Delheij, R Henderson, K P Jackson, C D P Levy, C A Miller (Spokesperson)
HARVARD U – T E Chupp
SIMON FRASER U – J Mildenberger, M C Vetterli
WESTERN ONTARIO U – W P Alford

Accelerator TRIUMF *Detector* Counter, Spectrometer

Reactions Polarized beam and target

$p\ ^3He \rightarrow p\ p\ X$	290 MeV (T_{lab})
$p\ ^3He \rightarrow p\ n\ X$	"

Brief description The setup consists of a polarized ^3He target, the Medium Resolution Spectrometer (MRS), and two arrays of plastic scintillators. The target was developed using the method of optical pumping of alkalide Rb vapor and spin exchange via atomic collisions with ^3He. A similar experiment (TRIUMF-616) was completed at 220 MeV in 1991.

Journal papers PL B275 (1992) 259.

Related experiments TRIUMF-616

E-mail contact hausser@triumf.ca, miller@triumf.ca

TRIUMF-544

(Proposed May 1988, Completed data-taking Feb 1989)

AN EXPERIMENTAL SEARCH FOR A NEW LIGHT BARYON

TRIUMF – R Abegg, D Frekers (√ Spokesperson), R Helmer, R S Henderson, K P Jackson, C A Miller, S Ram, S Yen
TEL AVIV U – D Ashery, S Nussinov, E Piasetzky, A Rahav, A I Yavin (√ Spokesperson)

Accelerator TRIUMF *Detector* Spectrometer, Counter

Reactions

$p\ p \rightarrow n\ X$	460 MeV (T_{lab})

Brief description Data taken, results are negative.

Journal papers PR D49 (1994) 3120.

E-mail contact frekers@triumf.ca, yavin@tauphy.tau.ac.il

TRIUMF-552

(Proposed Nov 1988, Completed data-taking 1990)

$pp \rightarrow d\pi^+$ ANALYZING POWERS NEAR THRESHOLD

TRIUMF – R Abegg, L G Greeniaus, D A Hutcheon (√ Spokesperson), C A Miller
ALBERTA U – E Korkmaz, D Mack, W C Olsen, N L Rodning

Accelerator TRIUMF *Detector* Spectrometer

Reactions Polarized beam

$p\ p \rightarrow$ deut π^+	291, 295 MeV (T_{lab})

Particles studied deut

Brief description Measures analyzing powers for polarized beam at two energies very close to threshold.

Journal papers NP A535 (1991) 637. No other papers expected.

Related experiments TRIUMF-466

E-mail contact smurf@triumf.ca

TRIUMF-556

(Proposed Nov 1988)

THE REACTION $\pi^+\ ^4He \rightarrow p p p n \pi^+ \pi^-$

INFN, TRIESTE – P Camerini, N Grion (Spokesperson), R Rui
BRITISH COLUMBIA U – R R Johnson, O Meirav, M E Sevior, V Sossi, D Vetterli (Spokesperson), P Weber
TRIUMF – D Gill, G R Smith

Accelerator TRIUMF *Detector* Spectrometer

Reactions

π^+ He $\rightarrow p p p n \pi^+ \pi^-$	280 MeV (T_{lab})

E-mail contact grion@trieste.infn.it, grion@triumf.ca

TRIUMF-557

(Proposed Nov 1988, Began data-taking 1991, Completed data-taking 1992)

ELASTIC SCATTERING OF 100 MeV π^+ FROM A POLARIZED ^3He TARGET

WESTERN ONTARIO U – A Celler
TRIUMF – P Delheij, D R Gill, R Helmer, P Levy, D F Ottewell, P Schmor, S Yen
TRIUMF & SIMON FRASER U – O F Haeusser (Spokesperson)
TRIUMF & MELBOURNE U – R Henderson
OREGON STATE U – R H Landau
SIMON FRASER U – B Larson (Spokesperson), A Trudel, M C Vetterli
SASKATCHEWAN U – R B Schubank, N R Stevenson
BRITISH COLUMBIA U – V Sossi

Accelerator TRIUMF *Detector* Spectrometer

Reactions Polarized target

$\pi^+\ ^3He \rightarrow \pi^+\ ^3He$	100 MeV (T_{lab})

Brief description Measures the asymmetry parameter and differential cross section.

Journal papers PRL 67 (1991) 3356.

Related experiments LAMPF-1267

E-mail contact hausser@triumf.ca

TRIUMF-560

(Proposed Nov 1988)

LOW ENERGY $\pi^+ p$ ANALYZING POWERS WITH CHAOS

TRIUMF – P A Amaudruz, D Healey, D Ottewell, G R Smith (Spokesperson)
TRIUMF & BRITISH COLUMBIA U – R R Johnson
BRITISH COLUMBIA U – J T Brack, G Hofman, G Jones, M Pavan, M E Sevior, D Vetterli
REGINA U – E L Mathie, R Tacik
COLORADO U – J J Kraushaar, R J Peterson, R A Ristinen
TRIESTE U – P Camerini, N Grion, R Rui
KARLSRUHE U – E T Boschitz

Accelerator TRIUMF *Detector* CHAOS

Reactions Polarized target

$\pi^+\ p \rightarrow \pi^+\ p$	—

E-mail contact smith@erich.triumf.ca

TRIUMF-561

(Proposed Nov 1988, Began data-taking Aug 1990, Completed data-taking Jan 1991)

THRESHOLD MEASUREMENTS OF $H(\pi^-, \pi^+\pi^-)n$ AND $H(\pi^+, \pi^+\pi^+)n$

BRITISH COLUMBIA U – R R Johnson, O Meirav, M E Sevior (Spokesperson), V Sossi, D Vetterli, P Weber
BONN U – J Ernst
TRIUMF – D R Gill, D F Ottewell, G R Smith, G Wait

Accelerator TRIUMF *Detector* Counter

Reactions

$\pi^-\ p \rightarrow n\ \pi^+\ \pi^-$	172, 184, 190, 203 MeV (T_{lab})
$\pi^+\ p \rightarrow n\ \pi^+\ \pi^+$	"

Brief description Measures the chiral symmetry breaking parameter ξ, together with $I = 0$ and $I = 2$ $\pi\pi$ scattering lengths. Ran with a π^+ beam in August 90 and with a π^- beam in January 91.

Journal papers PRL 66 (1991) 2569, and PR D48 (1993) 3987.

E-mail contact msevior@triumf.ca

SUMMARIES OF TRIUMF EXPERIMENTS

TRIUMF-566

(Approved 1990)

ELASTIC PROTON SCATTERING FROM POLARIZED ^{3}He

SIMON FRASER U & TRIUMF – O F Haeusser (Spokesperson)
TRIUMF – P P J Delheij, K Ferguson, R Henderson, K P Jackson, C D P Levy, C A Miller, B Morrissette, M C Vetterli, R M Woloshyn
SIMON FRASER U – J Mildenberger, A Rahav
WESTERN ONTARIO U – W P Alford
HARVARD U – T E Chupp

Accelerator TRIUMF *Detector* ?

Reactions Polarized target
$p\ ^3\mathrm{He} \rightarrow p\ ^3\mathrm{He}$ —

E-mail contact hausser@triumf.ca

TRIUMF-570

(Proposed Jul 1989, Approved Aug 1989, Began data-taking Dec 1989, Completed data-taking Jan 1993)

GAMMA–NEUTRINO ANGULAR CORRELATION IN MUON CAPTURE ON ^{28}Si

LBL – D S Armstrong (√ Spokesperson)
BRITISH COLUMBIA U – D F Measday, B A Moftah
KENTUCKY U – J Bauer, J Evans, T P Gorringe, B Johnson
VALPARAISO U, INDIANA – S Stanislaus

Accelerator TRIUMF *Detector* Photon spectrometer

Reactions Polarized beam
$\mu^-\ ^{28}\mathrm{Si} \rightarrow\ ^{28}\mathrm{Al}\ \nu_\mu$ 0 MeV (T_{lab})

Brief description Studies induced weak pseudoscalar coupling g_p. Compton-suppressed germanium semiconductor detectors and NaI scintillator array used as photon detectors. Angular correlation extracted from lineshape of Doppler-broadened gamma spectrum.

Related experiments TRIUMF-452, TRIUMF-612

E-mail contact armd@newton.physics.wm.edu, armd@reg.triumf.ca

TRIUMF-592

(Proposed 1991, Approved 1992, In preparation)

RADIATIVE MUON CAPTURE ON ^{3}He

RMC COLLABORATION
TRIUMF – J A Macdonald, J M Poutissou, R Poutissou, D H Wright (√ Spokesperson)
MONTREAL U – P Depommier, G Jonkmans, C Leroy
BRITISH COLUMBIA U – B Doyle, T Duty, P Gumplinger, M D Hasinoff, E Saettler
VIRGINIA TECH – D S Armstrong, M Blecher, C Sigler
KENTUCKY U – T P Gorringe

Accelerator TRIUMF *Detector* Wire chamber

Reactions
$\mu^-\ ^3\mathrm{He}$ 62 MeV/c (P_{lab})

Brief description After stopping in liquid ^{3}He, muons are captured producing photons between 0 and 100 MeV. A measurement of the branching ratio allows the extraction of the pseudoscalar coupling constant g_p. To be compared to g_p measured in H (TRIUMF-452). Scheduled to begin data taking November 94 and run till Summer 95.

Related experiments TRIUMF-452

E-mail contact wright@triumf.ca

TRIUMF-598

(Proposed 1990, Approved Jul 1990, Began data-taking Jul 1990, Completed data-taking Aug 1992)

INTEGRAL CROSS SECTIONS FOR THE π^+p INTERACTION IN THE 3,3 RESONANCE REGION

HEBREW U – E Friedman (√ Spokesperson), A Goldring, M Paul, M Schechter
BRITISH COLUMBIA U – N Fazel, R R Johnson, N Suen, D Vetterli
KARLSRUHE U – J Jaki, M Metzler
TRIUMF – A Altman, B K Jennings
TUBINGEN U – G J Wagner
WEIZMANN INST – Z Fraenkel

Accelerator TRIUMF *Detector* Scintillator

Reactions
$\pi^+\ p$ 125–200 MeV (T_{lab})
$\pi^-\ p$ "

Brief description Measures integral cross sections using the transmission method. Targets are polyethylene and graphite.

Journal papers PL B254 (1991) 40, and PL B302 (1993) 18.

E-mail contact elifried@vms.huji.ac.il

TRIUMF-612

(Proposed Jul 1990, Approved Jul 1990)

HYPERFINE DEPENDENCE OF EXCLUSIVE MUON CAPTURE ON ^{19}F, ^{23}Na, ^{27}Al, ^{35}Cl, AND ^{37}Cl

KENTUCKY U – J Bauer, T P Gorringe (Spokesperson), B Johnson, M A Kovash, M Pickar
BRITISH COLUMBIA U – P Gumplinger, M D Hasinoff, D F Measday, B Moftah, W Schott
VIRGINIA TECH – D S Armstrong
TRIUMF – D H Wright

Accelerator TRIUMF *Detector* Photon spectrometer

Reactions
$\mu^-\ ^{23}\mathrm{Na} \rightarrow\ ^{23}\mathrm{Ne}\ \nu$ 0 MeV (T_{lab})
$\mu^-\ ^{27}\mathrm{Al} \rightarrow\ ^{27}\mathrm{Mg}\ \nu$ "
$\mu^-\ ^{35}\mathrm{Cl} \rightarrow\ ^{35}\mathrm{S}\ \nu$ "

Particles studied p

Brief description Studies the weak pseudoscalar coupling g_p. Germanium semiconductor with a BGO Compton suppression shield is used as a photon detector.

E-mail contact gorringe@ukcc.uky.edu, gorringe@triumf.ca

TRIUMF-624

(Proposed Nov 1990, Approved Nov 1990, Began data-taking 1993)

THE $(\pi, 2\pi)$ REACTION, A TOOL TO DETERMINE SCATTERING LENGTHS AND COUPLING CONSTANTS

TRIUMF – D Ottewell, G R Smith
BRITISH COLUMBIA U – M Iqbal, R R Johnson (Spokesperson), C Jones, M E Sevior (Spokesperson), V Sossi, D Vetterli
REGINA U – E L Mathie, R Tacik
COLORADO U – R Ristenen
TRIESTE U – S Buttazoni, P Camerini, N Grion (Spokesperson), R Rui (Spokesperson)
KARLSRUHE U – E Boschitz
HEBREW U – E Friedman
CARNEGIE MELLON U – M Rozon

Accelerator TRIUMF *Detector* CHAOS

Reactions
$\pi^+\ p \rightarrow \pi^+\ \pi^+\ n$ 230–350 MeV (T_{lab})
$\pi^+\ p \rightarrow \pi^+\ \pi^0\ p$ "

$\pi^- p \rightarrow \pi^+ \pi^- n$ "
$\pi^- p \rightarrow \pi^- \pi^0 p$ "

Brief description Studies the $\pi\pi$ scattering length, and π–π phase shifts near threshold.

E-mail contact johnson@physics.ubc.ca, rrjohnson@triumf.ca, msevior@triumf.ca, grion@trieste.infn.it, grion@triumf.ca, rui@triumf.ca

TRIUMF-630

(Approved 1993)

ELASTIC PROTON SCATTERING FROM SIDEWAYS AND LONGITUDINALLY POLARIZED ^{3}He

SIMON FRASER U – E J Brash, C Chan, B Larson, A Rahav, A Trudel, D M Whittal (Spokesperson)
TRIUMF – R Abbeg, P Delheij, R Henderson, P Levy, M Vetterli
TRIUMF & SIMON FRASER U – O Haeusser
WESTERN ONTARIO U – W P Alford
HARVARD U & TRIUMF & SIMON FRASER U – T E Chupp
MANITOBA U – J P Svenne

Accelerator TRIUMF *Detector* ?

Reactions Polarized target
$p\ ^3\mathrm{He} \rightarrow p\ ^3\mathrm{He}$ —

TRIUMF-633

(Proposed Nov 1990, Approved Nov 1990, In preparation)

MEASUREMENT OF $pp \rightarrow pn\pi^+$ AT 420 AND 500 MeV

OHIO U – H Clark, R Finlay, K H Hicks (✓ Spokesperson)
MANITOBA U – W Falk
TRIUMF – D A Hutcheon, C A Miller, I I Strakovsky, P L Walden, S Yen
ALBERTA U – E Korkmaz
REGINA U – G Huber

Accelerator TRIUMF *Detector* Single-arm spectrometer

Reactions Polarized beam
$p\ p \rightarrow p\ n\ \pi^+$ 420–500 MeV (T_{lab})

Brief description Measures differential cross section. Detectors are large magnetic spectrometers. Scheduled to start taking data at the end of 1994.

E-mail contact hicks@ouvaxa.cats.ohiou.edu, hicks@triumf.ca

TRIUMF-643

(Proposed Jun 1991, Approved Jun 1991, Began data-taking 1992, Completed data-taking 1992)

TEST OF THE LOW ENERGY THEOREM FOR RADIATIVE PION CAPTURE

NEW MEXICO U – B Bassalleck
WASHINGTON U, SEATTLE – C Gossett
TRIUMF – D A Hutcheon (Spokesperson), R Jacot-Guillarmod, D Ottewell, R Schubank, N R Stevenson
KENTUCKY U – M A Kovash (Spokesperson), K Liu
ALBERTA U – E Korkmaz, A Opper
BOSTON U – E Booth, J Miller
SASKATCHEWAN U – Y M Shin

Accelerator TRIUMF *Detector* Photon spectrometer

Reactions
$\pi^- p \rightarrow n \gamma$ 10–20 MeV (T_{lab})

Brief description Determines the zero pion energy limit of the E_{0+} (electric dipole) multipole amplitude from cross section measurements over a wide angular range. Target is a supercooled cell of liquid hydrogen. Uses NaI spectrometer.

E-mail contact smurf@triumf.ca, kovash@ie.pa.uky.edu, kovash@triumf.ca, phy133@ukcc.uky.edu

TRIUMF-645

(Proposed Jun 1991, Approved Jun 1991, Began data-taking May 1992, Completed data-taking Jun 1992)

ABSOLUTE DIFFERENTIAL CROSS SECTIONS IN THE $\pi^{\pm}p \rightarrow \pi^{\pm}p$ REACTION AROUND THE Δ RESONANCE

PISCAT COLLABORATION
BRITISH COLUMBIA U – F Duncan, A Feltham, G Jones, J Lange, M M Pavan (✓ Spokesperson), K Raywood, M E Sevior
TRIUMF – R Adams, J T Brack (✓ Spokesperson), D Ottewell, G R Smith, B Wells
REGINA U – E L Mathie, R Tacik
COLORADO U – R A Ristinen
KARLSRUHE U – H M Staudenmaier
ST PETERSBURG, INP – I I Strakovsky
SIMON FRASER U – R Helmer

Accelerator TRIUMF *Detector* Scintillator

Reactions
$\pi^+ p \rightarrow \pi^+ p$ 141–267 MeV (T_{lab})
$\pi^- p \rightarrow \pi^- p$ "

Brief description Uses flat, solid CH_2 (polyethylene) targets as well as a supercooled flat-window liquid hydrogen target. Scintillator telescopes are used for coincidence detection of pions and protons. Covers angular range between 30° and 160° c.m. Anticipates 1–1.5% statistical and 1.5–2.0% systematic uncertainties. Data analysis in progress (May 94).

Related experiments TRIUMF-322, TRIUMF-471

E-mail contact marcello@triumf.ca, brack%spectr@vaxf.colorado.edu

TRIUMF-653

(Began data-taking 1993, Completed data-taking 1993)

MEASUREMENT OF THE $\pi^+\pi^-$ INVARIANT MASS IN NUCLEI AS A TOOL FOR DETERMINING THE MASS DISTRIBUTION OF THE σ MESON

TRIUMF – P Amaudruz, J Brack, D Ottewell, G R Smith
BRITISH COLUMBIA U – R R Johnson, G Jones, M E Sevior
REGINA U – E L Mathie, R Tacik
COLORADO U – R A Ristinen
NEW MEXICO STATE U – G S Kyle
GRENOBLE U – P Schuck
TRIESTE U – P Camerini, N Grion (Spokesperson), R Rui (Spokesperson)

Accelerator TRIUMF *Detector* CHAOS

Reactions
π^+ nucleus $\rightarrow \pi^+ \pi^-$ nucleus 280 MeV (T_{lab})
π^+ nucleus $\rightarrow \pi^+ \pi^+$ nucleus "

Brief description The aim is to study pion production in nuclei. Targets are ^{2}H, ^{12}C, ^{40}Ca, and ^{208}Pb.

E-mail contact grion@triumf.ca, grion@trieste.infn.it, rui@triumf.ca

TRIUMF-661

(Approved 1992, In preparation)

NEUTRON–NEUTRON SCATTERING LENGTH VIA $\pi^- d \rightarrow \gamma nn$

NEW MEXICO U – B Bassalleck
KENTUCKY U – T P Gorringe, C Jiang, M A Kovash (Spokesperson), K Liu, A D MacKellar, M A Pickar, T A Shibata
BRITISH COLUMBIA U – D Measday
BOSTON U – J Miller
TRIUMF – D Ottewell
LOUISVILLE U – J Chalmers

Accelerator TRIUMF *Detector* Scintillator, Calorimeter

Reactions

$\pi^- D \rightarrow \gamma n n$ —

Brief description Measures both the s-wave nn scattering length and the nn effective range in triple coincidence mode. The values of a_{nn} and r_{nn} are determined from the measured shape of the endpoint region of the γ-ray energy spectrum, which is reconstructed from measurements of directions of all three final-state particles and measured time-of-flight of both neutrons. Neutrons are detected in an array of scintillator bars and γ's in a stacked array of detectors consisting of a plastic veto counter, an active NaI convertor, an x–y MWPC, and a NaI calorimeter.

E-mail contact kovash@triumf.ca, kovash@ie.pa.uky.edu, phy133@ukcc.uky.edu

TRIUMF-703

(Approved Jul 1993, Began data-taking Dec 1993, In progress)

PION LIFETIME MEASUREMENT

TRIUMF – D A Bryman, M Fujiwara, J A Macdonald, G Marshal, T Numao (√ Spokesperson), A Olin

Accelerator TRIUMF *Detector* Counter

Reactions

$\pi^+ \rightarrow e^+ \nu$ —

Particles studied π^+

Brief description The pion lifetime is measured by observing the time dependence of the surface muon yield. Target is a plastic scintillator. Taking data (May 94).

Related experiments TRIUMF-248

E-mail contact toshio@triumf.ca

TRIUMF-704

(Approved 1993, In preparation)

CHARGE SYMMETRY BREAKING IN $np \rightarrow d\pi^0$ CLOSE TO THRESHOLD

SASP-CSB COLLABORATION
TRIUMF & ALBERTA U – R Abegg, P W Green, L G Greeniaus, D A Hutcheon, C A Miller, P L Walden
ALBERTA U – A K Opper (√ Spokesperson)
HELSINKI U – J A Niskanen
NORTHERN BRITISH COLUMBIA U – E Korkmaz (√ Spokesperson)
SASKATCHEWAN U – N R Kolb

Accelerator TRIUMF *Detector* Spectrometer

Reactions

$n\ p \rightarrow$ deut π^0	281 MeV (T_{lab})
$p\ p \rightarrow$ deut π^+	293.5 MeV (T_{lab})

Brief description Measures forward–backward asymmetry in the center of mass distribution of deuterons from $np \rightarrow d\pi^0$. If charge symmetry is conserved, this quantity must be zero. The deuteron distribution from $pp \rightarrow d\pi^+$ is used to determine instrumental asymmetries. Uses the SASP magnetic spectrometer and associated detectors. Target is liquid hydrogen. In preparation (May 94).

Related experiments TRIUMF-121, TRIUMF-369, IUCF-E-088

E-mail contact opper@phys.ualberta.ca, korkmaz@unbc.edu

Underground/Underwater Experiments

UNDERGROUND-FREJUS

(Began data-taking Feb 1984, Completed data-taking Sep 1988)

NUCLEON DECAY EXPERIMENT WITH A MODULAR FLASH CHAMBER DETECTOR

FREJUS COLLABORATION

AACHEN, TECH HOCHSCH, I PHYS INST – C Berger, M Froehlich, H Moench, R Nisius, F Raupach, P Schleper
ORSAY, LAL – Y Benadjal, D Blum, C Bourdarios, B Dudelzak, P Eschstruth, S Jullian, D Lalanne, F Laplanche, C Longuemare, C Paulot, O Perdereau, P Roy, G Szklarz
ECOLE POLYTECHNIQUE – L Behr, B Degrange, U Nguyen-Khac, S Tisserant
SACLAY – C Arpesella, P Bareyre, R Barloutaud (Spokesperson), A Borg, G Chardin, J Ernwein, J F Glicenstein, L Mosca, L Moscoso
WUPPERTAL U – J Becker, K H Becker, H J Daum, B Jacobi, B Kuznik, J Loeffler, H Meyer, R Moeller, M Schubnell, Y Wei, P Wintgen

Accelerator NONE *Detector* Calorimeter

Particles studied p, n

Brief description A 900-ton array of 3-mm steel plates separated by layers of 5×5-mm^2 polypropylene flash chambers. There are 115 planes of Geiger tubes for triggering. The detector is 4850 m of water equivalent underground. Searches for nucleon decays, $n\bar{n}$ oscillations, studies high-energy cosmic ν_μ's from point sources, and atmospheric muons and neutrinos.

Journal papers PL B174 (1986) 118, NIM A262 (1987) 463, PL B227 (1989) 489, PR D40 (1989) 2163, NP B313 (1989) 509, ZPHY C48 (1990) 221, PL B240 (1990) 237, PL B245 (1990) 305, NIM A302 (1991) 406, ZPHY C50 (1991) 385, and PL B269 (1991) 227.

UNDERGROUND-GALLEX

(Approved Apr 1985, Began data-taking Jun 1990, In progress)

GALLIUM EUROPEAN EXPERIMENT

GALLEX COLLABORATION

HEIDELBERG, MAX PLANCK INST – P Anselmann, W Hampel, G Heusser, J Kiko, T Kirsten (√ Spokesperson), M Laubenstein, E Pernicka, S Pezzoni, U Roenn, M Sann, C Schlosser, R Wink, M Wojcik
KERNFORSCHUNGSZENTRUM, KARLSRUHE – K Ebert, T Fritsch, K Hellriegel, E Henrich, L Stieglitz, R von Ammon
GRAN SASSO – M Balata, N Ferraris, H Lalla
MILAN U – E Bellotti, C Cattadori, O Cremonesi, E Fiorini, L Zanotti
MUNICH, TECH U – M Altmann, R Moessbauer, U Schanda, F von Feilitzsch
NICE U – G Berthomieu, E Schatzman
WEIZMANN INST – I Carmi, I Dostrovsky
ROME U – C Bacci, P Belli, R Bernabei, S D'Angelo, L Paoluzi
SACLAY – A Bevilacqua, S Charbit, M Cribier, L Gosset, J Rich, M Spiro, T Stolarczyk, C Tao, D Vignaud
BROOKHAVEN – R L Hahn, F X Hartmann, J K Rowley, R W Stoenner, J Weneser

Accelerator NONE *Detector* Counter

Reactions

$\nu_e\ ^{71}\mathrm{Ga} \rightarrow e^-\ ^{71}\mathrm{Ge}$ —

Particles studied ν_e

Brief description This is a radiochemical neutrino experiment. Uses 30 tons of gallium in 8.2-molar $GaCl_3$ solution. Installed in the South Wing of Hall A of the Gran Sasso Laboratory. Has an overhead shielding of about 3400 m of water equivalent. An interaction with neutrinos effectively transforms gallium chloride into $GeCl_4$, which is then extracted from the solution with an appropriate gas purging system. Counted in extremely low-level proportional counters. Sensitive to the low-energy neutrinos produced by the *pp* fusion in the Sun. Designed for an order of one event per day. Taking data (May 94).

Journal papers NIM A274 (1989) 203, PL B285 (1992) 376, PL B285 (1992) 390, NIM A329 (1993) 541, PL B314 (1993) 445, PL B327 (1994) 377, and NP (PROC SUPPL) B35 (1994) 418.

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WWW Home-page http://www.lngs.infn.it/physics.html

UNDERGROUND-HOMESTAKE

(Began data-taking 1970, In progress)

THE HOMESTAKE CHLORINE SOLAR NEUTRINO EXPERIMENT

PENN U – B T Cleveland, T Daily, R Davis, Jr (√ Spokesperson), J Distel, K Lande (√ Spokesperson), C K Lee, P Wildenhain
LEHMANN COLL – J Ullman

Accelerator NONE *Detector* Counter

Reactions

$\nu_e\ ^{37}\mathrm{Cl} \rightarrow e^-\ ^{37}\mathrm{Ar}$ —

Particles studied ν_e

Brief description The ^{37}Cl solar neutrino detector in the Homestake Gold Mine consists of 615 tons of tetrachloroethylene (C_2Cl_4), 4000 m of water equivalent underground. It uses radiochemical techniques to determine the ^{37}Ar production rate. The detector was built at BNL in 1965–67 and operated by Brookhaven until 1984. At that time the laboratory was transferred to Penn U. Collecting data regularly since 1970.

Journal papers PRL 47 (1981) 1507.

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UNDERGROUND-IMB

(Proposed 1979, Approved 1980, Began data-taking 1982, Completed data-taking Mar 1991)

THE IRVINE-MICHIGAN-BROOKHAVEN EXPERIMENT

UC, IRVINE – J Breault, W Gajewski, P G Halverson, W R Kropp, C McGrew, L Price, F Reines, J Schultz, H W Sobel (√ Spokesperson)
UC, IRVINE & WARSAW U, IEP – D Kielczewska
BROOKHAVEN – M Goldhaber
BOSTON U – S T Dye, E Hazen, J L Stone (√ Spokesperson), L R Sulak
CLEVELAND STATE U – C B Bratton
HAWAII U – J G Learned, S Matsuno
LOUISIANA STATE U – R Svoboda
LOS ALAMOS – T J Haines
CAL STATE, DOMINGUEZ HILLS – K Ganezer

Accelerator NONE *Detector* Counter

Reactions

$p \rightarrow e^+\ \pi^0$ —
$p \rightarrow \mu^+\ \pi^0$ —
$p \rightarrow e^+\ K^0$ —
$p \rightarrow \nu\ K^+$ —
$p \rightarrow e^+\ \eta$ —
$p \rightarrow e^+\ \rho$ —
$p \rightarrow e^+\ e^-\ e^+$ —
$n \rightarrow e^+\ \pi^-$ —
$n \rightarrow \mu^+\ \pi^-$ —
$n \rightarrow e^+\ e^-\ \nu$ —
$n \rightarrow \bar{n}$ —

monopole $p \rightarrow$ monopole $e^+ \pi^0$	—
monopole $p \rightarrow$ monopole $e^+ \eta$	—
monopole $p \rightarrow$ monopole $e^+ \rho$	—
monopole $p \rightarrow$ monopole $e^+ \omega$	—
monopole $p \rightarrow$ monopole $\mu^+ \omega$	—
monopole $n \rightarrow$ monopole $\nu \pi^0$	—
monopole $n \rightarrow$ monopole $e^+ \pi^-$	—

Particles studied p, n, muon, ν, monopole

Brief description An 8000-ton water Čerenkov detector, 1570 m of water equivalent underground. The modified detector, IMB-3, began operating in May 86. It had 8-inch phototubes attached to wave-shifting plates. The PMT time resolution was improved from 11 to 8 ns. Studies nucleon decays, including monopole induced, stellar-collapse neutrinos, and high-energy cosmic ν_μ's. Data analysis in progress (May 94).

Journal papers PRL 51 (1983) 27, PRL 51 (1983) 245, PRL 52 (1984) 720, PRL 52 (1984) 1092, NIM A239 (1985) 467, NP B252 (1985) 261, PRL 54 (1985) 22, PRL 54 (1985) 2299, PRL 55 (1985) 2114, PRL 57 (1986) 1986, PRL 57 (1986) 2872, NIM A261 (1987) 540, PRL 58 (1987) 1494, PL B184 (1987) 305, PL B188 (1987) 388, ASTJ 315 (1987) 420, PR D35 (1987) 2073, PR D36 (1987) 30, NIM A264 (1988) 28, PRL 61 (1988) 2522, PR D37 (1988) 3361, PR D38 (1988) 768, PRPL 163 (1988) 137, PRL 62 (1989) 2069, PR D39 (1989) 1492, PR D42 (1990) 2974, PRL 66 (1991) 2561, PR D43 (1991) 1413, PRL 69 (1992) 1010, PR D46 (1992) 3720, NIM A324 (1993) 363, PR D47 (1993) 4203, and PR D49 (1994) 2169.

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UNDERGROUND-KAMIOKANDE-III

(Began data-taking Nov 1985, In progress)

THE KAMIOKANDE EXPERIMENT

TOKYO U, ICRR – Y Fukuda, T Hayakawa, K Inoue, T Ishida, S Joukou, T Kajita, S Kasuga, Y Koshio, T Kumita, K Matsumoto, M Nakahata, K Nakamura, A Sakai, M Shiozawa, J Suzuki, Y Suzuki, Y Totsuka (✓ Spokesperson)
TOKYO U, INS – K Nishikawa
KEK – K S Hirata, K Kihara, Y Oyama, M Yamada
TOKAI U, SHIBUYA – M Koshiba, K Nishijima
KOBE U – T Kajimura, T Suda, A T Suzuki
NIIGATA U – T Ishizuka, K Miyano; H Miyata, H Okazawa, H Takei
OSAKA U – T Hara, N Kishi, Y Nagashima, M Takita, A Yoshimoto
TOKYO INST TECH – Y Hayato, K Kaneyuki, Y Takeuchi, T Tanimori
GIFU U – S Tasaka
TOHOKU U – M Koga, A Suzuki
MIYAGI U OF EDUCATION – S Mori

Accelerator NONE *Detector* Counter

Reactions

$\nu e^- \rightarrow \nu e^-$	—
$\bar{\nu}_e p \rightarrow n e^+$	—

Particles studied p, n, monopole, muon, ν

Brief description A 3000-ton water Čerenkov detector, 2700 m of water equivalent underground. The KAMIOKANDE-I detector has been upgraded with new electronics, TDC's, and one thousand 20-inch phototubes surrounded by aluminized reflectors. Studies nucleon decays, solar, supernova, atmospheric and high-energy cosmic neutrinos, high-energy muons, *etc.* The second phase was completed in April 90, the third phase started in October 90. Taking data (May 94).

Journal papers PRL 58 (1987) 1490, PRL 59 (1987) 2604, PL B205 (1988) 416, PRL 61 (1988) 385, PRL 61 (1988) 2653, PR D38 (1988) 448, PL B220 (1989) 308, PRL 63 (1989) 16, PR D39 (1989) 1481, ASTJ 359 (1990) 574, PRL 65 (1990) 1297, PRL 65 (1990) 1301, PL B270 (1991) 89, PRL 66 (1991) 9, PR D43 (1991) 2843, PR D44 (1991) 617, PR D44 (1991) 2220, PR D44 (1991) 2241 [erratum: PR D45 (1992) 2170], PL B278 (1992) 217, PL B280 (1992) 146, PL B289 (1992) 463, PL B311 (1993) 357, NP (PROC SUPPL) B31 (1993) 105, and NIM A340 (1994) 612.

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UNDERGROUND-KGF

(Began data-taking Oct 1980)

THE KOLAR GOLD FIELD EXPERIMENT

TATA INST – H Adarkar, S R Dugad, S D Kalmani, M R Krishnaswamy, J D Kulkarni, M G K Menon, N K Mondal, P S Murty, P Nagaraj, V S Narasimham (Spokesperson), B Satyanarayana, B V Sreekantan
OSAKA CITY U – Y Hayashi, N Ito, S Kawakami, T Mitsuyama, T Nakamura, K Tanaka
KANAGAWA U – S Miyake

Accelerator NONE *Detector* Calorimeter

Particles studied p, n

Brief description Phase-I of the experiment was completed in 1985. The phase-II detector is a 260-ton iron tracking calorimeter with 60 layers of proportional counter tubes, 6600 m of water equivalent underground. A monopole detector has been added in phase-III. Studies nucleon decays and searches for magnetic monopoles and point sources of high-energy ν_μ's. Has been taking data since November 85.

Journal papers PL B106 (1981) 339, PL B115 (1982) 349, PL B142 (1984) 99, NC 9C (1986) 167, NIM A284 (1989) 422, and PL B267 (1991) 138.

UNDERGROUND-LVD

(Approved Apr 1985, Began data-taking Jun 1992, In progress)

SEARCH FOR STELLAR-COLLAPSE NEUTRINOS WITH THE LARGE VOLUME DETECTOR

ASHIKAGA INST TECH – K Saitoh
BOLOGNA U – G Anzivino, G Bari, M Basile, G Bruni, G Cara Romeo, L Cifarelli, F Cindolo, A Contin, P Giusti, G Iacobucci, M Luvisetto, T Massam, R Nania, G Sartorelli
BROWN U – A De Silva, M Widgoff
CAMPINAS U – J A Chincellato, L G Dos Santos, N Mengotti Silva, A Turtelli
CERN – A Zichichi (✓ Spokesperson)
CALABRIA U – L Caputi, G Susinno
FLORENCE U – A Bizzetti, P Desiati, G Landi, B Monteleoni, P G Pelfer, P Pinna, H Tang
FRASCATI – S Bianco, R Casaccia, F L Fabbri, G Maccarrone, S Sarwar, L Votano, A Zallo
GRAN SASSO – A Bosco, N Taborgna
HOUSTON U – K Lau, B Mayes, G H Mo, D Parks, L Pinsky, J Pyrlik, D Sanders, R Weinstein
CCAST WORLD LAB, BEIJING – Y Ban, Y Cao, K Chen, R Chen, S Cong, S Gu, X Lin, L Lu, J Ma, Z Mao, M Pu, J Qiu, D Shen, W Tian, F Wang, H Wang, S Wang, Z Xu, X Zhou, Q Zhu, X Zhu, B Zhuang
INDIANA U – E D Alyea
MIT, LNS – M Deutsch, Y Guo, E S Hafen, P Haridas, I A Pless, J Tang, L Xu
MOSCOW, INR – V S Berezinsky, V L Dadykin, R I Enikeev, F F Khaichukov, E V Korolkova, P V Kortchaguin, V B Kortchaguin, V A Kudryavtsev, A S Malguin, M A Markov, V G Ryasny, O G Ryazhskaya, V P Talochkin, V F Yakushev, G T Zatsepin
NORTHEASTERN U – J Moromisato, E Von Goeler
OKAYAMA UNIV SCI – I Yamamoto
OKAYAMA U – T Wada
PERUGIA U – B Alpat, I Uman
SAITAMA U – N Inoue, A Misaki
TURIN U – C Aglietta, P Antonioli, G Badino, L Bergamasco, R Bertoni, C Castagnoli, A Castellina, G Cini, M Dardo, W Fulgione, P Galeotti, P Ghia, C Morello, G Navarra, L Panaro, L Periale, P Picchi, O Saavedra, G C Trinchero, P Vallania, S Vernetto

URBINO U – G Conforto, P Dominici, F Grianti, G Guidi, R Mantovani, S Santini, F Vetrano

Accelerator NONE *Detector* Scintillator, Streamer chamber

Reactions

$\overline{\nu}_e\, p \rightarrow e^+\, n$	—
$\nu\, C \rightarrow \nu\, C\, \gamma$	—
$\overline{\nu}\, C \rightarrow \overline{\nu}\, C\, \gamma$	—
$\nu\, e^- \rightarrow \nu\, e^-$	—
$\nu_e\, C \rightarrow e^-$ Nit	—
$\overline{\nu}_e\, C \rightarrow e^+$ Bor	—

Particles studied p, n, muon, ν

Brief description The experiment is located in the Gran Sasso Laboratory at a minimum depth of about 3300 mwe. The apparatus consists of a streamer tube tracking system interleaved with a large volume of liquid scintillator and its support structure which acts as a passive absorber. It is a high precision tracking calorimeter with the major part of its volume sensitive, and with the sensitive elements uniformly distributed. Of the five towers which will constitute the complete LVD, the first one is operational since June 92 and the second one since June 94. The main features of an LVD tower are: surface area 660 ^{2}, geometrical acceptance 1768 m^2 sr, and liquid scintillator mass 368 tons. The major purpose of the experiment is to search for neutrinos from stellar collapses in our galaxy. Other physics goals include: measurement of the atmospheric neutrino flux and search for neutrino oscillations, study of the spectrum and interactions of cosmic ray muons and muon bundles, and investigation of events detected in time coincidence with the EASTOP experiment at the surface of the mountain. Taking data (June 94).

Journal papers NC C9 (1986) 237, NIM A264 (1988) 5, NIM A274 (1989) 177, NIM A277 (1989) 11, NIM A277 (1989) 17, NIM A295 (1990) 466, NC 105A (1992) 1793, NC 105A (1992) 1815, and NIM A329 (1993) 521.

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UNDERGROUND-MACRO

(Proposed 1984, Approved Apr 1985, Began data-taking Feb 1989, In progress)

MONOPOLE, ASTROPHYSICS, AND COSMIC RAYS OBSERVATORY

MACRO COLLABORATION

BARI U & INFN, BARI – R Bellotti, F Cafagna, M Calicchio, G DeCataldo, C DeMarzo, O Erriquez, C Favuzzi, P Fusco, N Giglietto, P Guarnaccia, M N Mazziotta, T Montaruli, P Spinelli

BOLOGNA U & INFN, BOLOGNA – S Cecchini, H Dekhissi, G Giacomelli (√ Spokesperson), G Mandrioli, A Margiotta-Neri, L Patrizii, B Pavesi, V Popa, E Scapparone, P Serra-Lugaresi, P F Spada, M Spurio, V Togo

BOSTON U – S Ahlen, J T Hong, E Kearns, G Ludlam, A Marin, C Okada, J L Stone, L R Sulak, W Worstell

CAL TECH – B C Barish (√ Spokesperson), E Katsavounidis, S Kyriazopoulou, G Liu, R Liu, D G Michael, R Nolty, C W Peck, N D Pignatano, K Scholberg, C W Walter

DREXEL U – C Lane, M Mittelbrunn, J Steele, R Steinberg

FRASCATI – G Battistoni, H Bilokon, C Bloise, M Carboni, V Chiarella, C Forti, A Grillo, E Iarocci, A Marini, V Patera, F Ronga, L Satta, A Sciubba, M Spinetti, V Valente

GRAN SASSO – R Antolini, C Gustavino, S Mikheyev, S Parlati, J Reynoldson

INDIANA U – C Bower, A Habig, R Heinz, L Miller, S Mufson, J Musser

AQUILA U – I De Mitri, A Di Credico, P Monacelli

LECCE U & INFN, LECCE – P Bernardini, G Mancarella, D Martello, O Palamara, S Petrera, P Pistilli, A Surdo

MICHIGAN U – R Baker, S Coutu, E Diehl, K Hanson, D Levin, M Longo, G Tarle

NAPLES U, IFS & INFN, NAPLES – M Ambrosio, G C Barbarino, D Campana, F Guarino, G Osteria

PISA U & INFN, PISA – A Baldini, C Bemporad, F Cei, G Giannini, M Grassi, D Nicolo, R Pazzi

ROME U – G Auriemma, S Bussino, A Corona, M De Vincenzi, E Lamanna, P Lipari, F Sartogo, C Satriano, M Severi

TEXAS A AND M – Y Lu, A Sanzgiri, R Webb

TURIN U & INFN, TURIN – V Bisi, P Giubellino, A Marzari-Chiesa, M Masera, M Monteno, L Ramello, M Sitta

BARTOL RESEARCH INST – J Petrakis

SANDIA – P Green

Accelerator NONE *Detector* Scintillator

Particles studied monopole, muon, ν

Brief description The MACRO detector has been primarily designed to conduct a search for supermassive grand unified magnetic monopoles. It is a general purpose detector, which is also searching for nuclearites, WIMP's, fractional charge particles, $\overline{\nu_e}$ from stellar gravitational collapses, high-energy ν_μ's from cosmic sources, *etc.* It is studying high-energy cosmic ray muons (vertical intensity, seasonal variation, anisotropy, possible muon astronomy), cosmic ray composition at high energies, atmospheric neutrinos, *etc.* Operates in coincidence with an air shower array (EASTOP) to study the primary cosmic ray composition at high energies. The detector has six supermodules in two levels, each instrumented to operate independently of the others. Each lower supermodule consists of an horizontal array of two layers of liquid scintillation counters, ten layers of limited streamer tubes, one layer of CR39 nuclear track detectors and seven layers of absorbers. The upper part (Attico) has four horizontal layers of streamer tubes and one layer of scintillators. The sides are covered with one layer of scintillators and 6 layers of streamer tubes. The CR39 detector is also mounted on the east vertical side. The global dimensions are 12×76×9 m^3 and it has 600 tons of liquid scintillator. The detector is located in Hall B of the Gran Sasso Laboratory. Has an overhead shielding of about 3800 m of water equivalent. Taking data (May 94).

Journal papers NC 9C (1986) 281, NIM A281 (1989) 213, PR D42 (1990) 1396, PL B249 (1990) 149, NIM A300 (1991) 581, NIM A301 (1991) 275, NP (PROC SUPPL) B24 (1991) 191, NIM A321 (1992) 609, PRL 69 (1992) 1860, ASPP 1 (1992) 11, PR D46 (1992) 895, PR D46 (1992) 4836, NP B370 (1992) 432, NIM A324 (1993) 337, ASTJ 412 (1993) 30, and PRL 72 (1994) 608.

Related experiments CERN-WA-086, CERN-EMU-018

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UNDERGROUND-SAGE

(Began data-taking May 1988, In progress)

THE SOVIET-AMERICAN GALLIUM SOLAR NEUTRINO EXPERIMENT (SAGE)

SAGE COLLABORATION

MOSCOW, INR – J N Abdurashitov, E L Faizov, V N Gavrin (√ Spokesperson), A O Gusev, A V Kalikhov, T V Knodel, I I Knyshenko, V N Kornoukhov, I N Mirmov, A M Pshukov, A M Shalagin, A A Shikhin, P V Timofeyev, E P Veretenkin, V M Vermul, G T Zatsepin

LOS ALAMOS – T J Bowles (√ Spokesperson), J S Nico, W A Teasdale, D L Wark, J F Wilkerson

PENN U – B T Cleveland, T Daily, R Davis, K Lande, C K Lee, P W Wildenhain

LOUISIANA STATE U – M L Cherry

PRINCETON U – R T Kouzes

Accelerator NONE *Detector* GGNT

Reactions

$\nu_e\, ^{71}Ga \rightarrow e^-\, ^{71}Ge$	—

Particles studied ν_e

Brief description Uses the Gallium-Germanium Neutrino Telescope (GGNT) situated in an underground laboratory built in the Baksan Neutrino Observatory, Northern Caucasus, Russia. Has an overhead shielding of about 4700 m of water

equivalent. Sensitive to the low energy neutrinos produced by the *pp* fusion in the Sun. Exploits the radiochemical procedure and uses liquid metallic gallium (30 tons in the first stage, 57 tons in 1991). A removal of the cosmogenic ^{68}Ge was carried out in 1988/89. The first data in the 1989 run had a high background. A purification procedure, implemented beginning with the January 90 extraction, resulted in a significant background reduction. A calibration with a ^{51}Cr artificial neutrino source of about 1 mC activity is planned. The SAGE-II phase began in September 92. Counts the K and L peaks in ^{71}Ge decay, with 57 tons of Ga and low background. Taking data (May 94).

Journal papers PRL 67 (1991) 3332, and PL B328 (1994) 234.

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UNDERGROUND-SOUDAN-2

(Proposed 1981, Approved 1983, Began data-taking 1988, In progress)

THE SOUDAN-2 PROTON DECAY EXPERIMENT

SOUDAN-2 COLLABORATION

ARGONNE – D S Ayres, D A Crane, T H Fields, M C Goodman, F V Lopez, E N May, L E Price, R V Seidlein, J L Thron, H J Trost, J L Uretsky
MINNESOTA U – C R Bode, P M Border, H Courant, D M DeMuth, R N Gray, K Johns, S M S Kasahara, N P Longley, M J Lowe, M L Marshak (√ Spokesperson), W H Miller, L Mualem, E A Peterson, D M Roback, K Ruddick, D J Schmid, M H Schub, M A Shupe, V Vassiliev, G Villaume, S J Werkema
ARGONNE & MINNESOTA U – H M Gallagher
OXFORD U – W W M Allison, G D Barr, C B Brooks, J H Cobb, G L Giller, D H Perkins, A Stassinakis, M A Thomson, N West, U Wielgosz
RUTHERFORD – G J Alner, D J A Cockerill, R J Cotton, C Garcia-Garcia, P J Litchfield, G F Pearce
TUFTS U – B Ewen, T Kafka, J A Kochocki, W Leeson, W A Mann, R H Milburn, A Napier, W P Oliver, B Saitta, J Schneps, N Sundaralingam
WESTERN WASHINGTON U – W L Barrett

Accelerator NONE *Detector* Calorimeter

Particles studied p, n, ν_e, ν_μ

Brief description A 960-ton iron tracking calorimeter uses drift projection tubes arranged in a hexagonal array. The tubes are 15 mm in diameter separated by 1.6 mm of steel. Trigger thresholds are 100 MeV kinetic energy for muons and 150 MeV for electrons. The main detector is completely surrounded by a 1700 m^2 active shield of proportional tubes which identifies events associated with cosmic ray muons. A charged particle test-beam calibration of the 4.3-ton calorimeter modules has been completed and a neutrino beam calibration is proposed. A surface array and an air Čerenkov detector are operated in coincidence with SOUDAN-2 detector to provide information about the air showers which produce underground muons. The experiment is located in the Soudan mine, Minnesota, 2090 m of water equivalent underground. The data taking began in mid-1988 when 275 tons of detector was installed. The detector was completed in late 1993. Physics topics include studies of nucleon decay, atmospheric neutrinos and neutrino oscillations, and searches for magnetic monopoles and point sources of cosmic rays. The collaboration has also proposed to use the SOUDAN-2 detector for a long baseline neutrino oscillation experiment (see FNAL-P822 proposal).

Journal papers NIM A276 (1989) 371, NIM A283 (1989) 642, PR D42 (1990) 2967, JPHY G17 (1991) S393, PL B269 (1991) 220, NP (PROC SUPPL) A28 (1992) 377, and PR D46 (1992) 4846.

Related experiments FNAL-822, BNL-841

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WWW Home-page
http://hepwww.rl.ac.uk/ndk$root/www/soudan2.html

UNDERGROUND-SUDBURY

(Proposed 1985, Approved 1990, In preparation)

THE SUDBURY NEUTRINO OBSERVATORY (SNO)

SNO COLLABORATION

QUEENS U, KINGSTON – E Bonvin, H C Evans, G T Ewan (√ Spokesperson), A Hallin, H W Lee, J R Leslie, J D MacArthur, H B Mak, A B McDonald, W McLatchie, T J Radcliffe, B C Robertson, P Skensved, R L Stevenson
CHALK RIVER, AECL – E D Earle, J D Hepburn, G M Milton, B Sur
CRPP, OTTAWA – I Blevis, W F Davidson, C K Hargrove, K McFarlane, H Mes, T Noble, M O'Neill, M Shatkay, D Sinclair
CARLETON U – A L Carter, B Hollebone
GUELPH U – P Jagam, J Law, R Ollerhead, J J Simpson, J X Wang
LAURENTIAN U – J Bigu, E D Hallman, R U Haq, J G Hykaway, A Roberge, C J Virtue
BRITISH COLUMBIA U – R Komar, C Waltham
PENN U – E W Beier (√ Spokesperson), T Ekenberg, W Frati, F M Newcomer, R Van de Water, R Van Berg
PRINCETON U – M M Lowry
LOS ALAMOS – T J Bowles, P Doe, M M Fowler, A Hime, R G H Robertson, J B Wilhelmy, J F Wilkerson, J M Wouters
LBL – Y D Chan, K T Lesko, M E Moorhead, E B Norman, A R Smith, R G Stokstad, I Žlimen
OXFORD U – J C Barton, N A Jelley (√ Spokesperson), A B Knox, W Locke, N W Tanner (√ Spokesperson), P T Trent, D L Wark

Accelerator NONE *Detector* Counter

Reactions

$\nu\, e^- \rightarrow \nu\, e^-$	—
ν_e deut $\rightarrow p\, p\, e^-$	—
ν deut $\rightarrow p\, n\, \nu$	—
$\overline{\nu}_e$ deut $\rightarrow n\, n\, e^+$	—
$\overline{\nu}_e\, p \rightarrow n\, e^+$	—

Particles studied ν

Brief description The detector is a 1000-ton heavy water (D_2O) Čerenkov detector designed to study neutrinos from the Sun and other astrophysical sources. The use of heavy water allows both electron neutrinos and all other types of neutrinos to be observed by three complementary reactions. The detector will be sensitive to the ν_e flux and energy spectrum shape and to the total neutrino flux irrespective of neutrino type. These measurements will provide information on both vacuum neutrino oscillations and matter-enhanced oscillations, the MSW effect. In the event of a supernova it will be very sensitive to ν_μ and ν_τ as well as the ν_e's emitted in the initial burst, enabling sensitive mass measurements as well as providing details of the physics of stellar collapse. The underground cavity is complete and equipment is being installed. The detector is scheduled to be filled with heavy water in Fall of 1995. In preparation (May 94).

Journal papers NC 9C (1986) 308, PL B194 (1987) 321, and NIM A314(1992) 373.

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UNDERGROUND-SUPER-KAMIOKANDE

(Proposed 1986, In preparation)

THE SUPER-KAMIOKANDE SOLAR NEUTRINO AND NUCLEON DECAY DETECTOR

Accelerator NONE *Detector* SUPER-KAMIOKANDE

Brief description Uses a 50,000-ton ring-imaging water Čerenkov detector at a depth of 2700 m of water equivalent (mwe) in the Kamioka Mozumi mine in Japan. The detector consists of a stainless steel tank in the shape of a right circular cylinder,

39 m diameter and 41 m height, filled with purified water. It is optically segmented into an inner volume, and an outer (anti-coincidence) region. The inner region is viewed by 11,200 photomultiplier tubes (PMT's). The outer annulus is used to tag entering muons as well as to attenuate low-energy γ's and neutrons. The outer region is viewed by 2,200 PMT's. This is a join collaboration of Kamiokande and IMB groups, and consists of almost fifty Japanese and American physicists. In preparation (May 94). For further details, please contact the spokesperson, Dr. Yoji Totsuka [Tokyo U., ICRR].

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WWW Home-page http://web.phys.washington.edu/local_web/SuperK/aaa_SuperK_home.html

UNDERWATER-BAIKAL

(Proposed 1984, Approved Jan 1984, Jan 1987, Began data-taking 1984, In progress)

THE LAKE BAIKAL DEEP UNDERWATER NEUTRINO TELESCOPE, NT-200

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Accelerator NONE *Detector* Counter

Particles studied ν, muon, monopole, exotic

Brief description The deep-underwater Čerenkov detector NT-200 will consist of nearly 200 optical modules arranged on 8 strings at 1000 m depth. The main component of a module is a highly sensitive phototube. The experiment studies muons generated in neutrino interactions, measures fluxes of muons generated in the atmosphere, searches for local sources of very-high-energy particles, gives limit on the flux of heavy magnetic monopoles catalyzing proton decay, *etc.* Data already taken with single string variants. The completion of the detector is expected in 1993/94.

Journal papers NP (PROC SUPPL) B14 (1990) 51, NP (PROC SUPPL) B19 (1991) 388, and YF 52 (1990) 86 = SJNP 52 (1990) 54.

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UNDERWATER-DUMAND

(Proposed 1988, Approved 1990, In preparation)

DEEP UNDERWATER MUON AND NEUTRINO TELESCOPE

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Accelerator NONE *Detector* Counter

Particles studied muon, ν, monopole

Brief description In the first stage of the experiment (DUMAND-I), a test of the operation of 7 phototube modules was carried out. Measurements were made with a vertical string of modules suspended from a ship. Phase-II was approved in 1990. The plans call for an octagonal 9-string array, 24 tubes per string to be built by 1995. The array called DUMAND-II will be located at a depth of 4760 m, 25 km off the coast of the Hawaiian Islands. For more details see the DUMAND-II proposal (U. of Hawaii report, HDC-1-88). The aim of the experiment is to build a system capable of searching for point sources of high-energy neutrinos of astrophysical origin, and very-high-energy cosmic ray muons. Other systems to be studied include WIMP's, quark nuggets, and monopoles. The detector is a 2-megaton Čerenkov counter, with a muon area of 20,000 m^2, and an angular resolution of 1°. Initial installation took place in December 93, and proof data was acquired. As of June 94, three strings are ready to be installed. Awaiting submarine robot for ocean connection operations (scheduled for Spring 95).

Journal papers NIM A276 (1989) 359, and PR D42 (1990) 3613.

Related experiments UNDERWATER-BAIKAL

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WWW Home-page http://web.phys.washington.edu/local_web/dumand/aaa_dumand_home.html

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