Title

Current Experiments in Elementary Particle Physics

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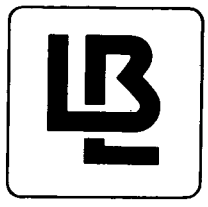

LAWRENCE BERKELEY LABORATORY
University of California

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Abstract – This report contains summaries of 720 recent and current experiments in elementary particle physics (experiments that finished taking data before 1980 are excluded). Included are experiments at Brookhaven, CERN, CESR, DESY, Fermilab, Moscow Institute of Theoretical and Experimental Physics, Tokyo Institute of Nuclear Studies, KEK, LAMPF, Leningrad Nuclear Physics Institute, Saclay, Serpukhov, SIN, SLAC, and TRIUMF, and also experiments on proton decay. Instructions are given for searching online the computer database (maintained under the SLAC/SPIRES system) that contains the summaries. Properties of the fixed-target beams at most of the laboratories are summarized.

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INTRODUCTION

This report contains summaries of 720 approved experiments in elementary particle physics. A glance at the summaries in the body of the report will show the kind of information given. Note that a summary includes a list of the any journal papers that have come from the experiment. Experiments at the following laboratories are included:

Brookhaven (BNL)	KEK
CERN	Leningrad Nuclear Physics Institute (LENI)
CESR	Los Alamos (LAMPF)
DESY	Saclay
Fermilab (FNAL)	Serpukhov (SERP)
Institute for Nuclear Studies, Tokyo (INS)	SIN
Institute for Theoretical and Experimental Physics, Moscow (ITEP)	SLAC
	TRIUMF

There are also summaries of proton decay experiments (P-DECAY). Experiments that finished taking data before 1980 are not included here but exist on a computer database (see below).

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 in 1986." 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 for 403 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, so if there is no ✓ by the spokesperson the summary is likely to be incomplete.

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 1980 (going back to about 1975, and including experiments at Argonne and Rutherford). A guide to using the EXPERIMENTS database online begins on p. 3.

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. They are needed for searching the EXPERIMENTS database online.

Properties of particle beams — Tables at the back of the report summarize the properties of beams for fixed-target experiments at Brookhaven, CERN, Fermilab, KEK, LAMPF, Serpukhov, SIN, SLAC, and TRIUMF.

Supplement on detectors — This report has a supplement entitled "Major Detectors in Elementary Particle Physics." The second edition, describing 49 detectors, appeared in May 1985. For each detector, there is a 2-page summary giving properties and performance characteristics and a diagram. A third edition is planned for 1988.

Acknowledgments — We thank L. Addis (SLAC) for much help with the SPIRES database system, A. Ogawa (SLAC) for help with the TEX system, M. Ferro-Luzzi (CERN) for permission to make extensive use of "Experiments at CERN in 1986," J. Coleman (FNAL) for information about Fermilab experiments, and 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. Comments should be sent to:

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

Requests for copies from the Americas, Australasia, and the Far East should go to the above address, while those from other areas should go to:

CERN Scientific Information Service
CH-1211 Geneva 23
Switzerland

SEARCHING THE EXPERIMENTS COMPUTER DATABASE ONLINE

As mentioned in the Introduction, the summaries in this report and summaries of many earlier experiments are contained in a computer database named EXPERIMENTS maintained at SLAC under the SPIRES database management system.

Anyone who has an account on the SLAC IBM 3081 computer can access this database online. If you have an account but are unfamiliar with SPIRES, a "Guide to VM SPIRES" is available from the SLAC Library, Bin 196, SLAC, P.O. Box 4349, Stanford, CA 94305, USA (phone: 415/854-3300, ext. 2411). If you do not have an account and cannot find anyone who does (at main laboratories, ask at the library), contact Louise Addis of the SLAC Library. If you just want to try out the system, contact us about using a temporary guest account: Particle Data Group, 50-308, Lawrence Berkeley Laboratory, Berkeley, CA 94720, USA (phone: 415/486-4723, or FTS 451-4723).

The EXPERIMENTS database is also available under a different system in Europe (contact M. Whalley, Dept. of Physics, Univ. of Durham, South Road, Durham DH1 3LE, England) and in the USSR (contact V. V. Ezhela, Inst. for High Energy Physics, Serpukhov, Moscow Region, USSR).

A brief description of how to use the EXPERIMENTS database under SPIRES follows. Words *not* enclosed in angular brackets <> are to be typed as given (only the letters in **BOLDFACE UPPER CASE** are needed, and these may be entered in upper or lower case). Words in angular brackets are "variables" for which the user substitutes an appropriate value, again in either upper or lower case (the brackets are *not* typed).

If you will be communicating with the SLAC computer at 1200 BAUD or less (such as over telephone lines or with a hardcopy terminal), you will probably want to run in line-by-line mode, in which case you need to set your terminal/modem for half-duplex operation. If you will be communicating at a speed greater than 1200 BAUD, you will probably want to run in full-screen mode, in which case you need to use full-duplex, even-parity, 7-data-bit operation. You will usually connect to the computer through the "MICOM switch," which will ask you what "class" you want. If you are set up for line-by-line mode, type:

VMLINE

If you are set up for full-screen mode, type:

VM24

In full-screen mode, you will then be asked to type a carriage return, and for the kind of terminal you are using (e.g., VT100 or ADM3A). Finally, in either mode, type an extra carriage return after you see the message VM/370 ONLINE. [Note that in full-screen mode, whenever the screen fills up (indicated by the word MORE at the bottom), you may clear it by hitting the CLEAR key (which may be ENTER, CONTROL-L, or CONTROL-Z on your terminal); if you don't explicitly clear the screen, it will do so automatically after a minute or so (you can hold the screen indefinitely by hitting a carriage return). Also, if you are listing out information and want to abort the listing, type HT and a carriage return before hitting the CLEAR key. In line-by-line mode, you can abort a listing with the BREAK or ATTN key.]

After going through the above connection procedure, log on to the computer by typing:

Logon <your-account>
(e.g., **L**ogon **JDOE**)

Then type your password when asked for it (it will not show on your terminal), and finally type an extra carriage return after the system gives its introductory messages.

To enter the SPIRES system, type:

SPIRES
(special SPIRES-only accounts, ending in the letters SPI, don't need to do this)

To get a detailed explanation of how to use a particular SPIRES command, type:

EXPlain <command-word>
(e.g., **EXP**lain **FIND**, **EXP**lain **EXPLAIN**, **EXP**lain **EVERYTHING**)

To access the database, type:

SELect EXPERIMENTS

To find out what indices are available for searching in this database (and the various index names you may use to refer to them), type:

SHOw INDex

To see a random selection of values in an index (and thus determine the form to use for a search value), type:

BROwse <index-name>
(e.g., **BROwse EXP**eriment-num)

To see a selection of values in an index near a particular value (perhaps to see if a value you are interested in is valid, or to see nearby values), type:

BROwse <index-name> <value>
(e.g., **BROwse EXP**eriment-num **SLAC-PEP**)

To search for experiments satisfying certain criteria, type:

FINd <index-name> <value> **AND(OR)** <index-name> <value> . . .

Some sample searches are:

FINd **EXP**eriment-num **CERN-UA-001**

FINd Author **RUBBIA**

FINd **DET**ector **OMEGA OR OMEGAPRIME**

FINd Title **J/PSI**

This finds any experiment with J/PSI as part of the title.

FINd **CIT**ation **"PRL 46 (1981) 1115"**

Note that the above form, with spaces but no commas between the elements, must be used. Note also the quotes which are required here and in the following two examples; for an explanation, see the discussion below on ***Searching Problems***.

FINd **RE**action **"PI- P --> PI0 N" AND ECM 3 TO 4**

The "arrow" here is composed of two minus signs and a greater-than sign. Specifying the reaction as, e.g., **PI- P#**, would get all reactions with $\pi^- p$ as the initial state, regardless of the final state. Energies and momenta are in GeV and GeV/c, respectively.

FINd Particle **"UPSI(9460)"**

Searching Problems: *If your search does not find any experiments, there are two common reasons why it may have failed spuriously.* ***(1)*** *You may have used an incorrect form for the value for which you were searching (e.g., an incorrect particle or experiment name). To find out the correct form, use the BROWSE command for the index you are searching (see above), or look in the lists of names and abbreviations beginning on page 21. Note, in particular, that in reaction and particle searches, an antiparticle name is formed by following the corresponding particle name with BAR (thus the antiproton is written as PBAR); in title searches, particle names are somewhat variable in their spelling, and several forms may be used.* ***(2)*** *Any search value containing any of the special characters ( ) < > = must be enclosed in quotes "..."; see the examples for CITATION, REACTION, and PARTICLE above.*

After entering a FIND command, you will be told the number of experiments satisfying the criteria given. At this point, you have several options:

(1) You may list out the information available for these experiments by typing:

TYPe (or **TYPe PAU**se if you are in line-by-line mode on a CRT terminal)

[Recall that you may abort a long listing by hitting the BREAK or ATTN key if you are in line-by-line mode, or by typing HT followed by a carriage return followed by the CLEAR (ENTER, CONTROL-L, or CONTROL-Z) key if you are in full-screen mode.]

Or (2) you may narrow the list already found (i.e., add more selection criteria) by typing:

AND <index-name> <value>

Or (3) you may broaden the list already found (i.e., include more cases) by typing:

OR <index-name> <value>

Or (4) you may initiate a new search with a new FIND command, or issue any other command.

To switch to a briefer format (which does not list reactions and certain other information), type:

SET FORmat **QUICKLIST**

To switch back to the complete format, type:

SET FORmat **DEFAULT**

To terminate the session and log off the computer, type:

CP LOGoff

BEAM/TARGET/MOMENTUM INDEX

Beam-target	Lab momentum GeV/c	Experiment
γ e^-	0.12–0.40	INS-ES-111
γ p	0.60–1.10	INS-15-1
γ p	0.80–1.00	INS-14-3
γ p	0.90–1.15	INS-17-1
γ p	<1.30	INS-15-2
γ p	10.5	SLAC-BC-076
γ p	20.0	SLAC-BC-072/073
γ p	20.0	SLAC-BC-075
γ p	65.0–180.	CERN-WA-069
γ p	70.0–140.	FNAL-516
γ p	80.0–140.	FNAL-612
γ p	<200.	CERN-NA-014
γ p	<200.	CERN-NA-014-2
γ p	100.–260.	FNAL-691
γ p	200.–600.	FNAL-683
γ n	0.55–0.90	INS-14-4
γ nucleon	10.0–180.	CERN-NA-001
γ deut	0.30–0.65	INS-16-1
γ deut	0.35–0.85	INS-15-3
γ deut	0.40–0.80	INS-ES-112
γ deut	0.50–1.00	INS-18-3
γ deut	0.50–1.00	INS-ES-103
γ deut	0.50–1.00	INS-19-1
γ deut	?	INS-ES-113
γ He	0.20–0.45	INS-ES-105
γ He	0.20–0.45	INS-19-2
γ nucleus	0.20–0.45	INS-17-2
γ nucleus	0.20–0.45	INS-18-1
γ nucleus	0.20–1.00	INS-16-2
γ nucleus	0.35–0.60	INS-19-3
γ nucleus	0.35–0.85	INS-15-3
γ nucleus	0.74–0.98	INS-15-4
γ nucleus	10.0–180.	CERN-NA-001
γ nucleus	20.0–80.0	CERN-WA-058
γ nucleus	70.0–200.	CERN-EMU-006
γ nucleus	<300.	FNAL-458
γ nucleus	200.–500.	FNAL-687
γ nucleus	?	INS-ES-101
γ crystal	0.50	INS-ES-102
γ crystal	15.0–150.	CERN-WA-081
γ crystal	20.0–200.	CERN-NA-033
MOMENTUM RANGES FOR NEUTRINO BEAMS ARE NOT DEFINED VERY SYSTEMATICALLY.		
ν Ne	10.0–200.	FNAL-646
ν_e e^-	0.020–0.053	LAMPF-225
ν_e e^-	0.030	LAMPF-1015
ν_e e^-	<70.0	SERP-E-152
ν_e e^-	10.0–200.	FNAL-646
ν_e Ne	10.0–200.	FNAL-646
ν_e nucleus	0.50–3.00	CERN-PS-180
ν_e nucleus	<70.0	SERP-E-152
ν_e nucleus	10.0–250.	FNAL-636
$\overline{\nu}_e$ e^-	10.0–200.	FNAL-646
$\overline{\nu}_e$ e^-	<230.	FNAL-594
$\overline{\nu}_e$ Ne	10.0–200.	FNAL-646
$\overline{\nu}_e$ Al	2.00–30.0	SERP-E-045
ν_μ e^-	<0.050	LAMPF-1015
ν_μ e^-	<12.0	BNL-734
ν_μ e^-	2.00–30.0	SERP-E-045
ν_μ e^-	<70.0	SERP-E-152
ν_μ e^-	5.0–100.	CERN-WA-079
ν_μ e^-	<150.	CERN-WA-021
ν_μ e^-	<200.	FNAL-053A
ν_μ e^-	<230.	FNAL-594
ν_μ e^-	<260.	CERN-WA-018
ν_μ e^-	<400.	FNAL-635
ν_μ p	<10.0	BNL-737
ν_μ p	<12.0	BNL-734
ν_μ p	<150.	CERN-WA-021
ν_μ p	<200.	FNAL-053A
ν_μ p	<260.	CERN-WA-001
ν_μ p	<260.	CERN-WA-025
ν_μ n	<10.0	BNL-737
ν_μ n	<12.0	BNL-734
ν_μ n	2.0–30.0	SERP-E-045
ν_μ n	<230.	FNAL-594
ν_μ n	<260.	CERN-WA-025
ν_μ deut	<10.0	BNL-737
ν_μ deut	<260.	CERN-WA-001
ν_μ deut	<260.	CERN-WA-025
ν_μ Ne	<200.	FNAL-053A
ν_μ Ne	10.0–200.	FNAL-646
ν_μ Al	2.00–30.0	SERP-E-045
ν_μ Fe	<160.	CERN-WA-001-2
ν_μ Fe	<260.	CERN-WA-001
ν_μ Fe	2.00–30.0	SERP-E-045
ν_μ Fe	30.0–230.	FNAL-701
ν_μ Pb	<200.	CERN-WA-044
ν_μ nucleus	0.50–1.50	CERN-PS-181
ν_μ nucleus	0.50–3.00	CERN-PS-180
ν_μ nucleus	<6.0	CERN-PS-167
ν_μ nucleus	<6.0	CERN-PS-168
ν_μ nucleus	10.0–20.0	SERP-E-107
ν_μ nucleus	<70.0	SERP-E-152
ν_μ nucleus	10.0–100.	CERN-WA-059
ν_μ nucleus	10.0–100.	FNAL-531
ν_μ nucleus	10.0–100.	FNAL-564
ν_μ nucleus	<160.	CERN-WA-018-2
ν_μ nucleus	10.0–200.	CERN-WA-047
ν_μ nucleus	<230.	FNAL-594
ν_μ nucleus	10.0–250.	FNAL-636
ν_μ nucleus	25.0–250.	FNAL-616
ν_μ nucleus	<260.	CERN-WA-018
ν_μ nucleus	<400.	FNAL-744
ν_μ nucleus	10.0–400.	FNAL-632
ν_μ nucleus	<500.	FNAL-733
ν_μ nucleus	<500.	FNAL-745
ν_μ nucleus	<600.	FNAL-770
ν_μ nucleus	20.0–600.	FNAL-652
$\overline{\nu}_\mu$ e^-	<0.05	LAMPF-1015
$\overline{\nu}_\mu$ e^-	<12.0	BNL-734
$\overline{\nu}_\mu$ e^-	5.0–100.	CERN-WA-079
$\overline{\nu}_\mu$ e^-	<200.	FNAL-180
$\overline{\nu}_\mu$ e^-	<230.	FNAL-594
$\overline{\nu}_\mu$ e^-	<260.	CERN-WA-018
$\overline{\nu}_\mu$ e^-	<400.	FNAL-635
$\overline{\nu}_\mu$ p	<12.0	BNL-734
$\overline{\nu}_\mu$ p	2.0–30.0	SERP-E-045
$\overline{\nu}_\mu$ p	<150.	CERN-WA-021
$\overline{\nu}_\mu$ p	<200.	FNAL-180
$\overline{\nu}_\mu$ p	<230.	FNAL-594
$\overline{\nu}_\mu$ p	<260.	CERN-WA-001
$\overline{\nu}_\mu$ p	<260.	CERN-WA-025
$\overline{\nu}_\mu$ n	<12.0	BNL-734
$\overline{\nu}_\mu$ n	<260.	CERN-WA-025
$\overline{\nu}_\mu$ nucleon	<200.	FNAL-180
$\overline{\nu}_\mu$ deut	<260.	CERN-WA-001
$\overline{\nu}_\mu$ deut	<260.	CERN-WA-025
$\overline{\nu}_\mu$ Ne	10.0–200.	FNAL-646
$\overline{\nu}_\mu$ Al	2.00–30.0	SERP-E-045
$\overline{\nu}_\mu$ Fe	2.00–30.0	SERP-E-045
$\overline{\nu}_\mu$ Fe	<160.	CERN-WA-001-2
$\overline{\nu}_\mu$ Fe	30.0–230.	FNAL-701
$\overline{\nu}_\mu$ Fe	<260.	CERN-WA-001
$\overline{\nu}_\mu$ Fe	<260.	CERN-WA-018
$\overline{\nu}_\mu$ nucleus	<6.0	CERN-PS-167
$\overline{\nu}_\mu$ nucleus	<6.0	CERN-PS-168
$\overline{\nu}_\mu$ nucleus	10.0–20.0	SERP-E-107
$\overline{\nu}_\mu$ nucleus	10.0–100.	CERN-WA-059
$\overline{\nu}_\mu$ nucleus	10.0–100.	FNAL-531
$\overline{\nu}_\mu$ nucleus	10.0–100.	FNAL-564
$\overline{\nu}_\mu$ nucleus	<160.	CERN-WA-018-2
$\overline{\nu}_\mu$ nucleus	10.0–200.	CERN-WA-047
$\overline{\nu}_\mu$ nucleus	<230.	FNAL-594
$\overline{\nu}_\mu$ nucleus	25.0–250.	FNAL-616
$\overline{\nu}_\mu$ nucleus	<260.	CERN-WA-018
$\overline{\nu}_\mu$ nucleus	10.0–400.	FNAL-632
$\overline{\nu}_\mu$ nucleus	<400.	FNAL-744
$\overline{\nu}_\mu$ nucleus	<500.	FNAL-733

BEAM/TARGET/MOMENTUM INDEX

Beam-target	Lab momentum GeV/c	Experiment
$\overline{\nu}_\mu$ nucleus	<600.	FNAL-770
$\overline{\nu}_\mu$ nucleus	20.0–600.	FNAL-652
ν_τ Ne	10.0–200.	FNAL-646
ν_τ nucleus	10.0–250.	FNAL-636
$\overline{\nu}_\tau$ Ne	10.0–200.	FNAL-646
e^- p	3.0–21.0	SLAC-E-140
e^- p	6.40	SLAC-E-130
e^- p	14.0	SLAC-E-136
e^- p	16.2	SLAC-E-130
e^- p	21.0	SLAC-E-136
e^- p	22.6	SLAC-E-130
e^- p	28.5	SLAC-E-136
e^- deut	3.0–21.0	SLAC-E-140
e^- deut	6.40	SLAC-E-130
e^- deut	16.2	SLAC-E-130
e^- deut	22.6	SLAC-E-130
e^- Fe	3.0–21.0	SLAC-E-140
e^- Wt	2.50	KEK-PF-000
e^- Au	3.0–21.0	SLAC-E-140
e^- nucleus	20.0	SLAC-E-137
$e^\pm$ crystal	1.00–10.0	CERN-PS-188
$e^\pm$ crystal	20.0–200.	CERN-NA-042
$e^\pm$ crystal	150.	CERN-NA-033

Beam-target	C.m. energy GeV	Experiment
e^+ e^-	0.320–0.423	CERN-NA-007
e^+ e^-	3.00–8.40	SLAC-SP-030
e^+ e^-	3.10-5.0	SLAC-SP-032
e^+ e^-	4.40–11.2	DESY-DORIS-CRYSTAL-BALL
e^+ e^-	7.40–11.5	DESY-DORIS-LENA
e^+ e^-	9.00–11.5	DESY-DORIS-ARGUS
e^+ e^-	9.00–12.0	CESR-CLEO
e^+ e^-	9.40–11.6	CESR-CUSB
e^+ e^-	9.40–11.6	CESR-CUSB-II
e^+ e^-	10.0–44.0	DESY-PETRA-JADE
e^+ e^-	12.0–47.0	DESY-PETRA-MARK-J
e^+ e^-	12.0–47.0	DESY-PETRA-TASSO
e^+ e^-	14.0–47.3	DESY-PETRA-CELLO
e^+ e^-	29.0	SLAC-PEP-002
e^+ e^-	29.0	SLAC-PEP-004/009
e^+ e^-	29.0	SLAC-PEP-005
e^+ e^-	29.0	SLAC-PEP-006
e^+ e^-	29.0	SLAC-PEP-012
e^+ e^-	29.0	SLAC-PEP-014
e^+ e^-	29.0	SLAC-PEP-020
e^+ e^-	29.0	SLAC-PEP-021
e^+ e^-	35.0	DESY-PETRA-PLUTO-2
e^+ e^-	60.0	KEK-TE-004
e^+ e^-	<70.0	KEK-TE-001
e^+ e^-	<70.0	KEK-TE-002
e^+ e^-	<70.0	KEK-TE-003
e^+ e^-	100.	SLAC-SLC-SLD
e^+ e^-	100.	SLAC-SLC-6
e^+ e^-	<120.	CERN-LEP-ALEPH
e^+ e^-	<120.	CERN-LEP-DELPHI
e^+ e^-	<120.	CERN-LEP-L3
e^+ e^-	<120.	CERN-LEP-OPAL

Beam-target	Lab momentum GeV/c	Experiment
μ^- p	0.0	SIN-R-78–15.1
μ^- p	120.–280.	CERN-NA-002
μ^- p	120.–280.	CERN-NA-009
μ^- p	?	TRIUMF-249
μ^- deut	0.0	TRIUMF-297
μ^- He	0.0	BNL-745
μ^- He	0.0	SIN-R-82–03.1
μ^- ^{6}Li	0.0	TRIUMF-326
μ^- nucleus	0.0	LAMPF-421
μ^- nucleus	0.0	SIN-R-81–02
μ^- nucleus	0.0	TRIUMF-104
μ^- nucleus	100.–280.	CERN-NA-004
μ^+ e^-	0.005	LAMPF-869
μ^+ e^-	0.020–0.029	TRIUMF-304
μ^+ e^-	?	TRIUMF-168
μ^+ Al	0.125	BNL-754
muon p	120.	CERN-NA-037
muon p	280.	CERN-NA-037
muon p	<750.	FNAL-665
muon deut	120.	CERN-NA-037
muon deut	280.	CERN-NA-037
muon nucleus	120.	CERN-NA-037
muon nucleus	160.	CERN-NA-037
muon nucleus	280.	CERN-NA-037
muon nucleus	280.	CERN-NA-028
muon nucleus	325.	CERN-NA-028
muon nucleus	<750.	FNAL-665
pion deut	?	TRIUMF-375
pion ^{12}C	<4.00	KEK-132
pion nucleus	250.	FNAL-769
pion nucleus	350.	CERN-NA-019
pion nucleus	?	CERN-NA-018
π^+ p	0.077–0.150	TRIUMF-394
π^+ p	0.140	SIN-R-82–17
π^+ p	0.150–0.242	LAMPF-567
π^+ p	0.247	LAMPF-058/120
π^+ p	0.300–0.460	CERN-SC-094
π^+ p	0.378–0.625	LAMPF-806
π^+ p	0.471–0.687	LAMPF-849
π^+ p	0.522	LAMPF-032
π^+ p	0.687	LAMPF-058/120
π^+ p	1.40–2.10	ITEP-E-801
π^+ p	1.50–1.90	CERN-PS-160
π^+ p	2.50–14.0	CERN-PS-157
π^+ p	5.00–20.0	SERP-E-102
π^+ p	6.0	BNL-838
π^+ p	10.0	BNL-755
π^+ p	20.0	CERN-WA-056
π^+ p	40.0	SERP-E-155
π^+ p	50.0–200.	CERN-WA-006
π^+ p	60.0–70.0	SERP-E-161
π^+ p	80.0	CERN-WA-069
π^+ p	85.0	CERN-WA-076
π^+ p	100.	FNAL-577
π^+ p	100.	FNAL-597
π^+ p	140.	CERN-WA-069
π^+ p	147.	FNAL-570
π^+ p	200.	FNAL-577
π^+ p	200.	CERN-WA-070
π^+ p	250.	CERN-NA-022
π^+ p	280.	CERN-WA-070
π^+ p	280.	CERN-WA-083
π^+ p	300.	CERN-NA-024
π^+ p	400.	FNAL-609
π^+ n	5.0–20.0	SERP-E-102
π^+ n	20.0	CERN-WA-056
π^+ nucleon	70.0	SERP-E-163
π^+ deut	0.038	LAMPF-828
π^+ deut	0.054	LAMPF-828
π^+ deut	0.066	LAMPF-828
π^+ deut	0.096–0.169	LAMPF-767
π^+ deut	0.150	LAMPF-567
π^+ deut	0.160	LAMPF-567
π^+ deut	0.169	LAMPF-567
π^+ deut	0.169–0.364	TRIUMF-205
π^+ deut	0.188	LAMPF-567
π^+ deut	0.195–0.410	TRIUMF-337
π^+ deut	0.207	LAMPF-567
π^+ deut	0.209–0.410	SIN-R-79-07

BEAM/TARGET/MOMENTUM INDEX

Beam-target	C.m. energy GeV	Experiment
π^+ deut	0.215–0.443	SIN-R-78-18
π^+ deut	0.220–0.260	SIN-R-73-01.2
π^+ deut	0.225	LAMPF-567
π^+ deut	0.242	LAMPF-567
π^+ deut	0.246	LAMPF-478
π^+ deut	0.246–0.370	TRIUMF-377
π^+ deut	0.265	TRIUMF-360
π^+ deut	0.275–0.600	LAMPF-825
π^+ deut	0.310–0.417	LAMPF-605
π^+ deut	0.310–0.417	LAMPF-979
π^+ deut	0.340	SIN-R-78-18
π^+ deut	0.370	LAMPF-581
π^+ deut	0.370	LAMPF-783
π^+ deut	0.396–0.665	LENI-SC-062
π^+ deut	0.478	LAMPF-783
π^+ deut	0.480–1.16	KEK-083
π^+ deut	0.573	LAMPF-783
π^+ deut	0.740	KEK-081
π^+ deut	1.00–1.40	CERN-PS-159
π^+ deut	1.05	BNL-798
π^+ deut	1.50	KEK-081
π^+ deut	300.	FNAL-705
π^+ deut	750.	FNAL-705
π^+ deut	?	TRIUMF-303
π^+ trit	0.243–0.413	LAMPF-905
π^+ trit	0.246	LAMPF-546
π^+ trit	0.288	LAMPF-546
π^+ ^{3}He	0.128–0.331	SIN-R-79-05
π^+ ^{3}He	0.243–0.413	LAMPF-905
π^+ ^{3}He	0.246	LAMPF-546
π^+ ^{3}He	0.288	LAMPF-546
π^+ He	0.242	LAMPF-898
π^+ He	0.288	LAMPF-998
π^+ He	0.374	LAMPF-898
π^+ He	100.–150.	CERN-NA-008
π^+ ^{12}C	1.05	BNL-758
π^+ C	2.60	ITEP-E-784
π^+ Bi	2.60	ITEP-E-784
π^+ nucleus	0.20–2.00	KEK-094
π^+ nucleus	0.850	BNL-828
π^+ nucleus	1.00–5.00	KEK-090
π^+ nucleus	1.00–9.00	ITEP-E-771
π^+ nucleus	1.05	BNL-798
π^+ nucleus	1.50	ITEP-E-812
π^+ nucleus	1.85	ITEP-E-823
π^+ nucleus	3.00	ITEP-E-823
π^+ nucleus	30.0	CERN-WA-072
π^+ nucleus	40.0	SERP-E-155
π^+ nucleus	100.	FNAL-597
π^+ nucleus	140.–300.	CERN-NA-010
π^+ nucleus	150.	CERN-NA-003
π^+ nucleus	200.	FNAL-565
π^+ nucleus	200.	FNAL-629
π^+ nucleus	200.	CERN-NA-003
π^+ nucleus	250.	CERN-NA-022
π^+ nucleus	250.	FNAL-615
π^+ nucleus	280.	CERN-NA-003
π^+ nucleus	360.	CERN-WA-082
π^+ nucleus	500.	FNAL-672
π^+ nucleus	530.	FNAL-706
π^+ crystal	1.00–10.0	CERN-PS-188
π^+ crystal	2.00–20.0	CERN-PS-164
π^- e^-	250.	CERN-NA-007
π^- e^-	300.	CERN-NA-007
π^- p	0.0	SIN-R-81-01
π^- p	0.0	SIN-R-85-10
π^- p	0.0	SIN-R-85-14
π^- p	0.0	TRIUMF-217
π^- p	0.077–0.220	TRIUMF-009
π^- p	0.077–0.150	TRIUMF-394
π^- p	0.087–0.128	LAMPF-190
π^- p	0.100–0.150	LAMPF-808
π^- p	0.140	SIN-R-82-17
π^- p	0.190–0.430	SIN-R-75-07.2
π^- p	0.247	LAMPF-058/120

Beam-target	Lab momentum GeV/c	Experiment
π^- p	0.247–0.687	LAMPF-804
π^- p	0.300–0.460	CERN-SC-094
π^- p	0.350–0.450	SIN-R-86-02
π^- p	0.378–0.625	LAMPF-806
π^- p	0.400–0.600	LENI-SC-063
π^- p	0.471–0.687	LAMPF-849
π^- p	0.687	LAMPF-058/120
π^- p	1.40–2.10	ITEP-E-801
π^- p	2.00–14.0	CERN-PS-157
π^- p	6.00	BNL-838
π^- p	<8.00	KEK-064
π^- p	8.00	BNL-771
π^- p	8.00	KEK-121
π^- p	8.00–12.0	CERN-WA-074
π^- p	9.00	KEK-135
π^- p	10.0	BNL-755
π^- p	10.0	BNL-834
π^- p	12.0	BNL-818
π^- p	12.0	CERN-WA-056
π^- p	13.0	BNL-726
π^- p	13.0	BNL-732
π^- p	13.0	SERP-E-116
π^- p	13.5	BNL-755
π^- p	20.0	BNL-705
π^- p	20.0	CERN-WA-007
π^- p	20.0	SERP-E-148
π^- p	20.0–40.0	SERP-E-105
π^- p	21.0	BNL-769
π^- p	22.0	BNL-747
π^- p	25.0	SERP-E-116
π^- p	30.0	SERP-E-148
π^- p	33.0	SERP-E-142
π^- p	38.0	SERP-E-140
π^- p	40.0	SERP-E-116
π^- p	40.0	CERN-WA-007
π^- p	40.0	SERP-E-148
π^- p	40.0	SERP-E-112
π^- p	40.0	SERP-E-147
π^- p	40.0	SERP-E-155
π^- p	40.0	SERP-E-164
π^- p	60.0	CERN-WA-007
π^- p	60.0–70.0	SERP-E-161
π^- p	70.0	SERP-E-163
π^- p	80.0	CERN-WA-007
π^- p	80.0	CERN-WA-069
π^- p	85.0	CERN-WA-067
π^- p	100.	CERN-NA-012
π^- p	100.	FNAL-577
π^- p	100.	FNAL-597
π^- p	100.–345.	CERN-NA-008
π^- p	140.	CERN-WA-069
π^- p	140.	CERN-WA-011
π^- p	147.	FNAL-570
π^- p	150.	CERN-NA-005
π^- p	175.	FNAL-663
π^- p	200.	FNAL-577
π^- p	200.	CERN-WA-070
π^- p	200.	FNAL-580
π^- p	230.	CERN-NA-012
π^- p	280.	CERN-WA-070
π^- p	280.	CERN-WA-083
π^- p	300.	CERN-NA-005
π^- p	300.	CERN-NA-024
π^- p	300.	CERN-WA-076
π^- p	320.	FNAL-597
π^- p	360.	CERN-NA-016
π^- p	360.	CERN-NA-027

BEAM/TARGET/MOMENTUM INDEX

Beam-target	Lab momentum GeV/c	Experiment
π^- nucleon	70.0	SERP-E-163
π^- deut	0.0	SIN-R-81-01
π^- deut	0.096–0.169	LAMPF-767
π^- deut	0.096–0.342	LAMPF-295
π^- deut	0.246	LAMPF-478
π^- deut	0.246–0.370	TRIUMF-377
π^- deut	0.250	LAMPF-689
π^- deut	0.370	LAMPF-581
π^- deut	0.370	LAMPF-783
π^- deut	0.408	LAMPF-981
π^- deut	0.420–1.16	KEK-083
π^- deut	0.478	LAMPF-783
π^- deut	0.552	LENI-SC-067
π^- deut	0.573	LAMPF-783
π^- deut	1.00–1.40	CERN-PS-159
π^- deut	300.	FNAL-705
π^- deut	750.	FNAL-705
π^- trit	0.243–0.413	LAMPF-905
π^- trit	0.246	LAMPF-546
π^- trit	0.288	LAMPF-546
π^- ^{3}He	0.	SIN-R-79-05
π^- ^{3}He	0.243–0.413	LAMPF-905
π^- ^{3}He	0.246	LAMPF-546
π^- ^{3}He	0.288	LAMPF-546
π^- He	0.242	LAMPF-898
π^- He	0.288	LAMPF-998
π^- He	0.374	LAMPF-898
π^- He	50.0–300.	CERN-NA-008
π^- ^{6}Li	2.60	ITEP-E-784
π^- ^{7}Li	2.60	ITEP-E-784
π^- Be	100.–200.	CERN-NA-011
π^- Be	150.	CERN-WA-077
π^- Be	185.	FNAL-673
π^- Be	225.	FNAL-326
π^- Be	225.	FNAL-610
π^- Be	275.	FNAL-650
π^- Be	300.	CERN-WA-077
π^- C	2.60	ITEP-E-784
π^- Si	40.0	SERP-E-157
π^- Si	200.	CERN-NA-032
π^- Fe	278.	FNAL-595
π^- Cu	20.0	SERP-E-148
π^- Cu	30.0	SERP-E-148
π^- Cu	40.0	SERP-E-148
π^- Cu	225.	FNAL-326
π^- Cu	230.	CERN-NA-032
π^- Sn	225.	FNAL-326
π^- Wt	225.	FNAL-326
π^- Pb	100.–200.	CERN-NA-029
π^- Bi	2.60	ITEP-E-784
π^- nucleus	0.20–2.00	KEK-094
π^- nucleus	1.00	SERP-E-127
π^- nucleus	1.00–1.20	KEK-150
π^- nucleus	1.00–9.00	ITEP-E-771
π^- nucleus	1.50	ITEP-E-812
π^- nucleus	1.85	ITEP-E-823
π^- nucleus	2.00–4.00	KEK-084
π^- nucleus	2.50	ITEP-E-813
π^- nucleus	3.00	ITEP-E-823
π^- nucleus	5.00	ITEP-E-813
π^- nucleus	20.0	SERP-E-148
π^- nucleus	30.0	SERP-E-148
π^- nucleus	30.0	CERN-WA-072
π^- nucleus	40.0	SERP-E-148
π^- nucleus	40.0	SERP-E-143
π^- nucleus	40.0	SERP-E-155
π^- nucleus	75.0	FNAL-615
π^- nucleus	100.	FNAL-597
π^- nucleus	125.	FNAL-537
π^- nucleus	140.–300.	CERN-NA-010
π^- nucleus	150.	CERN-NA-003
π^- nucleus	200.	FNAL-490
π^- nucleus	200.	FNAL-515
π^- nucleus	200.	FNAL-565
π^- nucleus	200.	CERN-NA-003
π^- nucleus	250.	FNAL-615
π^- nucleus	280.	CERN-NA-003
π^- nucleus	300.	CERN-NA-012-2
π^- nucleus	300.	CERN-NA-017
π^- nucleus	320.	FNAL-597
π^- nucleus	350.	CERN-WA-071
π^- nucleus	350.	CERN-WA-078
π^- nucleus	350.	FNAL-653
π^- nucleus	360.	CERN-WA-075
π^- nucleus	500.	FNAL-672
π^- nucleus	530.	FNAL-706
π^- crystal	1.00–10.0	CERN-PS-188
π^- crystal	2.00–20.0	CERN-PS-164
kaon nucleus	250.	FNAL-769
K^+ p	6.0	BNL-838
K^+ p	10.0	BNL-755
K^+ p	11.0	SLAC-E-135
K^+ p	32.1	SERP-E-133
K^+ p	70.0	CERN-WA-027
K^+ p	80.0	CERN-WA-069
K^+ p	100.	FNAL-577
K^+ p	100.	FNAL-597
K^+ p	140.	CERN-WA-069
K^+ p	147.	FNAL-570
K^+ p	200.	FNAL-577
K^+ p	250.	CERN-NA-022
K^+ n	1.06	KEK-034
K^+ n	1.28	KEK-034
K^+ n	1.39	KEK-034
K^+ n	1.49	KEK-034
K^+ n	5.00–20.0	SERP-E-102
K^+ n	75.0	FNAL-585
K^+ n	100.	FNAL-585
K^+ n	150.	FNAL-585
K^+ nucleon	70.0	SERP-E-163
K^+ deut	0.55–0.80	BNL-835
K^+ deut	1.50	KEK-081
K^+ deut	1.70	KEK-081
K^+ Xe	0.790	ITEP-E-802
K^+ Xe	0.800	ITEP-E-761
K^+ nucleus	0.55–0.80	BNL-835
K^+ nucleus	100.	FNAL-597
K^+ nucleus	200.	FNAL-565
K^+ nucleus	250.	CERN-NA-022
K^+ crystal	2.00–20.0	CERN-PS-164
K^- e^-	250.	CERN-NA-007
K^- p	0.0	BNL-811
K^- p	0.0	CERN-PS-165
K^- p	0.700	BNL-702
K^- p	1.80	BNL-813
K^- p	2.20	BNL-698
K^- p	4.74	CERN-PS-157
K^- p	6.00	BNL-771
K^- p	6.00	BNL-838
K^- p	8.00–16.0	CERN-WA-074
K^- p	10.0	BNL-755
K^- p	11.0	SLAC-E-135
K^- p	13.0	SERP-E-116
K^- p	20.0	CERN-WA-007
K^- p	20.0	SERP-E-148
K^- p	22.0	BNL-747
K^- p	25.0	SERP-E-116
K^- p	30.0	SERP-E-148
K^- p	33.0	SERP-E-142
K^- p	40.0	SERP-E-116
K^- p	40.0	CERN-WA-007
K^- p	40.0	SERP-E-148
K^- p	40.0	SERP-E-112
K^- p	60.0	CERN-WA-007
K^- p	70.0	SERP-E-163
K^- p	75.0	FNAL-585
K^- p	80.0	CERN-WA-007

BEAM/TARGET/MOMENTUM INDEX

Beam-target	Lab momentum GeV/c	Experiment
K^- p	80.0	CERN-WA-069
K^- p	100.	FNAL-585
K^- p	100.	FNAL-577
K^- p	109.	CERN-WA-028
K^- p	140.	CERN-WA-069
K^- p	150.	FNAL-585
K^- p	175.	FNAL-663
K^- p	200.	FNAL-577
K^- nucleon	70.0	SERP-E-163
K^- deut	0.870	BNL-773
K^- deut	1.00–1.40	CERN-PS-159
K^- ^{3}He	0.715	BNL-829
K^- ^{3}He	0.870	BNL-820
K^- ^{3}He	1.80	BNL-836
K^- He	0.72	BNL-774
K^- He	0.80	BNL-788
K^- ^{6}Li	0.72	BNL-752
K^- ^{6}Li	0.80	BNL-788
K^- C	0.80	BNL-759
K^- O	0.72	BNL-752
K^- Si	40.0	SERP-E-157
K^- Si	200.	CERN-NA-032
K^- Wt	6.00	BNL-751
K^- nucleus	0.0	KEK-117
K^- nucleus	0.40	CERN-PS-166
K^- nucleus	0.45	CERN-PS-166
K^- nucleus	0.80	BNL-746
K^- nucleus	0.80	BNL-760
K^- nucleus	0.80	BNL-781
K^- nucleus	1.00	SERP-E-127
K^- nucleus	200.	FNAL-565
K^- crystal	2.00–20.0	CERN-PS-164
K_L Cu	1.00–8.00	ITEP-E-811

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	0.300	SIN-Z-75-02
p p	0.644	TRIUMF-171
p p	0.696	TRIUMF-287
p p	0.775	TRIUMF-208
p p	0.777	TRIUMF-301
p p	0.800–1.20	SIN-R-71-07
p p	0.800–1.20	SIN-R-80-01
p p	0.808–1.46	LAMPF-498
p p	0.835–1.46	LAMPF-504
p p	0.850	SACLAY-118
p p	0.850	SACLAY-124
p p	0.862	SACLAY-123
p p	0.868	SACLAY-118
p p	0.868	SACLAY-124
p p	0.874	SACLAY-123
p p	0.883	SACLAY-123
p p	0.883–1.09	TRIUMF-132/192
p p	0.889	SACLAY-118
p p	0.889	SACLAY-124
p p	0.894	SACLAY-118
p p	0.900–2.00	KEK-057
p p	0.909	SACLAY-124
p p	0.912	LAMPF-973
p p	0.926	TRIUMF-174
p p	0.954–1.46	LAMPF-508
p p	0.989	TRIUMF-174
p p	1.00–1.20	SIN-R-78-06
p p	1.00–1.70	SACLAY-070
p p	1.00–2.00	SACLAY-017
p p	1.00–2.00	SACLAY-106
p p	1.00–2.00	SACLAY-144
p p	1.00–3.80	SACLAY-052
p p	1.00–3.80	SACLAY-101
p p	1.02–1.21	SACLAY-129
p p	1.05	TRIUMF-174
p p	1.06	TRIUMF-368
p p	1.09	TRIUMF-301
p p	1.09	LAMPF-336
p p	1.09	LAMPF-392
p p	1.09	LAMPF-517
p p	1.09	LAMPF-563
p p	1.09–1.46	LAMPF-518
p p	1.10	LAMPF-492
p p	1.10	SACLAY-124
p p	1.10	TRIUMF-300
p p	1.11	TRIUMF-174
p p	1.12–3.62	SACLAY-087
p p	1.12	SACLAY-124
p p	1.17	SACLAY-124
p p	1.20	SIN-R-78-05.4
p p	1.20	SIN-R-82-06
p p	1.20–3.80	SACLAY-104
p p	1.22	LAMPF-517
p p	1.22	LAMPF-590
p p	1.26	LAMPF-973
p p	1.28	LAMPF-194
p p	1.28	LAMPF-336
p p	1.28	LAMPF-517
p p	1.28	LAMPF-585
p p	1.28	LAMPF-708
p p	1.28	LAMPF-790
p p	1.28	LAMPF-885
p p	1.28–1.46	LAMPF-636
p p	1.30–3.20	SACLAY-052-2
p p	1.33–1.64	LENI-SC-056
p p	1.34	LAMPF-517
p p	1.38	LAMPF-973
p p	1.38	LAMPF-517
p p	1.38	LAMPF-708
p p	1.46	LAMPF-492
p p	1.46	LAMPF-385
p p	1.46	LAMPF-973
p p	1.46	LAMPF-336
p p	1.46	LAMPF-392
p p	1.46	LAMPF-517
p p	1.46	LAMPF-563
p p	1.46	LAMPF-590
p p	1.46	LAMPF-194
p p	1.46	LAMPF-708
p p	1.46	LAMPF-790
p p	1.46	LAMPF-885
p p	1.46	LAMPF-015
p p	1.46	LAMPF-402
p p	1.46	LAMPF-457
p p	1.46	LAMPF-462
p p	1.46	LAMPF-637
p p	1.46	LAMPF-758
p p	1.46	LAMPF-792
p p	1.46	LAMPF-846
p p	1.46	SACLAY-132
p p	1.46–1.70	LENI-SC-086
p p	1.51	SACLAY-088
p p	1.51	SACLAY-089
p p	1.56	SACLAY-088
p p	1.56	SACLAY-089
p p	1.62	SACLAY-088
p p	1.62	SACLAY-089
p p	<1.70	SACLAY-060
p p	1.70	SACLAY-088
p p	1.70	SACLAY-089
p p	1.81	SACLAY-088
p p	1.81	SACLAY-089
p p	2.25	SACLAY-132
p p	2.78	SACLAY-132
p p	3.31	SACLAY-132
p p	5.60	BNL-722
p p	6.00	BNL-838
p p	10.0	BNL-755
p p	13.0–26.0	BNL-782
p p	20.0	CERN-WA-007
p p	24.0	BNL-785
p p	28.0	BNL-748
p p	28.0	BNL-794
p p	32.0	SERP-E-150
p p	40.0	CERN-WA-007

BEAM/TARGET/MOMENTUM INDEX

Beam-target	Lab momentum GeV/c	Experiment
p p	50.0–200.	CERN-WA-006
p p	60.0	CERN-WA-007
p p	60.0–70.0	SERP-E-161
p p	70.0	SERP-E-100
p p	70.0	SERP-E-155
p p	80.0	CERN-WA-007
p p	85.0	CERN-WA-076
p p	100.	FNAL-577
p p	100.	FNAL-597
p p	100.–300.	CERN-NA-008
p p	147.	FNAL-570
p p	175.	FNAL-663
p p	200.	FNAL-577
p p	200.	CERN-NA-005
p p	200.	CERN-NA-025
p p	200.	CERN-WA-070
p p	200.	FNAL-581/704
p p	212.	CERN-R-420
p p	250.	CERN-NA-022
p p	280.	CERN-WA-070
p p	280.	CERN-WA-083
p p	281.	CERN-R-211
p p	293.–2094	CERN-R-210
p p	300.	CERN-WA-076
p p	300.	CERN-NA-005
p p	300.	CERN-NA-024
p p	314.	CERN-UA-006
p p	360.	CERN-NA-025
p p	360.	CERN-NA-016
p p	360.	CERN-NA-027
p p	>360.	CERN-NA-023
p p	400.	FNAL-557
p p	400.	FNAL-609
p p	400.	FNAL-623
p p	479.	CERN-R-211
p p	479.	CERN-R-421
p p	479.	CERN-R-608
p p	479.–2047	CERN-R-110
p p	479.–2047	CERN-R-501
p p	479.–2047	CERN-R-703
p p	479.–2047	CERN-R-808
p p	479.–2114	CERN-R-806
p p	511.–2047	CERN-R-807
p p	800.	FNAL-557
p p	800.	FNAL-743
p p	1031.	CERN-R-421
p p	1031.–2048.	CERN-R-416
p p	1440.	CERN-R-420
p p	1440.	CERN-R-211
p p	1496.	CERN-R-608
p p	2048.	CERN-R-211
p p	2048.	CERN-R-421
p p	2048.	CERN-R-608
p p	2048.	CERN-R-419
p p	2048.	CERN-R-422
p p	2114.	CERN-R-420
p p	?	SACLAY-113
p p	?	SACLAY-121
p n	1.09	LAMPF-392
p n	1.22	LAMPF-590
p n	1.30	KEK-075
p n	1.39	KEK-075
p n	1.46	LAMPF-385
p n	1.46	LAMPF-392
p n	1.46	LAMPF-590
p n	1.46	LAMPF-457
p n	1.46	LAMPF-792
p n	1.46	LAMPF-846
p n	1.59	KEK-075
p n	1.82	KEK-075
p n	32.0	SERP-E-150
p n	<70.0	SERP-E-119
p nucleon	1.46	LAMPF-634
p nucleon	70.0	SERP-E-163
p deut	0.679	TRIUMF-332
p deut	0.846	TRIUMF-332
p deut	0.989	TRIUMF-332
p deut	0.989–1.46	LAMPF-498
p deut	1.03	SACLAY-068
p deut	1.08	TRIUMF-332
p deut	1.09	LAMPF-635
p deut	1.09	LAMPF-664
p deut	1.09	LAMPF-853
p deut	1.22–1.56	LENI-SC-108
p deut	1.22–3.10	SACLAY-095
p deut	1.22–3.52	SACLAY-051
p deut	1.28	LAMPF-635
p deut	1.28	LAMPF-664
p deut	1.28	LAMPF-853
p deut	1.28	LAMPF-585
p deut	1.34–1.70	LENI-SC-088
p deut	1.46	LAMPF-385
p deut	1.46	LAMPF-635
p deut	1.46	LAMPF-664
p deut	1.46	LAMPF-853
p deut	1.46	LAMPF-015
p deut	1.46	LAMPF-360
p deut	1.46	LAMPF-462
p deut	1.46	LAMPF-795
p deut	1.46	LAMPF-818
p deut	1.46	LAMPF-951
p deut	1.58–2.20	SACLAY-099
p deut	1.60–3.41	SACLAY-095
p deut	32.0	SERP-E-150
p deut	70.0	SERP-E-100
p deut	300.	FNAL-705
p deut	750.	FNAL-705
p deut	900.	FNAL-772
p deut	?	SACLAY-037
p deut	?	SACLAY-113
p ^{3}He	0.912	LAMPF-973
p ^{3}He	1.26	LAMPF-973
p ^{3}He	1.34–2.47	SACLAY-051
p ^{3}He	1.38	LAMPF-973
p ^{3}He	1.40	SACLAY-050
p ^{3}He	1.40	SACLAY-126
p ^{3}He	1.46	LAMPF-973
p ^{3}He	1.60	SACLAY-050
p He	0.300	SIN-Z-80-01
p He	0.912	LAMPF-973
p He	1.26	LAMPF-973
p He	1.34–1.70	LENI-SC-088
p He	1.38	LAMPF-973
p He	1.46	LAMPF-973
p He	1.46	LAMPF-015
p He	72.1–525.	CERN-R-210
p He	100.–300.	CERN-NA-008
p He	119.–514.	CERN-R-110
p He	258.	CERN-R-418
p Li	1.00	LENI-SC-096
p Li	1.70	LENI-SC-104
p Be	1.46	LAMPF-360
p Be	22.0	BNL-817
p Be	28.5	BNL-744
p Be	100.–200.	CERN-NA-011
p Be	200.	FNAL-673
p Be	250.	FNAL-673
p Be	400.	CERN-NA-020
p Be	400.	FNAL-555
p Be	450.	CERN-NA-034
p Be	800.	FNAL-756
p Be	900.	FNAL-711
p ^{12}C	1.46	LAMPF-651
p C	1.00	LENI-SC-096
p ^{12}C	<4.00	KEK-132
p C	?	LENI-SC-074
p Si	200.	CERN-NA-032
p Ar	200.	CERN-NA-005
p Ca	900.	FNAL-772
p Cr	500.	FNAL-524
p Cu	0.846–0.933	TRIUMF-298
p Cu	0.880	SACLAY-107

BEAM/TARGET/MOMENTUM INDEX

Beam-target	Lab momentum GeV/c	Experiment
p Cu	1.70	LENI-SC-104
p Cu	400.	CERN-NA-020
p Fe	350.	FNAL-595
p Ag	500.	FNAL-524
p Ag	?	LENI-SC-074
p Xe	200.	CERN-NA-005
p Wt	500.	FNAL-524
p Ir	20.0	CERN-PS-162
p Pb	1.00	LENI-SC-096
p Th	28.0	BNL-779
p U	20.0	CERN-PS-162
p U	28.0	BNL-779
p nucleus	0.850–1.00	LENI-SC-097
p nucleus	1.00	LENI-SC-079
p nucleus	1.00	LENI-SC-085
p nucleus	1.00	LENI-SC-096
p nucleus	1.00	SERP-E-127
p nucleus	1.00–4.00	KEK-113
p nucleus	1.00–5.00	KEK-090
p nucleus	1.00–9.00	ITEP-E-771
p nucleus	1.00–28.0	BNL-778
p nucleus	1.20	SIN-R-81-06
p nucleus	1.70	LENI-SC-021
p nucleus	1.70	LENI-SC-029
p nucleus	1.70	LENI-SC-042
p nucleus	1.70	LENI-SC-052
p nucleus	1.70	LENI-SC-066
p nucleus	1.70	LENI-SC-104
p nucleus	2.50	ITEP-E-813
p nucleus	2.89	SACLAY-133
p nucleus	3.00	KEK-084
p nucleus	3.52	SACLAY-133
p nucleus	3.70	SACLAY-057
p nucleus	3.90	KEK-133
p nucleus	4.54–10.1	ITEP-E-831
p nucleus	5.00	ITEP-E-813
p nucleus	12.0	KEK-136
p nucleus	12.0–70.0	SERP-E-153
p nucleus	12.0	KEK-049
p nucleus	<13.0	KEK-082
p nucleus	16.0	BNL-810
p nucleus	16.0	BNL-814
p nucleus	17.0	BNL-790
p nucleus	20.0–400.	FNAL-591
p nucleus	70.0	SERP-E-120
p nucleus	70.0	SERP-E-121
p nucleus	70.0	SERP-E-144
p nucleus	70.0	SERP-E-155
p nucleus	100.	FNAL-597
p nucleus	200.	FNAL-565
p nucleus	200.	FNAL-629
p nucleus	200.–400.	FNAL-466
p nucleus	202.	CERN-NA-034-2
p nucleus	203.	CERN-WA-080
p nucleus	250.	CERN-NA-022
p nucleus	400.	FNAL-565
p nucleus	400.	CERN-NA-003
p nucleus	400.	CERN-NA-030
p nucleus	400.	CERN-WA-038
p nucleus	400.	CERN-WA-065
p nucleus	400.	CERN-WA-066
p nucleus	400.	FNAL-497
p nucleus	400.	FNAL-549
p nucleus	400.	FNAL-557
p nucleus	400.	FNAL-605
p nucleus	400.	FNAL-613
p nucleus	400.	FNAL-631
p nucleus	400.	FNAL-706
p nucleus	400.–450.	FNAL-622
p nucleus	450.	CERN-NA-030
p nucleus	450.	CERN-WA-068
p nucleus	500.	FNAL-576
p nucleus	500.	FNAL-672
p nucleus	800.	FNAL-557
p nucleus	800.	FNAL-605
p nucleus	800.	FNAL-706
p nucleus	800.	FNAL-508
p nucleus	800.	FNAL-758
p nucleus	800.	FNAL-759
p nucleus	800.	FNAL-761
p nucleus	800.	FNAL-762
p nucleus	800.	FNAL-763
p nucleus	800.	FNAL-764
p nucleus	800.	FNAL-765
p nucleus	1000	FNAL-672
p nucleus	1000	FNAL-729
p nucleus	1000	FNAL-747
p nucleus	1000	FNAL-750
p nucleus	1000	FNAL-751
p nucleus	?	FNAL-766
p crystal	1.00	LENI-SC-078
p crystal	1.00–10.0	CERN-PS-188
p crystal	2.00–20.0	CERN-PS-164
$\bar{p}$ p	0.0	CERN-PS-170
$\bar{p}$ p	0.0	CERN-PS-171
$\bar{p}$ p	0.0	CERN-PS-174
$\bar{p}$ p	0.0	CERN-PS-175
$\bar{p}$ p	0.0	CERN-PS-182
$\bar{p}$ p	0.0	CERN-PS-183
$\bar{p}$ p	0.0	CERN-PS-195
$\bar{p}$ p	<0.20	CERN-PS-179
$\bar{p}$ p	<0.30	CERN-PS-183
$\bar{p}$ p	<0.50	CERN-PS-161
$\bar{p}$ p	0.10–0.60	CERN-PS-178
$\bar{p}$ p	0.15–0.60	CERN-PS-173
$\bar{p}$ p	<0.650	BNL-708
$\bar{p}$ p	0.20–0.80	CERN-PS-172
$\bar{p}$ p	0.30–0.70	CERN-PS-198
$\bar{p}$ p	0.30–2.00	CERN-PS-172
$\bar{p}$ p	0.301–0.551	BNL-762
$\bar{p}$ p	0.335–0.960	KEK-074
$\bar{p}$ p	0.387–0.681	BNL-742
$\bar{p}$ p	0.390–0.780	KEK-074A
$\bar{p}$ p	0.40–1.00	CERN-PS-163-2
$\bar{p}$ p	0.50–1.50	CERN-PS-199
$\bar{p}$ p	1.20–1.60	BNL-789
$\bar{p}$ 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	1.20–2.00	CERN-PS-185
$\bar{p}$ p	3.00	KEK-062
$\bar{p}$ p	3.00–7.00	FNAL-760
$\bar{p}$ p	3.50	KEK-062
$\bar{p}$ p	3.50–7.50	CERN-R-704
$\bar{p}$ p	4.00	KEK-062
$\bar{p}$ p	4.50	KEK-062
$\bar{p}$ p	5.00	BNL-771
$\bar{p}$ p	6.00	BNL-838
$\bar{p}$ p	8.00–12.0	CERN-WA-074
$\bar{p}$ p	13.0	SERP-E-116
$\bar{p}$ p	20.0	CERN-WA-007
$\bar{p}$ p	20.0	SERP-E-148
$\bar{p}$ p	25.0	SERP-E-116
$\bar{p}$ p	30.0	SERP-E-148
$\bar{p}$ p	32.0	SERP-E-138
$\bar{p}$ p	32.0	SERP-E-150
$\bar{p}$ p	40.0	SERP-E-116
$\bar{p}$ p	40.0	CERN-WA-007
$\bar{p}$ p	40.0	SERP-E-148
$\bar{p}$ p	60.0	CERN-WA-007
$\bar{p}$ p	70.0	SERP-E-163
$\bar{p}$ p	74.0	CERN-WA-042
$\bar{p}$ p	80.0	CERN-WA-007
$\bar{p}$ p	100.	FNAL-577
$\bar{p}$ p	100.	FNAL-597
$\bar{p}$ p	137.	CERN-WA-042
$\bar{p}$ p	147.	FNAL-570
$\bar{p}$ p	175.	FNAL-663
$\bar{p}$ p	200.	FNAL-577
$\bar{p}$ p	200.	CERN-NA-005
$\bar{p}$ p	200.	FNAL-581/704

BEAM/TARGET/MOMENTUM INDEX

Beam-target	Lab momentum GeV/c	Experiment
HERE, FOR THE REST OF $\bar{p}p$, WE SWITCH FROM LAB MOMENTUM TO C.M. ENERGY		
$\bar{p}$ p	20.0	CERN-R-420
$\bar{p}$ p	23.5–62.7	CERN-R-210
$\bar{p}$ p	24.3	CERN-UA-006
$\bar{p}$ p	30.0	CERN-R-211
$\bar{p}$ p	30.0	CERN-R-421
$\bar{p}$ p	30.0	CERN-R-608
$\bar{p}$ p	30.0–62.0	CERN-R-110
$\bar{p}$ p	30.0–62.0	CERN-R-501
$\bar{p}$ p	30.0–62.0	CERN-R-703
$\bar{p}$ p	30.0–62.0	CERN-R-808
$\bar{p}$ p	31.0–62.0	CERN-R-807
$\bar{p}$ p	44.0	CERN-R-421
$\bar{p}$ p	52.0	CERN-R-420
$\bar{p}$ p	52.0	CERN-R-211
$\bar{p}$ p	53.0	CERN-R-608
$\bar{p}$ p	62.0	CERN-R-211
$\bar{p}$ p	62.0	CERN-R-421
$\bar{p}$ p	62.0	CERN-R-608
$\bar{p}$ p	63.0	CERN-R-420
$\bar{p}$ p	100.–540.	CERN-UA-004
$\bar{p}$ p	300.–2000	FNAL-710
$\bar{p}$ p	300.–2000	FNAL-713
$\bar{p}$ p	500.–2000	FNAL-741
$\bar{p}$ p	500.–2000	FNAL-775
$\bar{p}$ p	540.	CERN-UA-001
$\bar{p}$ p	540.	CERN-UA-003
$\bar{p}$ p	540.	CERN-UA-005
$\bar{p}$ p	630.	CERN-UA-001
$\bar{p}$ p	630.	CERN-UA-002
$\bar{p}$ p	630.	CERN-UA-007
$\bar{p}$ p	630.	CERN-UA-008
$\bar{p}$ p	800.–900.	CERN-UA-005-2
$\bar{p}$ p	2000	FNAL-735
$\bar{p}$ p	2000	FNAL-740
$\bar{p}$ p	?	KEK-131

Beam-target	Lab momentum GeV/c	Experiment
$\bar{p}$ n	32.0	SERP-E-150
$\bar{p}$ nucleon	70.0	SERP-E-163
$\bar{p}$ deut	0.0	CERN-PS-174
$\bar{p}$ deut	0.0	CERN-PS-175
$\bar{p}$ deut	<0.20	CERN-PS-179
$\bar{p}$ deut	<0.50	CERN-PS-161
$\bar{p}$ deut	<0.65	BNL-772
$\bar{p}$ deut	0.300–0.700	CERN-PS-198
$\bar{p}$ deut	0.335–0.960	KEK-074
$\bar{p}$ deut	<1.80	CERN-PS-201
$\bar{p}$ deut	32.0	SERP-E-150
$\bar{p}$ deut	74.0	CERN-WA-042
$\bar{p}$ deut	137.	CERN-WA-042
$\bar{p}$ deut	300.	FNAL-705
$\bar{p}$ deut	750.	FNAL-705
$\bar{p}$ ^{3}He	<0.20	CERN-PS-179
$\bar{p}$ He	>0.0	CERN-PS-194
$\bar{p}$ He	<0.60	CERN-PS-179
$\bar{p}$ Ne	<0.60	CERN-PS-179
$\bar{p}$ Al	0.40–0.60	BNL-742
$\bar{p}$ Ar	200.	CERN-NA-005
$\bar{p}$ Cu	0.40–0.60	BNL-742
$\bar{p}$ Br	<0.60	CERN-PS-179
$\bar{p}$ Ag	<0.60	CERN-PS-179
$\bar{p}$ Xe	200.	CERN-NA-005
$\bar{p}$ Pb	0.40–0.60	BNL-742
$\bar{p}$ nucleus	0.0	CERN-PS-176
$\bar{p}$ nucleus	0.0	CERN-PS-177
$\bar{p}$ nucleus	0.0	CERN-PS-186
$\bar{p}$ nucleus	<0.50	CERN-PS-161
$\bar{p}$ nucleus	<1.80	CERN-PS-201
$\bar{p}$ nucleus	0.30–0.80	CERN-PS-184
$\bar{p}$ nucleus	0.60	CERN-PS-187
$\bar{p}$ nucleus	3.00	KEK-084
$\bar{p}$ nucleus	100.	FNAL-597
$\bar{p}$ nucleus	125.	FNAL-537

Beam-target	Lab momentum GeV/c	Experiment
$\bar{p}$ crystal	2.00–20.0	CERN-PS-164
n p	0.600–1.20	SIN-R-72-02
n p	0.609–1.09	TRIUMF-190
n p	0.708	TRIUMF-182
n p	0.808–1.46	LAMPF-960
n p	0.873	TRIUMF-182
n p	0.883	TRIUMF-369
n p	0.950–2.00	SACLAY-078
n p	0.990	LAMPF-498
n p	1.00–2.00	SACLAY-106
n p	1.00–2.00	SACLAY-144
n p	1.02	TRIUMF-182
n p	1.02	TRIUMF-372
n p	1.06	TRIUMF-368
n p	1.06	TRIUMF-121
n p	1.09	LAMPF-665
n p	1.09	LAMPF-683
n p	1.09–1.46	LAMPF-770
n p	1.09–1.81	SACLAY-136
n p	1.11	TRIUMF-182
n p	1.22	LAMPF-590
n p	1.28	LAMPF-876
n p	1.28	LAMPF-498
n p	1.28	LAMPF-665
n p	1.28	LAMPF-683
n p	1.28–1.70	SACLAY-140
n p	1.45	LAMPF-366
n p	1.45	LAMPF-403
n p	1.46	LAMPF-498
n p	1.46	LAMPF-665
n p	1.46	LAMPF-683
n p	1.46	LAMPF-590
n p	1.46	LAMPF-876
n p	1.46	LAMPF-589
n p	1.46	LAMPF-861
n p	1.46	LAMPF-961
n p	10.0–28.0	BNL-766
n p	<400.	CERN-NA-006
n deut	0.60–1.20	SIN-R-72-02
n C	0.80–1.20	SIN-R-80-10
n C	45.0	SERP-E-104
n Si	280.	FNAL-400
n Si	560.	FNAL-400
n nucleus	0.0041–70.0	SERP-E-159
n nucleus	2.00–9.50	ITEP-E-822
n nucleus	40.0–60.0	SERP-E-146
n nucleus	300.	FNAL-630
$\bar{n}$ p	0.0043–0.043	BNL-795
$\bar{n}$ p	0.10–0.50	BNL-767
$\bar{n}$ p	<1.80	CERN-PS-201
$\bar{n}$ deut	<1.80	CERN-PS-201
Λ p	30.0–60.0	SERP-E-120
Λ deut	30.0–60.0	SERP-E-120
Λ nucleus	80.0–350.	FNAL-619
Σ^+ p	30.0–60.0	SERP-E-120
Σ^+ deut	30.0–60.0	SERP-E-120
Σ^- p	30.0–60.0	SERP-E-120
Σ^- p	74.0	CERN-WA-042
Σ^- p	137.	CERN-WA-042
Σ^- deut	30.0–60.0	SERP-E-120
Σ^- deut	74.0	CERN-WA-042
Σ^- deut	137.	CERN-WA-042
Σ^- Be	135.	CERN-WA-062
Σ^- Cu	300.–800.	FNAL-756
Σ^- nucleus	0.0	BNL-723
Σ^- nucleus	1.00	SERP-E-127
Σ^- nucleus	20.0–350.	FNAL-666
Σ^- nucleus	250.	FNAL-730
Ξ^- p	30.0–60.0	SERP-E-120
Ξ^- p	74.0	CERN-WA-042
Ξ^- p	137.	CERN-WA-042
Ξ^- deut	0.0	BNL-813
Ξ^- deut	30.0–60.0	SERP-E-120
Ξ^- deut	74.0	CERN-WA-042
Ξ^- deut	137.	CERN-WA-042

BEAM/TARGET/MOMENTUM INDEX

Beam-target	Lab momentum GeV/c	Experiment
Ξ^- Be	116.	CERN-WA-042
Ξ^0 p	30.0–60.0	SERP-E-120
Ξ^0 deut	30.0–60.0	SERP-E-120
Ω^- p	30.0–60.0	SERP-E-120
Ω^- deut	30.0–60.0	SERP-E-120
deut p	0.621–1.02	SACLAY-137
deut p	0.770–1.50	SACLAY-108
deut p	1.46	LAMPF-685
deut p	1.60–3.60	SACLAY-115
deut p	1.62	SACLAY-138
deut p	1.77–3.62	SACLAY-117
deut p	2.00–4.00	KEK-080
deut p	2.05	SACLAY-138
deut p	2.31	SACLAY-138
deut p	2.93	SACLAY-038-2
deut p	?	SACLAY-066
deut deut	1.50–4.00	KEK-125
deut deut	1.91–2.62	SACLAY-105
deut deut	2.98	SACLAY-080
deut deut	3.39	SACLAY-080
deut deut	3.72	SACLAY-080
deut deut	254.	CERN-R-418
deut deut	?	SACLAY-066
deut ^{3}He	0.22–0.26	SIN-R-73-01.2
deut ^{6}Li	?	SACLAY-010
deut Be	?	SACLAY-010
deut ^{10}Bor	?	SACLAY-010
deut nucleus	1.29	SACLAY-135
deut nucleus	1.60–3.60	SACLAY-115
deut nucleus	3.72	SACLAY-134
deut deut	12.0–13.0	SERP-E-139
deut p	12.0–13.0	SERP-E-139
trit p	2.50	ITEP-E-782
trit p	5.00	ITEP-E-782
^{3}He p	1.80–4.30	SACLAY-085
^{3}He p	2.50	ITEP-E-782
^{3}He p	4.74	SACLAY-050
^{3}He p	5.00	ITEP-E-782
^{3}He ^{3}He	?	SACLAY-092
^{3}He nucleus	1.80–4.30	SACLAY-085
He p	4.30	SACLAY-013
He p	7.00	SACLAY-013
He deut	4.30	SACLAY-013
He deut	7.00	SACLAY-013
He ^{3}He	4.30	SACLAY-013
He ^{3}He	7.00	SACLAY-013
He He	4.30	SACLAY-013
He He	5.00	SACLAY-013
He He	70.2–524.	CERN-R-210
He He	117.–512.	CERN-R-110
He He	117.–512.	CERN-R-808
He He	125.	CERN-R-418
He He	125.–512.	CERN-R-807
He nucleus	>45.0	CERN-PS-192
^{12}C nucleus	191.	BNL-810
^{12}C nucleus	191.	BNL-826
^{16}O Au	3633	CERN-NA-041
^{16}O Hg	3617	CERN-NA-039
^{16}O nucleus	208.–3202	CERN-EMU-001
^{16}O nucleus	255.	BNL-808
^{16}O nucleus	255.	BNL-814
^{16}O nucleus	255.	BNL-815
^{16}O nucleus	255.	BNL-825
^{16}O nucleus	255.	CERN-EMU-005
^{16}O nucleus	815.	CERN-EMU-005
^{16}O nucleus	960.	CERN-EMU-003
^{16}O nucleus	961.	CERN-NA-040
^{16}O nucleus	975.	CERN-EMU-004
^{16}O nucleus	975.	CERN-NA-035
^{16}O nucleus	<3202	CERN-NA-036
^{16}O nucleus	3202	CERN-EMU-003
^{16}O nucleus	3202	CERN-NA-040
^{16}O nucleus	3202	CERN-NA-034-2
^{16}O nucleus	3217	CERN-EMU-005
^{16}O nucleus	3217	CERN-EMU-004
^{16}O nucleus	3217	CERN-NA-035
^{16}O nucleus	3217	CERN-WA-080
^{16}O nucleus	?	BNL-802
^{16}O Pb	3202	CERN-EMU-002
^{16}O U	3602	CERN-NA-038
O Hg	240.	BNL-801
Ca Pb	8021	CERN-EMU-002
^{32}Su nucleus	509.	BNL-806
^{32}Su nucleus	509.	BNL-808
^{32}Su nucleus	509.	BNL-810
^{32}Su nucleus	509.	BNL-814
^{32}Su nucleus	509.	BNL-825
^{32}Su nucleus	509.	BNL-826
^{32}Su nucleus	1921	CERN-NA-040
^{32}Su nucleus	1951	CERN-NA-035
^{32}Su nucleus	<6403	CERN-NA-036
^{32}Su nucleus	6403	CERN-NA-040
^{32}Su nucleus	6433	CERN-NA-035
^{32}Su nucleus	?	BNL-802
Su Hg	480.	BNL-801
Su Pb	480.	BNL-793
Su Pb	6415	CERN-EMU-002
Su nucleus	480.	BNL-804
^{197}Au nucleus	3135	BNL-808
charged$^+$ crystal	12.0–180.	FNAL-660
charged$^+$ crystal	20.0–200.	FNAL-754
charged$^+$ crystal	30.0–200.	FNAL-753
charged$^+$ p	40.0	CERN-WA-063
charged$^-$ crystal	12.0–180.	FNAL-660
charged$^-$ crystal	20.0–200.	FNAL-754
charged$^-$ p	40.0	CERN-WA-063
hadron p	200.–2000	FNAL-690

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ABBREVIATIONS USED IN THE SUMMARIES

JOURNALS

Following are abbreviations for journals listed in the summaries:

AJP	American Journal of Physics
ANNP	Annals of Physics
APP	Acta Physica Polonica
ARNPS	Annual Review of Nuclear and Particle Science
CJP	Canadian Journal of Physics
CNPP	Comments on Nuclear and Particle Physics
EL	Europhysics Letters
HPA	Helvetica Physica Acta
IEEE MAG	Institute of Electrical and Electronics Engineers Transactions on Magnetics
IEEE TNS	Institute of Electrical and Electronics Engineers Transactions on Nuclear Science
JASA	Journal of the Acoustical Society of America
JETP	Journal of Experimental and Theoretical Physics (translation of ZETF)
JETPL	Journal of Experimental and Theoretical Physics Letters (translation of ZETFP)
JJAP	Japanese Journal of Applied Physics
JP	Journale de Physique
JPHY	Journal of Physics
JPL	Journale de Physique Lettres
JPSJ	Journal of the Physical Society of Japan
LNC	Lettere al Nuovo Cimento
NC	Nuovo Cimento
NIM	Nuclear Instruments and Methods
NP	Nuclear Physics
PL	Physics Letters
PR	Physical Review
PRPL	Physics Reports (Physics Letters C)
PRL	Physical Review Letters
PS	Physica Scripta
RMP	Reviews of Modern Physics
RNC	Rivista del Nuovo Cimento
RSI	Review of Scientific Instruments
SHEP	Surveys in High Energy Physics
SJNP	Soviet Journal of Nuclear Physics (translation of YF)
YF	Yadernaya Fizika (translated as SJNP)
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

The following abbreviations are 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

ANL	Argonne ZGS proton synchrotron (12.7 GeV/c Plab)
BNL	Brookhaven AGS proton synchrotron (31 GeV/c Plab)
CERN-ISR	CERN proton-proton Intersecting Storage Rings (62 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-PS	CERN Proton Synchrotron (28 GeV/c Plab)
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)
COSM	cosmic rays
DESY	Hamburg Deutches Electron SYnchrotron (7.5 GeV/c Plab)
DESY-DORIS	DESY DORIS electron-positron ring (11.6 GeV Ecm)
DESY-DORIS-II	DESY DORIS upgraded
DESY-PETRA	DESY PETRA electron-positron storage ring (40 GeV Ecm)
FNAL	FNAL proton synchrotron (500 GeV/c Plab)
FNAL-COLLIDER	FNAL $\overline{p}p$ collider (2000 GeV Ecm)
FNAL-TEV	FNAL TEVatron
ITEP	ITEP (Moscow) proton synchrotron (7 GeV/c Plab)
KEK-PF-LINAC	KEK electron linac (2.5 GeV) for photon factory and TRISTAN
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)
LENI	Leningrad Inst. of Nucl. Phys. synchrocyclotron (1 GeV Tlab)
NONE	no accelerator used
RHEL	Rutherford (NIMROD) proton synchrotron (8 GeV/c Plab)
SATURNE-II	Saclay Saturne-II p, d, and He synchrotron
SERP	Serpukhov proton synchrotron (76 GeV/c Plab)
SIN	Schweizerische Inst. für Nuklearforschung (590 MeV Tlab)
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)

DETECTORS

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
EMUL	emulsion
OSPK	optical spark chamber
OTHER	rare, nonelectronic detector (e.g., moon, ocean floor)
PHOTON	photon spectrometer such as NaI or Ge detectors
PLASTIC	Lexan, etc., used like emulsion
SAS	single-arm spectrometer
SPEC	spectrometer system
STRC	streamer chamber
TRAD	transition radiation detector
WAS	wide-angle spectrometer
WIRE	wire chamber

Acronyms for specific detectors. Those with an asterisk are described in "Major Detectors in Elementary Particle Physics" (LBL-91 supplement, May 1985).

AFS	CERN-ISR Axial-Field Spectrometer
ALEPH*	CERN-LEP detector
AMY*	KEK-TRISTAN high-resolution lepton detector
ARGUS*	DESY-DORIS-II detector
BIS-2	Serpukhov upgrade of BIS
BIS-2M	Serpukhov upgrade of BIS-2
CCM	FNAL, FNAL-TEV Chicago Cyclotron Magnet spectrometer
CDF*	FNAL-COLLIDER detector
CDHS	CERN-PS, CERN-SPS CERN-Dortmund-Heidelberg-Saclay neutrino detector
CELLO*	DESY-PETRA spectrometer system
CHARM	CERN-PS, CERN-SPS CERN-Hamburg-Amsterdam-Rome-Moscow neutrino detector
CHARM-II*	CERN-SPS upgrade of CHARM detector
CLEO*	CESR spectrometer system
CRYS-BALL*	SLAC-SPEAR, SLAC-PEP, DESY-DORIS, DESY-DORIS-II Crystal Ball large-solid-angle neutral detector
CRYS-BARREL	CERN-LEAR Crystal Barrel large-solid-angle detector
CRYS-BOX	LAMPF Crystal Box crystal array detector
CUSB	CESR Columbia-Stony Brook high-resolution calorimeter
CUSB-II*	CESR upgrade of CUSB
DASP	DESY-DORIS Double-Arm Spectrometer system
DELCO	SLAC-SPEAR, SLAC-PEP detector
DELPHI*	CERN-LEP detector
DIOGENE	Saclay SATURNE-II pictorial drift chamber
D0*	FNAL-COLLIDER detector

DETECTORS

EHS	CERN-SPS European Hybrid Spectrometer
EMC*	CERN-SPS European Muon Collaboration apparatus
EMS	ANL Effective-Mass Spectrometer
EPICS	LAMPF Energetic PIon Channel and Spectrometer
FANCY	KEK-PS, KEK-TRISTAN Forward ANd CYlindrical detector system
FMPS*	FNAL, FNAL-TEV Multiparticle Spectrometer
FODS	Serpukhov double-arm spectrometer
GAMS-2000	Serpukhov hodoscope gamma spectrometer
GAMS-4000	CERN-SPS 64×64 cell Pb-glass array
HPW*	BNL, Harvard-Penn-Wisconsin neutrino detector
HRS*	SLAC-PEP High-Resolution Spectrometer
HYPERSPEC	BNL hypernuclear spectrometer
JADE*	DESY-PETRA detector
JANUS	LAMPF proton polarimeter
LAB-E*	FNAL, FNAL-TEV target-calorimeter muon-spectrometer detector for neutrino physics
LAHRS	LAMPF Los Alamos High-Resolution proton Spectrometer
LASS	SLAC Large-Aperture Superconducting Solenoid spectrometer
LENA	DESY-DORIS nonmagnetic lead-glass NaI detector
LEPTON	Serpukhov magnetic wide-aperture spectrometer with automatic spark chambers
L3*	CERN-LEP detector
MAC*	SLAC-PEP MAgnetic Calorimeter
MARK-II*	SLAC-SPEAR, SLAC-PEP, SLAC-SLC detector
MARK-III*	SLAC-SPEAR detector
MARK-J*	DESY-PETRA detector
MEGA	LAMPF array of electron and photon spectrometers
MIS	Serpukhov multiparticle spectrometer
MPS	BNL MultiParticle Spectrometer
MPS-II*	BNL upgrade of BNL MPS
NICE	Serpukhov nonmagnetic precision spectrometer
OMEGA*	CERN-PS, CERN-SPS spectrometer system
OMEGAPRIME*	CERN-SPS spectrometer system
OMICRON	CERN-SC spectrometer system
OPAL*	CERN-LEP detector
PLASTIC-BALL	LBL-BEVALAC, CERN-SPS plastic ball detector
PLUTO	DESY-DORIS, DESY-PETRA superconducting solenoid spectrometer
RMS	CERN-PS, RHEL Rutherford Magnetic Spectrometer
SASF	FNAL Single-Arm Spectrometer Facility
SFM	CERN-ISR Split-Field Magnet
SHIP	KEK-TRISTAN detector for Search for Highly Ionizing Particles
SIGMA	Serpukhov CERN-IHEP magnetic spectrometer
SINDRUM	SIN large-solid-angle magnetic detector
SLD*	SLAC-SLC detector
SPEC-6M	Serpukhov 6 meter spectrometer
SPES-I	Saclay, SATURNE-II high-resolution spectrometer
SPES-III	Saclay, SATURNE-II high-resolution spectrometer
SPES-IV	Saclay, SATURNE-II high-resolution spectrometer
SPES-0	SATURNE-II modular lead-glass Cerenkov detector
SSF	SLAC Spectrometer Facility — 1.6, 8, and/or 20 GeV spectrometers
SUPERBENKEI	KEK-PS window-frame type superconducting magneto-spectrometer
TAGX	TOKYO large-aperture spectrometer system
TASSO*	DESY-PETRA
TELAS	KEK-PS Target-Embodied Large-Aperture Spectrometer
TISS	ITEP spark chamber and 2.5 m spectrometer
TOKIWA	KEK-PS spectrometer
TOPAZ*	KEK-TRISTAN solenoidal spectrometer with TPC
TPC*	SLAC-PEP Time Projection Chamber
TPS*	FNAL Tagged Photon Spectrometer
UA1*	CERN-PBAR/P UA1 experiment detector
UA2*	CERN-PBAR/P UA2 experiment detector
VENUS*	KEK-TRISTAN Versatile Economical and Novel Universal Spectrometer
2-GAMMA*	SLAC-PEP forward detectors for studying mainly the 2-gamma process

PARTICLES

The first column gives the name as printed in this report, the second gives the name to use in searching the SLAC/SPIRES database from which this report is taken (see p. 3). Charges of particles are omitted here (π^+, π^-, π^0), as are such obvious constructions as (γ), γ(s), γ's, etc.

Ag	AG	silver nucleus
Al	AL	aluminum nucleus
annihil	ANNIHIL	annihilation final state in nucleon-antinucleon scattering
anomalon	ANOMALON	nuclear fragment with anomalous cross section
Ar	AR	argon nucleus
^{37}Ar	AR37	argon-37 nucleus
Au	AU	gold nucleus
^{197}Au	AU197	gold-197 nucleus
axion	AXION	hypothesized light Higgs scalar boson
$a_0(980)$	A0(980)	meson [was $\delta(980)$]
$a_1(1270)$	A1(1270)	meson
$a_2(1320)$	A2(1320)	meson
$B(5270)$	B(5270)	bottom meson
$B^*(5325)$	B*(5325)	excited bottom meson
baryon	BARYON	unspecified baryon
$\overline{\text{baryon}}$	BARYONBAR	unspecified antibaryon
baryonium	BARYONIUM	meson coupling mainly to baryon-antibaryon
Be	BE	beryllium nucleus
Bi	BI	bismuth nucleus
^{10}Bor	BOR10	boron-10 nucleus – note name not same as chemical symbol
^{12}Bor	BOR12	boron-12 nucleus – note name not same as chemical symbol
^{8}Bor	BOR8	boron-8 nucleus – note name not same as chemical symbol
bottom	BOTTOM	unspecified particle with naked bottom
bottomonium	BOTTOMONIUM	unspecified $b\bar{b}$ meson
Br	BR	bromine nucleus
$b_1(1235)$	B1(1235)	the "Buddha" meson
C	C	carbon nucleus
C*(4.44)	C*(4.44)	4.44 keV excited state of carbon nucleus
Ca	CA	calcium nucleus
Cd	CD	cadmium nucleus
centauro	CENTAURO	final state with 50 or more charged particles, no π^0's
charged	CHARGED	unspecified charged particle
charm	CHARM	unspecified charmed particle
$\overline{\text{charm}}$	CHARMBAR	unspecified anticharmed particle
charmed-baryon	CHARMED-BARYON	unspecified charmed baryon
charmed-meson	CHARMED-MESON	unspecified charmed meson
charmonium	CHARMONIUM	unspecified $c\bar{c}$ meson
χ(unspec)	CHI(UNSPEC)	unspecified radiative decay product of $\psi(3685)$
χ_b(unspec)	CHI/B(UNSPEC)	unspecified radiative decay product of higher mass Υ's
$\chi_{b0}(10235)$	CHI/B0(10235)	$b\bar{b}$ meson
$\chi_{b0}(9860)$	CHI/B0(9860)	$b\bar{b}$ meson
$\chi_{b1}(10255)$	CHI/B1(10255)	$b\bar{b}$ meson
$\chi_{b1}(9895)$	CHI/B1(9895)	$b\bar{b}$ meson
$\chi_{b2}(10270)$	CHI/B2(10270)	$b\bar{b}$ meson
$\chi_{b2}(9915)$	CHI/B2(9915)	$b\bar{b}$ meson
$\chi_1(3510)$	CHI1(3510)	$c\bar{c}$ meson
$\chi_2(3555)$	CHI2(3555)	$c\bar{c}$ meson
Cl	CL	chlorine nucleus
^{37}Cl	CL37	chlorine-37 nucleus
Cr	CR	chromium nucleus
crystal	CRYSTAL	crystal, general target for channeling experiments
Cu	CU	copper nucleus
^{12}C	C12	carbon-12 nucleus
D(unspec)	D(UNSPEC)	unspecified charmed nonstrange meson
D	D	charmed nonstrange meson
$D^*(2010)$	D*(2010)	excited charmed nonstrange meson
D_s	D/S	$D_s(1971)$ charmed strange meson [was F]
$\overline{D}$	DBAR	anticharmed nonstrange meson
Δ(unspec)	DELTA(UNSPEC)	unspecified $I = 3/2$, $S = 0$ baryon
$\Delta(1232\,P_{33})$	DELTA(1232P33)	nucleon resonance
$\Delta(1950\,B)$	DELTA(1950B)	bump in production experiment
$\overline{\Delta}(1232\,P_{33})$	DELTABAR(1232P33)	antinucleon resonance
demon	DEMON	exotic 6-quark deuteron-like state
deut	DEUT	deuteron
$\overline{\text{deut}}$	DEUTBAR	antideuteron

dibaryon	DIBARYON	unspecified nonstrange dibaryon resonance
dibaryon($S=-1$)	DIBARYON(S=-1)	unspecified $S=-1$ dibaryon resonance
dibaryon($S=-2$)	DIBARYON(S=-2)	unspecified $S=-2$ dibaryon resonance
e^+	E+	positron
$e^\pm$	E+-	electron or positron
e^-	E−	electron
η	ETA	$\eta(549)$ meson
$\eta(1080)$	ETA(1080)	meson
$\eta(1440)$	ETA(1440)	glueball candidate [was $\iota(1440)$]
η_b	ETA/B	lowest mass $J^P=0^-$ $b\bar{b}$ meson
$\eta_c(2980)$	ETA/C(2980)	lowest mass $J^P=0^-$ $c\bar{c}$ meson
$\eta_c(3590)$	ETA/C(3590)	charmonium meson
η'	ETAPRIME	$\eta'(958)$ meson
exotic-meson	EXOTIC-MESON	cannot be formed of $q\bar{q}$
exotic-nucleon	EXOTIC-NUCLEON	cannot be formed of qqq
Fe	FE	iron nucleus
frag	FRAG	nuclear fragment
$f_0(1300)$	F0(1300)	$\pi\pi$ S-wave (near 1300 MeV) [was $\epsilon(1300)$]
$f_0(1590)$	F0(1590)	meson
$f_0(700)$	F0(700)	$\pi\pi$ S-wave (near 700 MeV) [was $\epsilon(700)$]
$f_0(975)$	F0(975)	meson [was $S(975)$]
$f_1(1285)$	F1(1285)	meson [was $D(1285)$]
$f_1(1420)$	F1(1420)	meson [was $E(1420)$]
$f_2(1270)$	F2(1270)	meson
$f_2(1720)$	F2(1720)	glueball candidate [was $\theta(1690)$]
$f'_2(1525)$	F2PRIME(1525)	meson
$f_4(2030)$	F4(2030)	$I=0$, $J^P=4^+$ meson resonance [was $h(2030)$]
Ga	GA	gallium nucleus
γ	GAMMA	photon
glueball	GLUEBALL	unspecified glueball
gluon	GLUON	
$h(990)$	H(990)	meson
hadron	HADRON	unspecified hadron
He	HE	helium nucleus
^{2}He	HE2	helium-2 nucleus
^{3}He	HE3	helium-3 nucleus
Hg	HG	mercury nucleus
higgs	HIGGS	Higgs boson
hvy-flavor	HVY-FLAVOR	unspecified particle carrying a flavor heavier than strange
hvy-lepton	HVY-LEPTON	unspecified heavy lepton
hvy-ν	HVY-NU	unspecified heavy neutrino
hvy-ν_e	HVY-NUE	unspecified heavy electron neutrino
hvy-ν_μ	HVY-NUMU	unspecified heavy muon neutrino
hypernuc	HYPERNUC	unspecified hypernucleus, generally containing more than two baryons
inelastic	INELASTIC	same as X, except elastic excluded
Ir	IR	iridium nucleus
J/ψ	J/PSI	$J/\psi(3097)$
jet	JET	jet of particles
K	K	K meson
K^*(unspec)	K*(UNSPEC)	unspecified K^*
$K^*(892)$	K*(892)	meson
$\overline{K}^*$(unspec)	K*BAR(UNSPEC)	unspecified $\overline{K}^*$
$\overline{K}^*(892)$	K*BAR(892)	meson
kaon	KAON	kaon or antikaon of unspecified charge
$\overline{K}$	KBAR	$\overline{K}$ meson
K_L	KL	$K_{\rm long}$, neutral K meson
$KN(1760)$	KN(1760)	meson
K_S	KS	$K_{\rm short}$, neutral K meson
$K_1(1240\text{–}1400)$	K1(1240–1400)	meson [was $Q(1240\text{–}1400)$]
$K_2(1770)$	K2(1770)	meson [was $L(1770)$]
$K_2^*(1430)$	K2*(1430)	meson
Λ	LAMBDA	Λ hyperon
Λ(unspec)	LAMBDA(UNSPEC)	unspecified $I=0$, $S=-1$ baryon
$\Lambda(1330\,\mathrm{B})$	LAMBDA(1330B)	bump in production experiment
$\Lambda(1520\,\mathrm{D}_{03})$	LAMBDA(1520D03)	hyperon resonance
$\Lambda N(2130)$	LAMBDA-N(2130)	$S=-1$ dibaryon resonance
Λ_c	LAMBDA/C	$\Lambda_c(2281)$ $I=0$ charmed baryon
$\overline{\Lambda}$	LAMBDABAR	antilambda
lepton	LEPTON	unspecified lepton
Li	LI	lithium nucleus

^{6}Li	LI6	lithium-6 nucleus
^{7}Li	LI7	lithium-7 nucleus
longlived	LONGLIVED	unspecified particle stable under strong and electromagnetic decay
meson	MESON	unspecified meson
meson(2950)	MESON(2950)	bump seen in $p\overline{p}\pi$
monopole	MONOPOLE	magnetic monopole
μ	MU	muon
mult[charged]	MULT(CHARGED)	multiplicity distribution for unspecified charged particle
muon	MUON	muon of unspecified charge
muonium	MUONIUM	μ^+e^- atom
n	N	neutron
n(spect)	N(SPECT)	spectator neutron
N(unspec)	N(UNSPEC)	unspecified $I = 1/2$, $S = 0$ baryon
$N(1440\,\mathrm{B})$	N(1440B)	bump in production experiment
$N(1440\,\mathrm{P}_{11})$	N(1440P11)	nucleon resonance
$N(1520\,\mathrm{B})$	N(1520B)	bump in production experiment
$N(1520\,\mathrm{D}_{13})$	N(1520D13)	nucleon resonance
$N(1675\,\mathrm{D}_{15})$	N(1675D15)	nucleon resonance
$N(1680\,\mathrm{F}_{15})$	N(1680F15)	nucleon resonance
$N(1700\,\mathrm{B})$	N(1700B)	bump in production experiment
N^*(unspec)	N*(UNSPEC)	$S = 0$ baryon of unspecified mass and isospin
$N^*_{5/2}$(unspec)	N*5/2(UNSPEC)	unspecified $I = 5/2$, $S = 0$ baryon
$\overline{n}$	NBAR	antineutron
Ne	NE	neon nucleus
neutral	NEUTRAL	unspecified neutral particle
^{12}Nit	NIT12	nitrogen-12 nucleus – note name not same as chemical symbol
$N\overline{N}(2020)$	NNBAR(2020)	meson
$N\overline{N}(2200)$	NNBAR(2200)	meson
ν	NU	unspecified neutrino
$\overline{\nu}$	NUBAR	unspecified antineutrino
nucleon	NUCLEON	unspecified nucleon
$\overline{\text{nucleon}}$	NUCLEONBAR	unspecified antinucleon
nucleus	NUCLEUS	unspecified nucleus
ν_e	NUE	electron neutrino
$\overline{\nu}_e$	NUEBAR	electron antineutrino
nuino	NUINO	any light supersymmetric particle
$\overline{\text{nuino}}$	NUINOBAR	antinuino
ν_μ	NUMU	muon neutrino
$\overline{\nu}_\mu$	NUMUBAR	muon antineutrino
ν_τ	NUTAU	τ neutrino
$\overline{\nu}_\tau$	NUTAUBAR	τ antineutrino
O	O	oxygen nucleus
ω	OMEGA	$\omega(783)$ meson
Ω^*(unspec)	OMEGA*(UNSPEC)	$S = -3$ baryon of unspecified mass and isospin
Ω	OMEGA	Ω hyperon
Ω_c	OMEGA/C	$\Omega_c(2740)$ $I = 0$ charmed doubly strange baryon
^{16}O	O16	oxygen-16 nucleus
p	P	proton
p(spect)	P(SPECT)	spectator proton
Pb	PB	lead nucleus
$\overline{p}$	PBAR	antiproton
ϕ	PHI	$\phi(1020)$ meson
$\phi(1680)$	PHI(1680)	meson
photino	PHOTINO	spin-1/2 SUSY partner of the photon
π	PI	pion
pion	PION	pion of unspecified charge
$\pi_2(1680)$	PI2(1680)	meson [was $A(1680)$]
pomeron	POMERON	
ψ(unspec)	PSI(UNSPEC)	unspecified ψ meson
$\psi(3685)$	PSI(3685)	$c\overline{c}$ meson
$\psi(3770)$	PSI(3770)	$c\overline{c}$ meson
$\psi(4415)$	PSI(4415)	$c\overline{c}$ meson
Pt	PT	platinum nucleus
quark	QUARK	quark of unspecified charge
quark(1/3)	QUARK(1/3)	quark of charge $-1/3$
quark(2/3)	QUARK(2/3)	quark of charge 2/3
$\overline{\text{quark}}(1/3)$	QUARKBAR(1/3)	antiquark of charge 1/3
$\overline{\text{quark}}(2/3)$	QUARKBAR(2/3)	antiquark of charge $-2/3$
ρ	RHO	$\rho(770)$ meson
$\rho(1250)$	RHO(1250)	meson

$\rho(1600)$	RHO(1600)	meson
$\rho_3(1690)$	RHO3(1690)	meson [was $g(1690)$]
S	S	intermediate scalar boson
s-electron	SELECTRON	spin-0 SUSY partner of the electron or positron
Si	SI	silicon nucleus
Σ	SIGMA	Σ hyperon
Σ(unspec)	SIGMA(UNSPEC)	unspecified $I = 1$, $S = -1$ baryon
$\Sigma(1385\,P_{13})$	SIGMA(1385P13)	hyperon resonance
$\Sigma(1670\,B)$	SIGMA(1670B)	bump in production experiment
$\Sigma(1915\,B)$	SIGMA(1915B)	bump in production experiment
$\Sigma(2250\,B)$	SIGMA(2250B)	bump in production experiment
$\Sigma_c(2450)$	SIGMA/C(2450)	$I = 1$ charmed baryon
$\overline{\Sigma}$	SIGMABAR	ordinary $\overline{\Sigma}$ antihyperon
Sn	SN	tin nucleus
s-particle	SPARTICLE	supersymmetric partner of any ordinary particle
s-quark	SQUARK	spin-0 SUSY quark partner
strange	STRANGE	unspecified strange particle
$\overline{\text{strange}}$	STRANGEBAR	unspecified strangeness +1 particle
strangeonium	STRANGEONIUM	unspecified meson whose quark content is dominantly $s\bar{s}$, such as the ϕ
Su	SU	sulfur nucleus – note name not same as chemical symbol
^{32}Su	SU32	sulfur-32 nucleus – note name not same as chemical symbol
Ta	TA	tantalum nucleus
tachyon	TACHYON	
τ	TAU	τ lepton
Th	TH	thorium nucleus
Tl	TL	thallium nucleus
top	TOP	unspecified particle with naked top
trit	TRIT	tritium nucleus
U	U	uranium nucleus
unspec	UNSPEC	unspecified particle
Υ(unspec)	UPSI(UNSPEC)	unspecified Υ particle
$\Upsilon(10023)$	UPSI(10023)	$b\bar{b}$ meson
$\Upsilon(10355)$	UPSI(10355)	$b\bar{b}$ meson
$\Upsilon(10575)$	UPSI(10575)	$b\bar{b}$ meson
$\Upsilon(10860)$	UPSI(10860)	$b\bar{b}$ meson
$\Upsilon(11020)$	UPSI(11020)	$b\bar{b}$ meson
$\Upsilon(9460)$	UPSI(9460)	$b\bar{b}$ meson
vee	VEE	unspecified neutral-strange-particle decay
vmeson	VMESON	vector meson of unspecified mass
W	W	weak gauge boson
water	WATER	
Wt	WT	tungsten nucleus – note name not same as chemical symbol
X	X	anything, as is $pp \to \pi^+$X or $K^-p \to$X
$X(1700)$	X(1700)	meson
$X(1935)$	X(1935)	meson [was $S(1935)$]
$X(2220)$	X(2220)	meson seen in J/ψ decays [was $\xi(2220)$]
Xe	XE	xenon nucleus
Ξ	XI	Ξ hyperon
Ξ(unspec)	XI(UNSPEC)	unspecified $I = 1/2$, $S = -2$ baryon
$\Xi(1530\,P_{13})$	XI(1530P13)	Ξ resonance
$\Xi(1630)$	XI(1630)	Ξ resonance
$\Xi(1820)$	XI(1820)	Ξ resonance
$\Xi(1940)$	XI(1940)	Ξ resonance
$\Xi(2030)$	XI(2030)	Ξ resonance
$\Xi(2250)$	XI(2250)	Ξ resonance
$\Xi(2500)$	XI(2500)	Ξ resonance
Ξ^*(unspec)	XI*(UNSPEC)	unspecified Ξ resonance
Ξ_c	XI/C	$\Xi_c(2460)$ $I = 1/2$ charmed strange baryon
$\overline{\Xi}$	XIBAR	$\overline{\Xi}$ antihyperon
Y	Y	Λ or Σ or low-mass Y*
Y^*(unspec)	Y*(UNSPEC)	$S = -1$ baryon of unspecified mass and isospin
Z	Z	neutral weak gauge boson
Z^*(unspec)	Z*(UNSPEC)	$S = +1$ exotic baryon of unspecified mass and isospin
$\varsigma(8300)$	ZETA(8300)	reported $\varsigma(8300)$ meson

BNL-698 (Jul 1976, Aug 1978) Approved Sep 1978; Completed Dec 1980.

POLARIZED-TARGET PHYSICS WITH THE MPS FOR STUDY OF STRANGE-PARTICLE REACTIONS

MASSACHUSETTS U, AMHERST – J Button-Shafer (√ Spokesperson), S Dhar, S Gottesman, R L Lichti

Accelerator BNL *Detector* MPS

Reactions Polarized target

$K^- p \to \Lambda \pi^0$	2.2 GeV/c
$K^- p \to \Lambda \pi^+ \pi^-$	"
$K^- p \to \Lambda \omega$	"
$K^- p \to \overline{K}^0 n$	"
$K^- p \to \overline{K}^0 p \pi^-$	"

Particles studied Y^*(unspec)

Comments The final states with a Λ are of most interest. Tests SU(6) predictions for $K^- p \to \Sigma(1385)\pi$. (Primarily a feasibility study.) Ran for 400 hours.

Papers NIM (submitted).

BNL-702 (Dec 1976) Approved Jan 1977; Started Feb 1980; Completed Mar 1983.

RADIATIVE DECAY $\Sigma^+ \to p\gamma$ FROM POLARIZED Σ^+ HYPERONS

YALE U – S Axelrod, R Morrison, J Snow, M E Zeller (Spokesperson)
BROOKHAVEN – D M Lazarus
MOUNT HOLYOKE COLL – H Nicholson
PITTSBURGH U – J A Thompson

Accelerator BNL *Detector* Combination

Reactions Polarized target

$K^- p \to \Sigma^+ \pi^-$	0.7 GeV/c
$K^- p \to \Sigma^- \pi^+$	"

Particles studied Σ^+, Σ^-

Comments Also studies nonleptonic decays of the Σ^+ and Σ^-. Ran for 1640 hours.

Papers PR D32 (1985) 11.

BNL-705 (Jan 1977) Approved May 1977; Started Feb 1980; Completed May 1980.

A SEARCH FOR NARROW AND BROAD RESONANCES DECAYING INTO $K_S K_S$, $\Lambda\overline{\Lambda}$, ΛK_S, AND $\overline{\Lambda} K_S$ FROM $\pi^- p$ INTERACTIONS AT 20 GeV/c USING THE BNL MPS

BROOKHAVEN – A Etkin, K J Foley, J H Goldman, K-W Lai, W A Love, T W Morris, S Ozaki, E D Platner, A C Saulys, C D Wheeler, E H Willen
BROOKHAVEN & CITY COLL, N Y – S J Lindenbaum
CITY COLL, N Y – M A Kramer
VANDERBILT U – J Marraffino, S Reucroft, C Roos, M S Webster (Spokesperson)
TUFTS U – F T Dao, A Mann, J Schneps
MICHIGAN STATE U – J Hylen, Z Ming Ma

Accelerator BNL *Detector* MPS

Reactions

$\pi^- p \to \Lambda \overline{\Lambda}$ neutral(s)	20 GeV/c
$\pi^- p \to K_S K_S$ neutral(s)	"
$\pi^- p \to \Lambda K_S$ (neutrals)	"
$\pi^- p \to \overline{\Lambda} K_S$ neutrals	"

Particles studied meson^0, N(unspec)^0, Ξ^*(unspec)^0

Comments Ran for 1018 hours.

BNL-708 (Mar 1977) Approved May 1977, Feb 1980; Started Nov 1978; Completed Apr 1981.

SEARCH FOR γ TRANSITIONS IN $\overline{p}p$ ANNIHILATIONS AT REST AND LOW ENERGIES

BROOKHAVEN – D I Lowenstein
BROWN U – D C Peaslee
MICHIGAN STATE U – R A Lewis, B Y Oh, M Pratap, G Sionakides, G A Smith, J Whitmore
SYRACUSE U – T Brando, T E Kalogeropoulos (√ Spokesperson), G S Tzanakos

Accelerator BNL *Detector* Combination

Reactions

$\overline{p} p \to \gamma$(s) hadrons	0–650 MeV/c
$\overline{p} p \to \pi^+ X$	"
$\overline{p} p \to \pi^- X$	"
$\overline{p} p \to K^+ X$	"
$\overline{p} p \to K^- X$	"

Comments Ran for 1850 hours.

Papers PR D23 (1981) 2788, PR D26 (1982) 543, and PL 139B (1984) 133.

BNL-722 (Mar 1978) Approved May 1978; Started Apr 1982; Completed Apr 1983.

FURTHER SEARCH FOR EXOTIC SIX-QUARK STATES

BROOKHAVEN – I-H Chiang, R A Johnson, T F Kycia (Spokesperson), K K Li, L S Littenberg

Accelerator BNL *Detector* Double-arm spectrometer

Reactions

$p p \to K^+ K^+ X$	5.6 GeV/c

Particles studied dibaryon($S = -2$)

Comments A repeat of BNL-703 with an improvement in sensitivity by a factor 100. Ran for 1255 hours.

BNL-723 (Mar 1978) Approved May 1979, Oct 1983; Started Mar 1982; Completed Jul 1984.

A PRECISION MEASUREMENT OF THE MAGNETIC MOMENT OF THE Σ^- BY THE EXOTIC ATOMS TECHNIQUE

WILLIAM AND MARY COLL – M Eckhause, D W Hertzog, J R Kane, W Phillips, W F Vulcan, R E Welsh (Spokesperson), R J Whyley, R G Winter
BOSTON U – G Dodson, J Miller, F O'Brien, B L Roberts (Spokesperson), D Tieger
CARNEGIE MELLON U – R B Sutton
CAL TECH – R J Powers
WYOMING U – A R Kunselman

Accelerator BNL *Detector* Spectrometer

Reactions

Σ^- nucleus $\to \Sigma^-$ nucleus γ	0 GeV/c

Particles studied Σ^-

Comments Uses Ge(Li) detectors to measure fine-structure splitting in Σ^- atoms. Measures, in addition to the Σ^- magnetic moment, the masses of the Σ^- and K^- and the effects of their strong interaction with heavy nuclei. Ran for 1504 hours.

Papers PRL 51 (1983) 1131.

BNL-726 (Apr 1978) Approved May 1978; Started Jul 1980; Completed Jun 1982.

SEARCH FOR CHARM IN HADRONIC INTERACTIONS NEAR THRESHOLD

NEW YORK U – J H Christenson (Spokesperson), E Hummel, G A Kreiter, J Sculli
BROOKHAVEN – P Yamin

Accelerator BNL *Detector* Spectrometer

Reactions

$\pi^- p \to$ charm X	13 GeV/c
$\pi^- p \to K^+ \pi^- \pi^- X$	"

Particles studied $D^*(2010)^-$, $\overline{D}^0$, charmed-baryon

Comments Looks for $D^{*-} \rightarrow \overline{D}^0 \pi^-$ decay followed by $\overline{D}^0 \rightarrow K^+ \pi^-$ decay, and for charmed baryons in the missing mass against the D^{*-}. Ran for 1795 hours.

Papers PRL 55 (1985) 154.

BNL-732 (Aug 1978) Approved Sep 1978, Feb 1980; Started Jan 1979; Completed Aug 1980.

SEARCH FOR THE η_c

BROOKHAVEN – I-H Chiang, R A Johnson, B P Kwan, T F Kycia (Spokesperson), K K Li, L S Littenberg, A Wijangco
PRINCETON U – A M Halling, G E Hogan, J C Licini, C G Lu, K McDonald, S Smith, M H Ye
ILLINOIS U, URBANA – L Garren, J Thaler

Accelerator BNL *Detector* Calorimeter

Reactions

$\pi^- p \rightarrow \gamma \gamma n$	13 GeV/c
$\pi^- p \rightarrow \eta_c(2980)\, n$	"
$\pi^- p \rightarrow \gamma$'s n	"

Particles studied $\eta_c(2980)$

Comments Ran for 2327 hours.

Papers PL 140B (1984) 145, and PR D34 (1986) 1619.

BNL-734 (Aug 1978) Approved Feb 1979, Feb 1984; Started Jan 1981; Completed May 1986.

A MEASUREMENT OF THE ELASTIC SCATTERING OF NEUTRINOS FROM ELECTRONS AND PROTONS

BROOKHAVEN – L A Ahrens, S H Aronson, B G Gibbard, M J Murtagh (√ Spokesperson), S J Murtagh, P J Wanderer, D H White
BROWN U – J Callas, D Cutts, J Hoftun, R E Lanou
KEK – K Abe, K Amako, S Kabe, T Shinkawa, A Sterad
OSAKA U – Y Nagashima, Y Suzuki
PENN U – E W Beier, L S Durkin, S M Heagy, M Hurley, A K Mann, H H Williams, T York
SUNY, STONY BROOK – D Hedin, M D Marx, E Stern

Accelerator BNL *Detector* Calorimeter

Reactions

$\nu_\mu e^- \rightarrow \nu_\mu e^-$	0–12 GeV/c
$\nu_\mu p \rightarrow \nu_\mu p$	"
$\nu_\mu p \rightarrow \nu_\mu p \pi^0$	"
$\nu_\mu p \rightarrow \nu_\mu n \pi^+$	"
$\nu_\mu n \rightarrow \mu^- p$	"
$\nu_\mu n \rightarrow \nu_\mu p \pi^-$	"
$\nu_\mu n \rightarrow \nu_\mu n \pi^0$	"
$\overline{\nu}_\mu e^- \rightarrow \overline{\nu}_\mu e^-$	"
$\overline{\nu}_\mu p \rightarrow \overline{\nu}_\mu p$	"
$\overline{\nu}_\mu p \rightarrow \overline{\nu}_\mu p \pi^0$	"
$\overline{\nu}_\mu p \rightarrow \overline{\nu}_\mu n \pi^+$	"
$\overline{\nu}_\mu n \rightarrow \overline{\nu}_\mu p \pi^-$	"
$\overline{\nu}_\mu n \rightarrow \overline{\nu}_\mu n \pi^0$	"

Comments Ran for 4630 hours. For a description of the apparatus, see the LBL-91 supplement on detectors.

Papers PRL 51 (1983) 1514, IEEE TNS 30 (1983) 3782, PRL 54 (1985) 18, PR D31 (1985) 2732, PRL 56 (1986) 1107, PR D34 (1986) 75, PRL 58 (1987) 636, and PR D35 (1987) 785.

BNL-735 (Oct 1978) Approved Feb 1979; Started Jun 1980; Completed Jun 1981.

TRANSVERSE MUON POLARIZATION IN $K^+ \rightarrow \mu^+ \pi^0 \nu$ DECAYS: AN EXPERIMENTAL TEST OF TIME REVERSAL INVARIANCE

BROOKHAVEN – R C Larsen, L B Leipuner, W M Morse
YALE U – R K Adair (Spokesperson), H Kasha, M Schmidt

Accelerator BNL *Detector* Counter

Reactions

$K^+ \rightarrow \mu^+ \pi^0 \nu_\mu$	4 GeV/c

Comments Ran for 2061 hours.

BNL-737 (Jan 1979) Approved Feb 1979; Started Nov 1979; Completed Jan 1980.

STUDY OF NEUTRINO INTERACTIONS IN DEUTERIUM

BROOKHAVEN – P L Connolly, S A Kahn, M J Murtagh, R B Palmer (√ Spokesperson), N P Samios, M Tanaka
TOHOKU U – K Abe, K Hasegawa, T Hayashino, T Kitagaki, S Kunori, Y Ohtani, K Tamai, S Tanaka, A Yamaguchi, H Yuta
TOHOKU GAKUIN U – M Higuchi, M Sato

Accelerator BNL *Detector* DBC-7FT

Reactions

ν_μ deut $\rightarrow \mu^-$ pion(s) X	0–10 GeV/c
ν_μ deut $\rightarrow \mu^-$ charmed-baryon X	"
ν_μ deut $\rightarrow \mu^-$ strange(s) X	"
$\nu_\mu n \rightarrow \nu_\mu p \pi^-$	"
$\nu_\mu n \rightarrow \mu^- p$	"
$\nu_\mu p \rightarrow \mu^- p \pi^+$	"
$\nu_\mu p \rightarrow \mu^- \Delta(1232 P_{33})^{++}$	"

Particles studied charmed-baryon

Comments An extension of BNL-427. Took 802 KPX.

Papers PR D28 (1983) 2900, and PR D34 (1986) 2554.

BNL-742 (Apr 1979) Approved May 1979; Started Feb 1981; Completed Jun 1981.

SEARCH FOR THE S MESON IN THE TOTAL, ELASTIC, AND ANNIHILATION $\overline{p}p$ CROSS SECTIONS

BROOKHAVEN – V Ashford, M Sakitt (√ Spokesperson), J Skelly
CASE WESTERN RESERVE U – W Fickinger, R Marino, D K Robinson

Accelerator BNL *Detector* Wire chamber

Reactions

$\overline{p}\, p \rightarrow$ X	387–681 MeV/c
$\overline{p}\, p \rightarrow \overline{p}\, p$	"
$\overline{p}\, p \rightarrow$ pions	"
$\overline{p}$ Cu	400–600 MeV/c
$\overline{p}$ Al	"
$\overline{p}$ Pb	"

Particles studied $X(1935)^0$

Comments Measures both the elastic and the absorption cross sections for the nuclear targets. Ran for 674 hours.

Papers PR C30 (1984) 1080, PR C31 (1985) 663, PRL 54 (1985) 518, and PR D34 (1986) 3332.

BNL-744 (Apr 1979) Approved May 1979; Started Feb 1980; Completed Aug 1980.

MEASUREMENT OF INCLUSIVE Σ^0 PRODUCTION RATE AND POLARIZATION IN THE REACTION p Be $\rightarrow \Sigma^0 X$

MASSACHUSETTS U, AMHERST – D Jensen (Spokesperson), M Kreisler, M Marcin, K Raychaudhuri, M Sullivan
BROOKHAVEN – G Bunce, Y Makdesi, P Yamin
MINNESOTA U – K Heller
MICHIGAN U – E C Dukes, O E Overseth

Accelerator BNL *Detector* Combination

Reactions

p Be $\rightarrow \Sigma^0$ X	28.5 GeV/c
p Be $\rightarrow \Lambda$ X	"

Comments The Σ^0 production rate is measured relative to the Λ rate. Ran for 872 hours.

Papers PL 142B (1984) 451.

BNL-745 (Apr 1979) Approved Sep 1979, Feb 1984; Started Feb 1983; Completed May 1986.

AN IMPROVED TEST OF QED — AN EXPERIMENT TO MEASURE VACUUM POLARIZATION IN THE 3D-3P TRANSITIONS IN MUONIC HELIUM

CERN – E Zavattini
BROOKHAVEN & COLUMBIA U – M May
COLUMBIA U – A Blaer, J Derderian, J French, A M Sachs (Spokesperson)

Accelerator BNL *Detector* Counter

Reactions

μ^- He $\rightarrow \mu^-$ He γ	0 GeV/c

Comments The transitions are stimulated by infrared radiation from an isotopic-gas CO_2 laser. Ran for 2142 hours.

BNL-746 (Apr 1979) Approved May 1979; Started Mar 1980; Completed Aug 1980.

SPIN AND ISOSPIN EFFECTS IN LIGHT HYPERNUCLEI

BROOKHAVEN – R E Chrien, M May, H Palevsky (√ Spokesperson), R Sutter
TURIN U – R Cester
MIT – M Deutsch
HOUSTON U – S Bart, E V Hungerford, B Mayes, L Pinsky
VASSAR COLL – R L Stearns
CARNEGIE MELLON U – P Barnes, S Dytman, R Eisenstein, D Marlow, F Takeutchi, R Wharton

Accelerator BNL *Detector* Spectrometer

Reactions

K^- nucleus $\rightarrow \pi^-$ hypernuc	800 MeV/c

Particles studied hypernuc

Comments Measures hypernucleus states of ^{10}B, ^{13}C, ^{14}N, and ^{18}O. Ran for 1359 hours.

Papers PRL 47 (1981) 1106.

BNL-747 (Aug 1979) Approved Oct 1980, Feb 1984; Started Jun 1982.

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

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

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

Comments Of particular interest is the role of glueballs in the breaking of the OZI rule in $\pi^-p \rightarrow \phi\phi n$. Three new meson states at 2050, 2300, and 2350 MeV fit the glueball resonance hypothesis and no other one proposed. For a description of the apparatus, see the LBL-91 supplement on detectors. Approved for 2300 hours, with 1807 hours run as of November 86.

Papers PRL 49 (1982) 1620, SHEP 4 (1983) 69, PL 131B (1983) 221, CNPP 13 (1984) 285, PL 165B (1985) 202, and PL 165B (1985) 217.

BNL-748 (Aug 1979) Approved Feb 1980, Oct 1982, Oct 1983; Started Mar 1982; Completed May 1984.

POLARIZATION IN pp ELASTIC SCATTERING AT MEDIUM AND HIGH $p_\perp^2$ FROM 15 TO 28.5 GeV/c

MICHIGAN U – K A Brown, R J Bruni, P R Cameron, D G Crabb, R L Cummings, M Fujisaki, M Hejazifar, F Z Khiari, A D Krisch (√ Spokesperson), A M T Lin, S L Linn, R S Raymond, T Shima, K M Terwilliger
NOTRE DAME U – J R O'Fallon
BROOKHAVEN – G T Danby, Y Y Lee, L G Ratner
COPENHAGEN U – P H Hansen
MIAMI U, FLA – A Perlmutter
MARYLAND U & MICHIGAN U – D C Peaslee
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

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

Comments Found very large polarization at $p_\perp^2 = 6.6$ GeV^2. Ran for 2550 hours.

Papers PRL 50 (1983) 802, and PRL 51 (1983) 2359.

BNL-749 (Aug 1979) Approved Sep 1979, Oct 1983; Started Mar 1982; Completed Apr 1984.

A MEASUREMENT OF MILLIWEAK CP VIOLATION IN K_L-K_S DECAYS THROUGH THE DETERMINATION OF ϵ'

BROOKHAVEN – R C Larsen, L B Leipuner, W M Morse
YALE U – R K Adair (Spokesperson), K Black, S R Blatt, M K Campbell, H Kasha

Accelerator BNL *Detector* Spectrometer

Reactions

$K^0 \rightarrow \pi^+\ \pi^-$	—
$K^0 \rightarrow \pi^0\ \pi^0$	—

Particles studied K^0

Comments Ran for 2037 hours.

Papers PRL 54 (1985) 1628.

BNL-751 (Apr 1980) Approved Oct 1980; Started May 1983; Completed Apr 1984.

MEASUREMENT OF HYPERON RADIATIVE DECAY

BRANDEIS U – J Bensinger, M Fortner, L Kirsch, H Piekarz, R Poster (Spokesperson), L Spencer, P Zogrofou
SOUTHEASTERN MASS U – Z Bar-Yam, J Dowd, W Kern
NOTRE DAME U – J M Bishop, N N Biswas, N M Cason, V P Kenney, M Rath, R Ruchti, W D Shephard
DUKE U – L Fortney, A Goshaw, E McGrory, W Robertson

Accelerator BNL *Detector* MPS-II

Reactions

K^- Wt $\rightarrow \Xi^0$ X	6 GeV/c
K^- Wt $\rightarrow \Omega^-$ X	"

Particles studied Ξ^0, Ω^-

Comments Measures the radiative decays $\Xi^0 \rightarrow p\gamma$, $\Xi^0 \rightarrow \Lambda\gamma$, $\Xi^0 \rightarrow \Sigma^0\gamma$, and $\Omega^- \rightarrow \Xi^-\gamma$. For a description of the apparatus, see the LBL-91 supplement on detectors. Ran for 850 hours.

BNL-752 (Dec 1979) Approved Feb 1980; Started Nov 1980; Completed Jun 1981.

A SEARCH FOR Σ HYPERNUCLEAR LEVELS IN ^{16}O IN THE (K^-, π^+) REACTION

HOUSTON U – S Bart, R Hackenburg, D Hancock, E V Hungerford (√ Spokesperson), B Mayes, L Pinsky, T Williams
BROOKHAVEN – R Chrien, M May, H Palevsky, R Sutter
CARNEGIE MELLON U – P Barnes, R Eisenstein, F Takeutchi, W Wharton
VASSAR COLL – R Sterns

Accelerator BNL *Detector* Spectrometer

Reactions

$K^-\ ^6\mathrm{Li} \rightarrow \pi^-$ hypernuc	720 MeV/c
$K^-\ \mathrm{O} \rightarrow \pi^-$ hypernuc	"

Particles studied hypernuc

Comments Ran for 690 hours.

Papers PL 110B (1982) 428.

BNL-754 (Dec 1979) Approved Feb 1980; Started May 1983; Completed Jun 1985.

DETERMINATION OF THE DYNAMICS OF μ^+ MOTION IN ALUMINUM

BTL, MURRAY HILL – A T Fiory, R P Minnich
BROOKHAVEN – A N Goland, Y C Jean, K G Lynn
WILLIAM AND MARY COLL – W J Kossler (Spokesperson)
GEORGE MASON U – W F Lankford
VIRGINIA STATE COLL – C E Stronach

Accelerator BNL *Detector* Counter

Reactions Polarized beam

μ^+ Al	125 MeV/c

Comments Studies depolarization effects in aluminum under various conditions. Ran for 1127 hours.

BNL-755 (Jan 1980) Approved Apr 1980, Oct 1983; Started Feb 1983; Completed Apr 1984.

$\pi^- p$ TWO-BODY EXCLUSIVE REACTIONS AT 90° FROM 8 GeV/c TO 18 GeV/c, AND (PHASE II) LARGE ANGLE EXCLUSIVES — POSITIVES AND POLARIZATION

BROOKHAVEN – D S Barton, G Bunce (√ Spokesperson), A S Carroll, Y Makdisi
MINNESOTA U – B Baller, G Blazey, H Courant, K Heller, S Heppelmann, M Marshak (√ Spokesperson), E Peterson, M Shupe, D S Wahl
SOUTHEASTERN MASS U – S Gushue, J Russell

Accelerator BNL *Detector* Double-arm spectrometer

Reactions

$\pi^- p \rightarrow \pi^- p$	10, 13.5 GeV/c
$\pi^- p \rightarrow \rho^- p$	"
$\pi^- p \rightarrow a_2(1320)^- p$	"
$\pi^- p \rightarrow \pi^+ \Delta(1232\,\mathrm{P}_{33})^-$	"
$\pi^- p \rightarrow K^+ \Sigma^-$	"
$\pi^- p \rightarrow K^+ \Sigma(1385\,\mathrm{P}_{13})^-$	"
$\pi^- p \rightarrow \Lambda K^0$	"
$\pi^+ p \rightarrow \pi^+ p$	10 GeV/c
$\pi^+ p \rightarrow K^+ \Sigma^+$	"
$K^+ p \rightarrow K^+ p$	"
$p p \rightarrow p p$	"
$p p \rightarrow p \Delta(1232\,\mathrm{P}_{33})^+$	"
$K^- p \rightarrow K^- p$	"

Comments The apparatus is a single-arm spectrometer and a nonmagnetic arm. Ran for 2579 hours.

Papers PRL 55 (1985) 1820, and PRL 55 (1985) 1824.

BNL-758 (Apr 1980) Approved May 1980; Started Feb 1983; Completed Apr 1983.

THE (π^+, K^+) REACTION — A NEW TOOL FOR THE STUDY OF HYPERNUCLEAR STRUCTURE

LOS ALAMOS – J Amann, T S Bhatia, T Kozlowski, J C Peng, R Silbar, H A Thiessen (√ Spokesperson)
BROOKHAVEN – R Chrien, P Pile, R Sutter
FLORIDA STATE U – H Plendl
HOUSTON U – S Bart, R Hackenburg, E Hungerford
RUTGERS U – C Glashausser, J McGill
VASSAR COLL – R L Stearns
CARNEGIE MELLON U – P D Barnes, G B Franklin, R Grace
TEXAS U – M Barlett, G W Hoffmann, E C Milner

Accelerator BNL *Detector* Spectrometer

Reactions

$\pi^+\ ^{12}\mathrm{C} \rightarrow K^+$ hypernuc	1050 MeV/c

Particles studied hypernuc

Comments The first experiment using this reaction with sufficient resolution to study hypernuclear states. Ran for 696 hours.

Papers PRL 54 (1985) 1237. No other papers expected.

BNL-759 (Jan 1981) Approved Mar 1981; Started May 1983; Completed May 1983.

THE WEAK DECAY MODES OF HYPERNUCLEI

CARNEGIE MELLON U – P D Barnes (√ Spokesperson), R A Eisenstein, G Franklin, R Grace, C Maher, R Rieder, J Seydoux, J Szymanski, W R Wharton
BROOKHAVEN – R Chrien, P Pile
HOUSTON U – R Hackenburg, E Hungerford
NEW MEXICO U – B Bassalleck
TEXAS U – M Barlett, E Milner

Accelerator BNL *Detector* Spectrometer

Reactions

K^- C $\rightarrow \pi^-$ hypernuc	800 MeV/c

Particles studied hypernuc

Comments Studies (1) the 4-fermion weak interactions $\Lambda N \rightarrow NN$, and (2) $\Lambda \rightarrow N\pi$ decays in nuclear matter. Measures the ground-state lifetime of $^{12}_{\Lambda}\mathrm{C}$ and the partial decay rates for these processes. Ran for 489 hours.

Papers PRL 55 (1985) 1055.

BNL-760 (Apr 1980) Approved May 1980; Started May 1982; Completed Jun 1982.

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

MIT – M Deutsch (Spokesperson), J Piekarz
BROOKHAVEN – R Chrien, M May, H Palevsky, H Piekarz, R Sutter
TURIN U – R Cester
HOUSTON U – S Bart, E V Hungerford, B Mayes, L Pinsky
NEW YORK U – B Budick
VASSAR COLL – R L Stearns
BEIJING, IHEP – Y Xu

Accelerator BNL *Detector* Spectrometer

Reactions

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

Particles studied hypernuc

Comments Targets are ^{7}Li, ^{9}Be, and ^{16}O. Both the π^- and γ's from de-excitation of the hypernuclear states are detected. Ran for 624 hours.

BNL-762 (Aug 1980) Approved Oct 1980; Started Mar 1982; Completed Apr 1982.

SEARCH FOR NARROW STRUCTURES IN THE $\bar{p}p$ ANNIHILATION CROSS SECTION FROM 1900 TO 1950 MeV

BROOKHAVEN – D I Lowenstein
MARYLAND U – D C Peaslee
MICHIGAN STATE U – R J Miller

PENN STATE U – R A Lewis, B Y Oh, G A Smith (√ Spokesperson), J Whitmore
SYRACUSE U – T Brando, I Daftari, A de Guzman, T E Kalogeropoulos, C Petridou, M Singer, G S Tzanakos, R Venugopal
TEMPLE U – R D von Lintig

Accelerator BNL *Detector* Spectrometer

Reactions

$\bar{p}\,p \rightarrow$ annihil	1900–1950 MeV (E_{cm})

Particles studied $X(1935)^0$

Comments Ran for 532 hours.

Papers PL 158B (1985) 505. No other papers expected.

BNL-766 (Sep 1980, Dec 1980) Approved Feb 1981; Started Jun 1982; Completed Jul 1986.

STUDY OF Ω^- PRODUCTION AND DEVELOPMENT OF ON-LINE HARDWARE PROCESSING

NEVIS LABS, COLUMBIA U – M Church, E Gottschalk, R Hylton, B Knapp (√ Spokesperson), B Stern, L Wiencke
MASSACHUSETTS U, AMHERST – E Hartouni, D Jensen, M Kreisler (√ Spokesperson), M Rabin
MEXICO U – C Avilez (√ Spokesperson)
FERMILAB – D Christian, G Guitierrez, S Holmes, J Strait, A Wehman
TEXAS ACCELERATOR CENTER – R Huson, J White

Accelerator BNL *Detector* Spectrometer

Reactions

$n\,p \rightarrow \Omega^-\,X$	10–28 GeV/c
$n\,p \rightarrow p\,\Omega^-\,3K^+\,2\pi^-$	"
$n\,p \rightarrow p\,\Omega^-\,K^0\,2K^+\,\pi^-$	"
$n\,p \rightarrow \Lambda\,X$	"
$n\,p \rightarrow \Lambda\,K^0\,p$	"
$n\,p \rightarrow \Lambda\,K^+\,p\,\pi^+\,2\pi^-$	"
$n\,p \rightarrow \Xi^-\,X$	"
$n\,p \rightarrow 2\Lambda\,X$	"
$n\,p \rightarrow \phi\,\pi^+\,\pi^-\,X$	"

Particles studied Ω^-

Comments Only a sampling of the reactions to be studied is listed above. The spectrometer is designed to measure exclusive topologies with high sensitivity. Ran for 1194 hours.

BNL-767 (Jan 1981) Approved Mar 1981; Started May 1983; Completed Jun 1985.

DEVELOPMENT OF A LOW ENERGY ANTINEUTRON SOURCE AND MEASUREMENT OF $\bar{n}p$ ANNIHILATION CROSS SECTIONS NEAR $\bar{N}N$ THRESHOLD

BROOKHAVEN – D I Lowenstein
HOUSTON U – C Chu, M Furic, E V Hungerford, T Kishimoto, B W Mayes, L S Pinsky, L Tang, A Xue
PENN STATE U – T Armstrong, C Elinon, K Hartman, A Hicks, R A Lewis, W Lochstet, G A Smith (√ Spokesperson)
RICE U – J Clement, J Kruk, B Moss, G S Mutchler, W von Witsch

Accelerator BNL *Detector* Wire chamber

Reactions

$\bar{n}\,p \rightarrow$ annihil	100–500 MeV/c
$\bar{n}\,p \rightarrow X$	"

Particles studied baryonium

Comments Ran for 1748 hours.

Papers PL 175B (1986) 383.

BNL-769 (Jan 1981) Approved Mar 1981; Started Apr 1984; Completed Jul 1984.

SEARCH FOR GLUEBALLS AND OTHER MESON STATES

NOTRE DAME U – J M Bishop, N N Biswas, N M Cason (√ Spokesperson), V P Kenney, R C Ruchti, W D Shephard
BRANDEIS U – J Bensinger, L Kirsch, F Lomanno, W Morris, R Poster
BROOKHAVEN – A Etkin, K J Foley, R Longacre, W A Love, T W Morris, E D Platner, V A Polychronakos, A C Saulys, C D Wheeler
BROOKHAVEN & CITY COLL, N Y – S J Lindenbaum
CITY COLL, N Y – M Kramer, Y Terramoto
DUKE U – L R Fortney, A T Goshaw, W D Walker

Accelerator BNL *Detector* MPS-II

Reactions

$\pi^-\,p \rightarrow n\,K_S\,K_S\,\pi^0$	21 GeV/c
$\pi^-\,p \rightarrow n\,K_S\,K_S\,\eta$	"
$\pi^-\,p \rightarrow n\,K_S\,K_S$	"

Particles studied glueball, $f_1(1420)$, meson^0

Comments A search for new mesons with the goal of determining whether they are ordinary quark states, exotic quark states, or glueballs. Ran for 901 hours. For a description of the apparatus, see the LBL-91 supplement on detectors.

Papers PL 177B (1986) 223.

BNL-771 (Jan 1981) Approved Mar 1981, Oct 1983; Started Apr 1983.

STUDY OF E-MESON CHARACTERISTICS IN π^-p, K^-p, AND $\bar{p}p$ INTERACTIONS

BROOKHAVEN – S U Chung (Spokesperson), R C Fernow, H Kirk, S D Protopopescu, D Weygand
FLORIDA STATE U – D Boehnlein, J H Goldman, V Hagopian, D Reeves
SOUTHEASTERN MASS U – Z Bar-Yam, J Dowd, W Kern, H Rudnicka
INDIANA U – R Crittenden, A Dzierba, T Marshall, S Teague, D Zieminska

Accelerator BNL *Detector* MPS-II

Reactions

$\pi^-\,p \rightarrow K^+\,K_S\,\pi^-\,X$	8 GeV/c
$\pi^-\,p \rightarrow f_1(1420)\,n$	"
$\pi^-\,p \rightarrow \Xi^-\,\pi^+\,\pi^-\,X$	"
$\pi^-\,p \rightarrow \Xi^*(\text{unspec})^-\,X$	"
$K^-\,p \rightarrow K^+\,K_S\,\pi^-\,X$	6 GeV/c
$K^-\,p \rightarrow f_1(1420)\,\Lambda$	"
$K^-\,p \rightarrow \Lambda\,K^-\,\pi^+\,K^0$	"
$K^-\,p \rightarrow \Xi^*(\text{unspec})^0\,K^0$	"
$K^-\,p \rightarrow \Lambda\,K_S\,\pi^-\,K^+$	"
$K^-\,p \rightarrow \Xi^*(\text{unspec})^-\,K^+$	"
$\bar{p}\,p \rightarrow K^+\,K_S\,\pi^-\,X$	5 GeV/c
$\bar{p}\,p \rightarrow f_1(1420)\,\pi^0$	"
$\bar{p}\,p \rightarrow f_1(1420)\,\rho^0$	"
$\bar{p}\,p \rightarrow \bar{p}\,p\,\pi^0$	"

Particles studied $f_1(1420)$, glueball, Ξ^*(unspec), baryonium, strangeonium

Comments An attempt to see if the $f_1(1420)$ is a glueball. For a description of the apparatus, see the LBL-91 supplement on detectors. Approved for 2425 hours, with 1625 hours run as of November 86.

Papers PR D30 (1984) 1409, PRL 55 (1985) 779, and PR D34 (1986) 1960.

BNL-772 (Aug 1981) Approved Feb 1982; Started Apr 1983; Completed May 1983.

SEARCH FOR $\bar{p}n$ BOUND AND RESONANT STATES

SYRACUSE U – I Daftari, A de Guzman, T E Kalogeropoulos (√ Spokesperson), C Petridou, R Venugopal
BROOKHAVEN – H Brown, M Sakitt

CASE WESTERN RESERVE U – R Debbe, W Fickinger, R Marino, K Robinson
BLOOMSBURG U – L Gray
COLUMBIA U – G Tzanakos
LE MOYNE COLL – D Bridges
MARYLAND U – D C Peaslee

Accelerator BNL *Detector* Spectrometer

Reactions

$\bar{p}$ deut → p X	0–650 MeV/c
$\bar{p}$ deut → π^+ X	"
$\bar{p}$ deut → π^- X	"

Particles studied baryonium

Comments Ran for 644 hours.

Papers PRL 56 (1986) 211, PRL 56 (1986) 215, and PL 180B (1986) 313.

BNL-773 (Aug 1981) Approved Feb 1983; Started Apr 1984; Completed Jul 1986.

SEARCH FOR $S = -1$ DIBARYON STATES IN THE Λp MISSING MASS SPECTRUM NEAR THE ΣN THRESHOLD IN THE REACTION $d(K^-,\pi^-)\Lambda p$

BRANDEIS U – J R Bensinger, L Kirsch, H Piekarz (Spokesperson), R Poster
HOUSTON U – R Hackenburg, E V Hungerford, B W Mayes, L S Pinsky
BROOKHAVEN – R Chrien, P Pile, R Sutter
NEW MEXICO U – B Bassalleck
VASSAR COLL – R Stearns
MIT – M Deutsch, J Piekarz
CARNEGIE MELLON U – P Barnes, W Wharton

Accelerator BNL *Detector* Spectrometer

Reactions

K^- deut → π^- Λ p	870 MeV/c

Particles studied dibaryon($S = -1$)

Comments Ran for 1550 hours.

BNL-774 (Aug 1981, Apr 1982) Approved May 1982; Started Apr 1985.

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 → π^+ hypernuc	720 MeV/c

Particles studied hypernuc

Comments A continuation of BNL-752. Approved for 500 hours with 432 hours run as of November 86.

BNL-775 (Aug 1981) Approved Feb 1982; Started Nov 1982; Completed Jan 1983.

NEUTRINO OSCILLATION EXPERIMENTS AT THE AGS TO COVER THE INTERVAL $0.1 < \Delta^2 \sin(2\alpha) < 100$ **eV**^{2}

BROOKHAVEN – L A Ahrens, S H Aronson, P L Connolly, B G Gibbard, M J Murtagh (✓ Spokesperson), S J Murtagh, S Terada, D H White
BROWN U – J Callas, D C Cutts, B Hughlock, R E Lanou
KEK – K Amako, S Kabe
OSAKA U – Y Nagashima, Y Suzuki
PENN U – K Abe, E W Beier, D C Doughty, S M Heagy, M Hurley, A K Mann, H H Williams, T York
SUNY, STONY BROOK – D Hedin, M D Marx, E Stern
UC, IRVINE – R C Allen, H H Chen, A Hahn, K C Weng

Accelerator BNL *Detector* Calorimeter

Reactions

ν_μ → ν_e	0–4 GeV/c

Particles studied ν_μ

Comments For a description of the apparatus, see the LBL-91 supplement on detectors. A $\nu_\mu \rightarrow \nu_e$ oscillation search using a narrow band beam. Ran for 658 hours.

BNL-776 (Sep 1981) Approved Feb 1982; Started Dec 1983; Completed May 1986.

NEUTRINO OSCILLATION EXPERIMENT

BROOKHAVEN – G Bozoki, A Fainberg
COLUMBIA U – M Atiya, C Y Chi, W Lee (Spokesperson), Y Qian, G Tzanakos
ILLINOIS U, URBANA – M Diesburg, E O'Brien, T O'Halloran, K Reardon, J Wiss
JOHNS HOPKINS U – B Barnett, B Blumenfeld, C Chien, L Madansky, J Matthews, A Pevsner
NAVAL RESEARCH LAB, WASH, D C – B Sa'enz, N Seeman

Accelerator BNL *Detector* Combination

Reactions

ν_μ → X	0–7 GeV/c
ν_μ → ν_e	"

Particles studied ν_μ

Comments Studies ν_μ disappearance and $\nu_\mu \rightarrow \nu_e$ oscillations. Ran for 2715 hours.

BNL-777 (Jan 1982) Approved May 1982; Started Feb 1985.

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

BROOKHAVEN – N J Baker, T Erickson, H A Gordon, D M Lazarus, T W Ludlam, V A Polychronakos, P Rehak, M J Tannenbaum
YALE U – P S Cooper, N Hadley, W D Herold, M E Zeller (Spokesperson)
WASHINGTON U, SEATTLE – V Chaloupka, H J Lubatti, J E Rothberg, K K Young
SIN – J Egger, H Kasper

Accelerator BNL *Detector* Spectrometer

Reactions

$K^+ \rightarrow \pi^+ \mu^+ e^-$	6 GeV/c
$K^+ \rightarrow \pi^+ e^+ e^-$	"

Particles studied K^+

Comments Approved for 1300 hours, with 409 hours run as of November 86.

BNL-778 (Apr 1982) Approved Oct 1982; Started Nov 1984; Completed Jun 1985.

STUDY OF NUCLEAR FRAGMENTS PRODUCED FROM p NUCLEUS COLLISIONS IN THE THRESHOLD REGION $1 < P < 28$ GeV/c USING A WARM GAS JET INTERNAL TARGET

PURDUE U – A Bujak, D D Carmony, L J Gutay, A S Hirsch, G Paderewski, N T Porile, C Sangster, R P Scharenberg (✓ Spokesperson), B C Stringfellow

Accelerator BNL *Detector* Spectrometer

Reactions

p nucleus → frag X	1–28 GeV/c

Comments The gas targets are hydrogen and noble gas mixtures. Ran for 1332 hours

Papers NIM A251 (1986) 242.

BNL-779 (Aug 1982) Approved Oct 1982; Started Nov 1982; Completed Sep 1983.

USE OF 28-GeV PROTON EXTERNAL BEAM FOR NUCLEAR SPECTROSCOPY AND NUCLEAR REACTION STUDIES

BROOKHAVEN – Y-Y Chu, S Katcoff (√ Spokesperson)

Accelerator BNL *Detector* Spectrometer

Reactions

p Th	28 GeV/c
p U	"

Comments Studies neutron-rich nuclides below thorium, measuring their γ-ray spectra and determining their level schemes. Ran for 10 hours.

Papers PR C28 (1983) 1379. No other papers expected.

BNL-780 (Sep 1982) Approved Feb 1983; Started May 1985.

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

BROOKHAVEN – R C Larsen, L B Leipuner, W M Morse (Spokesperson)
YALE U – R K Adair, J K Black, H Kasha, M P Schmidt (Spokesperson), C B Schwarz

Accelerator BNL *Detector* ?

Reactions

$K_L \rightarrow$ muon $e^{\pm}$	4–12 GeV/c
$K_L \rightarrow e^+ e^-$	"
$K_L \rightarrow \mu^+ \mu^-$	"

Particles studied K_L

Comments A sensitivity to branching fractions as small as about 10^{-10} is expected. Approved for 1000 hours, with 497 hours run as of November 86.

BNL-781 (Sep 1982) Approved Feb 1983; Started Jan 1984.

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

BROOKHAVEN – S Bart, R E Chrien, M May (Spokesperson), P Pile
MIT – M Deutsch (Spokesperson)
HOUSTON U – E V Hungerford, B Mayes, L Pinsky
CARNEGIE MELLON U – P Barnes
VASSAR COLL – R L Stearns
NEW YORK U – B Budick

Accelerator BNL *Detector* Spectrometer

Reactions

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

Particles studied hypernuc

Comments A continuation of BNL-760. Approved for 1028 hours, with 878 hours run as of November 86.

BNL-782 (Sep 1982) Approved Feb 1983; Started Jul 1984.

SPIN-SPIN EFFECTS IN MEDIUM AND HIGH MOMENTUM TRANSFER ELASTIC pp SCATTERING

MICHIGAN U – R J Bruni, P R Cameron, G R Court, D G Crabb, R L Cummings, I Gialas, F Z Khiari, A D Krisch (√ Spokesperson), A M T Lin, R R Raylman, R S Raymond, T Roser, K M Terwilliger
BROOKHAVEN – K A Brown, G T Danby, Y Y Lee, 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* Counter

Reactions Polarized beam and target

$p\,p \rightarrow p\,p$	13–26 GeV/c

Comments Continues to higher energies studies at Argonne of spin-spin effects. Approved for 700 hours, with 283 hours run as of November 86.

Papers PR D31 (1985) 3017, and PRL 57 (1986) 507.

BNL-785 (Jan 1983) Approved Feb 1983; Started Jul 1984; Completed Feb 1986.

SINGLE SPIN ASYMMETRY MEASUREMENT IN INCLUSIVE $\vec{p}p$ REACTIONS AT BEAM MOMENTA UP TO 24 GeV/c AND HIGH TRANSVERSE MOMENTUM

BROOKHAVEN – D S Barton, G Bunce, A S Carroll, Y I Makdisi (√ Spokesperson)
MINNESOTA U – H Courant, K Heller, S Heppelman, M Marshak, M Shupe (√ Spokesperson)
SOUTHEASTERN MASS U – J J Russell

Accelerator BNL *Detector* Single-arm spectrometer

Reactions Polarized beam

$p\,p \rightarrow \pi^+$ X	24 GeV/c
$p\,p \rightarrow \pi^-$ X	"
$p\,p \rightarrow K^+$ X	"
$p\,p \rightarrow K^-$ X	"
$p\,p \rightarrow p$ X	"

Comments Ran for 624 hours.

BNL-787 (Sep 1983) Approved Oct 1983; Started Jun 1984.

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

BROOKHAVEN – I-H Chiang, R A Johnson, T F Kycia (Spokesperson), K K Li, L S Littenberg, R C Strand
CARNEGIE MELLON U – D Marlow
COLUMBIA U – M S Atiya, R Seto
PRINCETON U – W C Louis, A J S Smith (Spokesperson)
TRIUMF – E Blackmore, D A Bryman, P Kitching, J A McDonald, J-M Poutissou

Accelerator BNL *Detector* Counter

Reactions

$K^+ \rightarrow \pi^+ \nu \bar{\nu}$	0 MeV/c
$K^+ \rightarrow \pi^+$ axion	"
$K^+ \rightarrow \pi^+$ nuino $\overline{\text{nuino}}$	"

Particles studied K^+, axion, nuino

Comments A sensitivity down to a level of about 2×10^{-10} is expected. Approved for 2500 hours, with 172 hours run as of November 86.

BNL-788 (Sep 1983) Approved Oct 1983; Started May 1985.

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

CARNEGIE MELLON U – P D Barnes (√ Spokesperson), G Diebold, G Franklin (√ Spokesperson), R Grace, D Hertzog, C Maher, B Quinn, J Seydoux, J Szymanski
BROOKHAVEN – S Bart, R Chrien, P Pile, R Sutter
HOUSTON U – E V Hungerford, T Kishimoto, L G Tang
NEW MEXICO U – B Bassalleck
VASSAR COLL – R Stearns

Accelerator BNL *Detector* Spectrometer

Reactions

K^- He $\rightarrow \pi^-$ hypernuc	800 MeV/c
K^- ^{6}Li $\rightarrow \pi^-$ hypernuc	"

Particles studied hypernuc

Comments The ^{5}He hypernucleus comes from decay of the ^{6}Li hypernucleus. Measures the lifetimes and branching fractions for the weak processes $\Lambda \rightarrow p\pi^-$, $\Lambda p \rightarrow np$, and $\Lambda n \rightarrow nn$ in the ^{4}He and ^{5}He hypernuclei. Approved for 650 hours, with 156 hours run as of November 86.

BNL-789 (Feb 1984) Approved Feb 1984; Started May 1984; Completed Jun 1985.

SEARCH FOR $\xi(2.22)$ FORMATION IN $\bar{p}p$ INTERACTIONS

NEW YORK U – J H Christenson, E Hummel, G Kreiter, P Nemethy, J Sculli (Spokesperson), M Zuo
BROOKHAVEN – P Yamin

Accelerator BNL *Detector* Wire chamber

Reactions

$\bar{p}\,p \rightarrow K^+\,K^-$	1.2–1.6 GeV/c
$\bar{p}\,p \rightarrow \pi^+\,\pi^-$	"

Particles studied $X(2220)$

Comments Ran for 1829 hours.

BNL-790 (Feb 1984) Approved Feb 1984; Started Apr 1984; Completed May 1984.

NUCLEAR STOPPING POWER MEASUREMENTS WITH 18-GeV/c PROTONS

BROOKHAVEN – D S Barton, G Bunce, A S Carroll, Y Y Chu, J B Cumming, P E Haustein, S Katcoff, T W Ludlam, Y Makdisi, L P Remsberg (Spokesperson)
MINNESOTA U – B Baller, J Blazey, B Collick, H Courant, K Heller, M Marshak, E Peterson, M Shupe, D S Wahl
SOUTHEASTERN MASS U – S Gushue, J Russell

Accelerator BNL *Detector* Single-arm spectrometer

Reactions

p nucleus $\rightarrow p$ X	17 GeV/c

Comments Measures inclusive proton spectra to determine the rate of energy loss of high energy protons traversing nuclear matter. Ran for 144 hours.

BNL-791 (1984) Approved Jun 1984; Started Apr 1985.

STUDY OF VERY RARE K_L DECAYS

UCLA – R D Cousins (Spokesperson), P Melese
LOS ALAMOS – J F Frank, W Kinneson, J W Lillberg, R McKee, Jr , G Sanders
PENN U – W R Molzon (Spokesperson), W D Wales
PRINCETON U – J F Greenhalgh
STANFORD U – G M Irwin, J L Ritchie, S G Wojcicki
TEMPLE U – L B Auerbach, V L Highland, W K McFarlane

Accelerator BNL *Detector* Spectrometer

Reactions

$K_L \rightarrow$ muon $e^{\pm}$	4–20 GeV/c
$K_L \rightarrow \mu^+\,\mu^-$	"
$K_L \rightarrow e^+\,e^-$	"
$K_L \rightarrow \pi^0\,e^+\,e^-$	"
$K_L \rightarrow \pi^0$ muon $e^{\pm}$	"

Particles studied K_L

Comments The first priority is a search for $K_L \rightarrow \mu e$ with a branching-ratio sensitivity of 10^{-12}. Approved for 2500 hours, with 233 hours run as of November 86.

BNL-793 (Aug 1984) Approved Oct 1984.

SEARCH FOR FRACTIONALLY CHARGED NUCLEI IN 15 A GeV SULFUR-OXYGEN COLLISIONS

UC, BERKELEY – P B Price (✓ Spokesperson), M H Salamon

Accelerator BNL *Detector* Plastic

Reactions

Su Pb	15 GeV (E_{lab}/N)

Particles studied quark

Comments Looks for quarks bound to nuclear fragments. Approved for 8 hours, with 2 hours run as of November 86.

BNL-794 (Aug 1984) Approved Oct 1984; Started Mar 1985.

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

MICHIGAN U – P R Cameron, G R Court, D G Crabb, I Gialas, F Z Khiari, A D Krisch (Spokesperson), A M T Lin, G de Muth, R S Raymond, T Roser, K M Terwilliger
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

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

Comments Measures elastic differential cross sections in different initial spin states in the large $p_\perp^2$ region from 6.6 to 8 (GeV/c)^2. Continues studies of BNL-748. Approved for 1200 hours, with 483 hours run as of November 86.

Papers PR D32 (1985) 3070.

BNL-795 (Sep 1984) Approved Oct 1984; Started Feb 1985; Completed May 1985.

MEASUREMENT OF THE IMAGINARY PART OF THE $I = 1$ $\bar{N}N$ S-WAVE SCATTERING LENGTH AT THRESHOLD

BROOKHAVEN – D I Lowenstein
HOUSTON U – M Furic, E Hungerford, T Kishimoto, B Mays, L Pinsky, L Tang, Y Xue
KERNFORSCHUNGSZENTRUM, KARLSRUHE & KARLSRUHE U – S Cierjacks, H Poth
NEW MEXICO U – B Bassalleck
PENN STATE U – T A Armstrong, R A Lewis, W Lochstet, B Y Oh, S M Playfer, G A Smith (✓ Spokesperson), J Whitmore
RICE U – J Buchanan, J Clement, J Kruk, B Moss, G Mutchler, W von Witsch

Accelerator BNL *Detector* Wire chamber

Reactions

$\bar{n}\,p \rightarrow$ annihil	< 1 MeV (T_{lab})

Particles studied baryonium

Comments Measures the product ($\bar{n}$ velocity)*(annihilation cross section) at energies very close to the $\bar{n}p$ threshold. Complimentary to BNL-767. Ran for 1104 hours.

BNL-798 (Sep 1984) Approved Oct 1984.

STUDY OF STRANGENESS IN NUCLEI BY USE OF THE (π^+, K^+) REACTION

BROOKHAVEN – S Bart, R E Chrien, P H Pile (✓ Spokesperson), R J Sutter
CARNEGIE MELLON U – P D Barnes, G Diebold, G B Franklin, D Herzog, J Seydoux, J Symanski
FLORIDA STATE U – H Plendl
HOUSTON U – E V Hungerford, T Kishimoto
LOS ALAMOS – J F Amann, T S Bhatia, J A McGill, E C Milner, J C Peng (✓ Spokesperson), R Silbar, H A Thiessen
RUTGERS U – C Glashausser
TEXAS U – M Barlett, G W Hoffman
TRIUMF – D Gill
VASSAR COLL – R L Stearns

Accelerator BNL *Detector* Spectrometer

Reactions

π^+ nucleus $\rightarrow K^+$ hypernuc	1.05 GeV/c
π^+ deut $\rightarrow K^+$ dibaryon($S = -1$)	"

Particles studied hypernuc, dibaryon($S = -1$)

Comments Extends measurements of BNL-758. Approved for 600 hours.

BNL-801 (Sep 1984) Approved Oct 1984.

A SEARCH FOR QUARKS PRODUCED IN HEAVY-ION MERCURY INTERACTIONS

SAN FRANCISCO STATE U – R W Bland, S Dickson, C L Hodges (✓ Spokesperson), R Johnson, M Lindgren, M Savage

Accelerator BNL *Detector* Other

Reactions

Su Hg	15 GeV (E_{lab}/N)
O Hg	"

Particles studied quark

Comments Quarks produced in collisions of oxygen and sulfur with a mercury target are stopped in the target, which then is distilled and run through an automated Millikan-type device. Quarks are also stopped in a liquid argon tank and collected electrostatically, then dissolved in mercury for the Millikan apparatus. Approved for 72 hours. Runs in late 1986.

BNL-802 (Sep 1984) Approved Oct 1984.

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

BROOKHAVEN – D Alburger, P D Bond, C Chasman, Y Y Chu, J B Cumming, J M van Dijk, E Duek, O Hansen (Spokesperson), P Haustein, S Katcoff, M J LeVine, T Ludlam, J Olness, A Pfoh, L P Remsberg, A Shor, A Sunyar, M Tanaka, M J Tannenbaum, P Thieberger, P Vincent, H Wegner
HIROSHIMA U – T Sugikate
LBL – D Greiner, T Mulera, V Perez-Mendez
MIT – H A Enge, L Grodzins, R J Ledoux, S G Steadman, D Woodruff
TOKYO U – Y Akiba, H Hamagaki, O Hashimoto, S Homma, Y Miake, S Nagamiya (Spokesperson)

Accelerator BNL *Detector* Single-arm spectrometer

Reactions

^{32}Su nucleus → charged X	—
^{16}O nucleus → charged X	—

Comments Aims to establish effective temperatures in hard nucleus-nucleus conditions and to measure particle production cross sections. Measures inclusive spectra of $\pi^{\pm}$, $K^{\pm}$, $p^{\pm}$ under well-defined, variable trigger conditions. Approved for 1000 hours, with 322 hours run as of November 86.

BNL-804 (Aug 1984) Approved Oct 1984.

SEARCH FOR FRACTIONAL CHARGE WITH HEAVY ION BEAMS AT THE BROOKHAVEN AGS

INDIANA U – S P Ahlen (Spokesperson)
MICHIGAN U – G Tarle (Spokesperson)

Accelerator BNL *Detector* Plastic

Reactions

Su nucleus	15 GeV (E_{lab}/N)

Particles studied quark

Comments Approved for 8 hours, with 2 hours run as of November 86.

BNL-805 (Dec 1984) Approved Mar 1985.

A SEARCH FOR GALACTIC AXIONS

ROCHESTER U – A C Melissinos (Spokesperson), J Rogers, W Wuensch
BROOKHAVEN – H Halama, A Prodell, P Thompson
FERMILAB – W-B Fowler

Accelerator COSM *Detector* Other

Particles studied axion

Comments A search for a light-mass axion through its electromagnetic conversion to a photon in the presence of a strong static field. Uses a high-field large-aperature solenoid and microwave detection apparatus.

BNL-806 (Dec 1984) Approved Mar 1985.

NUCLEAR FRAGMENTATION IN HEAVY ION COLLISIONS AT 15 GeV/amu

SIEGEN U – C Brechtmann, J Dreute, W Heinrich (√ Spokesperson)

Accelerator BNL *Detector* Plastic

Reactions

^{32}Su nucleus	15 GeV (T_{lab}/N)

Particles studied frag

Comments Measures the cross sections for the production of beam fragments with charges greater than six and the emission angles of fragments, and searches for anomalously short mean free paths. Approved for 10 hours, with 1 hour run as of November 86.

BNL-808 (Feb 1985) Approved Mar 1985.

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

CRACOW – R Holynski, A Jurak, B Wilczynska, H Wilczynski, W Wolter, B Wosiek, K Wozniak
LOUISIANA STATE U – W V Jones, A Olszewski
MINNESOTA U – P S Freier, C J Waddington (√ Spokesperson)

Accelerator BNL *Detector* Emulsion

Reactions

^{16}O nucleus	15 GeV (T_{lab}/N)
^{32}Su nucleus	"
^{197}Au nucleus	"

Comments A search for evidence for a quark-gluon plasma. Uses chambers. Approved for 40 hours. The ^{16}O exposure was completed November 86.

BNL-810 (Jan 1985) Approved Mar 1985.

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, N Y – S J Lindenbaum (√ Spokesperson)
CITY COLL, N Y – C Chan, M A Kramer
JOHNS HOPKINS U – P Halman, L Madansky

Accelerator BNL *Detector* MPS

Reactions

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

Comments Searches for anomalous behavior in rapidities, multiplicities, strangeness enhancements, transverse momenta, energy flows, etc. Targets are carbon, sulfur, and gold. The tracking and momentum analysis of most of the charged particles emitted in individual events permit a very sensitive search for anomalous phenomena such as a quark-gluon plasma. Approved for 1650 hours, with 9 hours run as of November 86.

BNL-811 (Jan 1985) Approved Mar 1985, Jun 1986.

RADIATIVE KAON CAPTURE AND HYPERON WEAK RADIATIVE DECAY

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

Accelerator BNL *Detector* Counter

Reactions

$K^- p \rightarrow \Lambda \gamma$	0 MeV/c
$K^- p \rightarrow \Sigma^0 \gamma$	"

Particles studied Λ, Σ^+

Comments Measures the above reactions for stopping K^- and the weak radiative decays of the Λ and Σ^+. Approved for 1550 hours, with 356 hours run as of November 86.

BNL-813 (Jan 1985) Approved Mar 1985.

SEARCH FOR A STRANGENESS −2 DIBARYON

CARNEGIE MELLON U – P D Barnes (√ Spokesperson), G Diebold, G Franklin (√ Spokesperson), D Hertzog, B Quinn, J Seydoux, J Szymanski, C Yi
BROOKHAVEN – S Bart, R Chrien, P Pile, R Sutter
ERLANGEN U – W Eyrich, A Hofmann
FREIBURG U – J Franz, N Hamann, E Roessle, H Schmitt
HOUSTON U – E V Hungerford
NEW MEXICO U – B Bassalleck
PITTSBURGH U – S Dytman
SACLAY – P Birien
VASSAR COLL – R L Stearns

Accelerator BNL *Detector* Spectrometer, Counter

Reactions

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

Particles studied dibaryon($S = -2$)

Comments Covers from about 100 MeV below to 20 MeV above the $\Lambda\Lambda$ mass. Approved for 1000 hours, but the experiment is conditional on the building of a new beam line. See also BNL-836 for a search in the reaction K^- ^{3}He $\rightarrow K^+$ dihyperon N.

BNL-814 (Feb 1985) Approved Nov 1985.

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

BROOKHAVEN – M Fatyga, R Hogue, D Lissauer, T Ludlam, L Olsen, V Polychronakos, I Stumer
CEBAF – V Burkert
CERN – W J Willis
LOS ALAMOS – J Boissevain, N J DiGiacomo, A Gavron, H Van Hecke, B V Jacak, P L McGaughey, W E Sondheim, J W Sunier
MICHIGAN STATE U – M Maier
NEW MEXICO U – B Bassalleck, J Hall, N Kominos, D Wolfe
PITTSBURGH U – W Cleland, J Saladin, J Thompson
SUNY, STONY BROOK – P Braun-Munzinger (√ Spokesperson), P Paul, J Stachel, T Throwe, L Waters
TEL AVIV U – O Benary, S Dagan, Y Oren
YALE U – B Shivakumar

Accelerator BNL *Detector* Spectrometer, Calorimeter

Reactions

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

Comments 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. Approved for 1200 hours. Scheduled to take test data in Spring 87 and to complete setting up in Summer 88.

BNL-815 (1985) Approved Mar 1986.

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

RAJASTHAN U – K B Bhalla, V Kumar, S Lokanathan
WASHINGTON U, SEATTLE – T H Burnett, J J Lord, R J Wilkes (√ Spokesperson)
MARBURG U – E Ganssauge
LUND U – S Garpman, B Jakobsson, L Karlsson, B Noren, I Otterlund (√ Spokesperson), S Persson, K Soederstroem, E Stenlund
OTTAWA U – C J D Hebert
NATIONAL RESEARCH COUNCIL, OTTAWA – B Judek
JAMMU U – L Mangotra, N K Rao
BEIJING, IHEP – P Y Zheng
SHANXI NORMAL U – J F Sun
TASHKENT, FTI – S A Asimov, G M Chernov, K G Gulamov, G Guliamov, W S Nawotny
HUA-ZHONG NORMAL U – X Cai, L S Lian
LEBEDEV INST – M I Tretyakova
GRENOBLE, CEN – F Schussler

Accelerator BNL *Detector* Emulsion

Reactions

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

Comments Uses emulsion chambers with lead calorimeters as well as emulsion stacks. Studies pseudo-rapidity density distributions, density fluctuations, multiplicity and angular distributions, production cross sections, etc. Approved for 26 hours.

BNL-816 (May 1985) Approved Jun 1985; Completed 1986.

SEARCH FOR NEUTRINO OSCILLATIONS

BROOKHAVEN – M J Murtagh, D H White
CERN – C Detraz, M Ferro-Luzzi, J M Perreau
PARIS, CURIE UNIV VI – P Astier, J Chauveau, J Dumarchez, F Kovacs, A Letessier, J M Levy, Y Pons, A M Touchard, F Vannucci (√ Spokesperson)
BOSTON U – G Bernardi, T Chrysicopoulou, J Stone

Accelerator BNL *Detector* Calorimeter

Reactions

$\nu_\mu \rightarrow \nu_e$	< 4 GeV/c

Comments A repeat of CERN-PS-191 with 20 times more statistics. Uses a fine-grained calorimeter.

BNL-817 (Jun 1985)

POLARIZATION TRANSFER IN HYPERON PRODUCTION

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

Accelerator BNL *Detector* MPS

Reactions Polarized beam

p Be $\rightarrow \Lambda$ X	22 GeV/c

Comments Has run for 404 hours as of November 86, with a request for 400 more hours deferred.

Papers PRL (submitted).

BNL-818 (1985) Approved Mar 1986.

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

BROOKHAVEN – S U Chung (Spokesperson)
INDIANA U & SOUTHERN MISSISSIPI U & RICE U – et al.

Accelerator BNL *Detector* MPS

Reactions

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

Particles studied exotic-meson

Comments Looks for a resonance in the $f_1(1285)\pi^-$ system. Approved for 1000 hours.

BNL-820 (1985) Approved Nov 1985.

SEARCH FOR $S = -1$ DIBARYON RESONANCE (D_S) IN THE MASS REGION 2050–2130 MeV USING THE REACTION ^{3}He$(K^-, \pi^+)nD_S$

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

Accelerator BNL *Detector* Spectrometer

Reactions

K^- ^{3}He $\rightarrow$ π^+ n dibaryon$(S = -1)$	870 MeV/c

Particles studied dibaryon$(S = -1)$

Comments Approved for 600 hours.

BNL-821 (Sep 1985, Sep 1986) Approved Nov 1986.

A NEW PRECISION MEASUREMENT OF THE MUON G-2 VALUE AT THE LEVEL OF 0.35 PPM

BOSTON U – E Hazen, C Heisey, B Kerosky, F Krienen, D Magaud, E K McIntyre, J P Miller, B L Roberts, D Stassinopoulos, L R Sulak, W Worstell
BROOKHAVEN – H N Brown, E D Courant, G T Danby, C R Gardner, J W Jackson, M May, A Prodell, R Shutt, P A Thompson
CITY COLL, N Y – M S Lubell
COLUMBIA U – A M Sachs
CORNELL U – T Kinoshita
HEIDELBERG U, PHYS INST – G zu Putlitz
LOS ALAMOS – W P Lysenko
MICHIGAN U – W Williams
MISSISSIPPI U – J T Reidy
SHEFFIELD U – F Combley
TOKYO U – K Nagamine
YALE U – S K Dhawan, A A Disco, F J M Farley, V W Hughes (Spokesperson), Y Kuang, H Venkateramania

Accelerator BNL *Detector* Calorimeter

Reactions Polarized beam

muon $\rightarrow$ $e^{\pm}$ ν $\overline{\nu}$	3.09 GeV/c

Particles studied muon

Comments Uses a 7-m-radius muon storage ring with a 1.47-tesla vertical field. Approved, with the number of hours still to be decided (December 86).

BNL-825 (Oct 1985) Approved Nov 1985.

RADIOCHEMICAL STUDIES OF ULTRARELATIVISTIC NUCLEAR COLLISIONS

OREGON STATE U – C Casey, W Loveland (√ Spokesperson)
LBL – G T Seaborg
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)
^{32}Su nucleus	"

Particles studied frag

Comments Targets are copper, silver, and gold. Induced radioactivities are determined by off-line γ spectroscopy. Investigates evidence for a quark-gluon plasma. Approved for 48 hours, with 37 hours run as of November 86.

BNL-826 (Dec 1985) Approved Mar 1986.

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

SAGA UNIV, JAPAN – H Itoh (√ Spokesperson)
TOHOKU U – M Chida, T Hayashino, Y Yamamoto
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 *Detector* Emulsion

Reactions

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

Comments Uses emulsion chambers in a 2-tesla magnetic field. A search for evidence for a quark-gluon plasma, etc. Approved for 10 hours. Scheduled to run May 87.

BNL-828 (Jan 1985) Approved Mar 1986.

SEARCH FOR η-MESIC NUCLEUS WITH THE (π^+, p) REACTION AT 0.85 GeV/c

LOS ALAMOS – B J Dropesky, R J Estep, G C Giesler, L C Liu (√ Spokesperson)
WILLIAM AND MARY COLL – M Finn, H Funsten (√ Spokesperson), C F Perdrisat
BROOKHAVEN – S Bart, R E Chrien (√ Spokesperson), P H Pile, R J Sutter, T E Ward
GEORGE MASON U – B J Lieb
RUTGERS U – R D Ransome
HOUSTON U – T Kishimoto
VASSAR COLL – R L Stearns
VIRGINIA TECH – C E Stronach

Accelerator BNL *Detector* Spectrometer

Reactions

π^+ nucleus $\rightarrow$ p X	0.85 GeV/c

Comments The targets are lithium, carbon, oxygen, and magnesium. Investigates a prediction of strongly bound systems of the η meson and nuclei. Approved for 120 hours.

BNL-829 (Jan 1986) Approved 1986.

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 Hoffman
VASSAR COLL – R L Stearns

Accelerator BNL *Detector* HYPERSPEC

Reactions

K^- ^{3}He $\rightarrow$ π^- X	715 MeV/c

Particles studied hypernuc

Comments Searches for a Λpp bound state. Later may search for a Λnn state in K^- ^{3}He $\rightarrow$ π^+X. Approved for 16 hours.

BNL-834 (Jan 1986) Approved Mar 1986.

STUDY OF HADRONIC HARD SCATTERING WAVE FUNCTIONS USING ELASTIC SCATTERING INSIDE NUCLEI

BROOKHAVEN - D S Barton, G M Bunce, A S Carroll (√ Spokesperson), S Gushue, Y I Makdisi
MINNESOTA U - H Courant, G Y Fang, K J Heller, S Heppelmann (√ Spokesperson), M L Marshak, E A Peterson, K Ruddick, M A Shupe
SOUTHEASTERN MASS U - J J Russell

Accelerator BNL *Detector* Spectrometer

Reactions

$\pi^- p \rightarrow \pi^- p$	10 GeV/c

Comments Studies elastic $\pi^- p$ scattering from protons in nuclei as a function of A. Approved for 800 hours. Scheduled to run December 86.

BNL-835 (Apr 1986) Approved Jun 1986.

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

TEL AVIV U - J Alster, D Ashery, J Lichtenstadt, M A Moinester, I Navon, E Piasetzky (√ Spokesperson), A Rahav, I Yavin
BROOKHAVEN - S Bart, R E Chrien (√ Spokesperson), M May, P H Pile, R J Sutter

Accelerator BNL *Detector* Counter

Reactions

K^+ deut	550–800 MeV/c
K^+ nucleus	"

Comments Measures the ratio of K^+ nucleus to $K^+ d$ total cross sections to search for evidence for nucleon swelling in nuclei. Targets are light nuclei with $N = Z$. Approved for 330 hours.

BNL-836 (May 1986) Approved Jun 1986.

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

CARNEGIE MELLON U - P D Barnes (Spokesperson), G Diebold, G Franklin (Spokesperson), D Hertzog, B Quinn, J Seydoux, J Szymanski, C Yi
BROOKHAVEN - S Bart, R Chrien, P Pile, R Sutter
ERLANGEN U - W Eyrich, A Hofmann
FREIBURG U - J Franz, N Hamann, E Roessle, H Schmitt
HOUSTON U - E V Hungerford
NEW MEXICO U - B Bassalleck
PITTSBURGH U - S Dytman
SACLAY - P Birien
VASSAR COLL - R L Stearns

Accelerator BNL *Detector* Spectrometer

Reactions

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

Particles studied dibaryon($S = -2$)

Comments See also BNL-813 for a search in the reaction $\Xi^- d \rightarrow$ dihyperon n. Approved for 700 hours.

BNL-838 (Oct 1986) Approved Nov 1986.

90° EXCLUSIVES AT 6 GeV

BROOKHAVEN - D S Barton, G Bunce (Spokesperson), A S Carroll, Y I Makdisi
MINNESOTA U - H Courant, K J Heller, S Heppelmann, M L Marshak, M A Shupe
SOUTHEASTERN MASS U - J J Russell (Spokesperson)

Accelerator BNL *Detector* Double-arm spectrometer

Reactions

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

Comments Continues studies of BNL-755 to a lower momentum, where the cross sections are larger. The apparatus is a single-arm spectrometer and a nonmagnetic arm. Approved for 500 hours.

CERN-EMU-001 (Apr 1984) Approved Nov 1984.

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

BEIJING, IHEP - P Y Zheng
RAJASTHAN U - K B Bhalla, V Kumar, S Lokanathan
WASHINGTON U, SEATTLE - T H Burnett, J J Lord, R J Wilkes
LBL - E Friedlander, H H Heckman, Y J Karant, P J Lindstrom
LUND U - S Garpman, B Jakobsson, L Karlsson, B Noren, I Otterlund (√ Spokesperson), S Persson, K Soderstrom, E Stenlund
OTTAWA U - C J D Hebert, J Hebert
NATIONAL RESEARCH COUNCIL, OTTAWA - B Judek
JAMMU U - L Mangotra, N K Rao
SHANXI NORMAL U - J F Sun
TASHKENT, FTI - S A Asimov, G M Chernov, K G Gulamov, G Guliamov, W S Nawotny
HUA-ZHONG NORMAL U - X Cai, L S Lian
LEBEDEV INST - M I Tretyakova
GRENOBLE, CEN - F Schussler
MARBURG U - E Ganssauge

Accelerator CERN-SPS *Detector* Emulsion

Reactions

^{16}O nucleus	13–200 GeV (E_{lab}/N)

Comments In preparation (November 86).

CERN-EMU-002 (May 1984) Approved Nov 1984.

SEARCH FOR FRACTIONALLY CHARGED NUCLEI IN HIGH-ENERGY OXYGEN-LEAD COLLISIONS

UC, BERKELEY - P B Price (√ Spokesperson)
CERN - G Vanderhaeghe

Accelerator CERN-SPS *Detector* Plastic

Reactions

^{16}O Pb	200 GeV (E_{lab}/N)
Su Pb	"
Ca Pb	"

Particles studied quark

Comments A 1-cm thick lead sheet followed by 10 sheets of CR-39, the whole pattern being repeated then nine more times. In preparation (November 86).

CERN-EMU-003 (Oct 1984) Approved Nov 1984.

INTERACTIONS OF ^{16}O PROJECTILE AND ITS FRAGMENTS IN NUCLEAR EMULSION AT ABOUT 60 AND 200 GeV/NUCLEON

CAIRO U - O E Badawy (Spokesperson), A El-Hamalawy, M El-Nadi, M El-Nagdy, A El-Shawarby, A El-Sourogy, M T Ghoneim, Z Moharram, M Mossaad, A Moussa, N Moussa, Z A Moussa, O Osman, N Rashid, M Riad, N M Sadek

Accelerator CERN-SPS *Detector* Emulsion

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

Particles studied anomalon

Comments In preparation (November 86).

CERN-EMU-004 (Oct 1985) Approved Feb 1986.

MEASUREMENT OF COULOMB CROSS SECTION FOR PRODUCTION OF DIRECT ELECTRON PAIRS BY HIGH ENERGY IONS AT THE CERN SPS

ALABAMA U, HUNTSVILLE – J C Gregory, T Hayashi
BOSTON U – S P Ahlen, A Marin
MICHIGAN U – J A Musser, G Tarle
NASA, MARSHALL – J H Derrickson, P B Eby, W F Fountain, T A Parnell (Spokesperson), F E Roberts, Y Takahashi, J W Watts
TOKYO U – S Dake, T Ogata, T Tabuki, T Tominaga

Accelerator CERN-SPS *Detector* Emulsion

Reactions
^{16}O nucleus → e^+ e^- X 60, 200 GeV (T_{lab}/N)

Comments Aims to establish cross sections for use in measuring energies of very high energy cosmic rays. In preparation (November 1986).

CERN-EMU-005 (Oct 1985) Approved Feb 1986.

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

ALABAMA U, HUNTSVILLE – J C Gregory, T Hayashi
NASA, MARSHALL – J H Derrickson, P B Eby, W F Fountain, T A Parnell, F E Roberts, Y Takahashi (Spokesperson), J W Watts
TOKYO U – S Dake, M Fuki, O Miyamura, S Nagamiya, T Ogata, T Tabuki

Accelerator CERN-SPS *Detector* Emulsion

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

Comments 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. In preparation (November 1986).

CERN-EMU-006 (Mar 1986) Approved Jun 1986; Completed Oct 1986.

STUDY OF THE PRODUCTION MECHANISMS AND DECAY PROPERTIES OF CHARMED PARTICLES OBSERVED IN NUCLEAR EMULSION COUPLED TO THE NA14 SPECTROMETER

BOLOGNA U & INFN, BOLOGNA – A Forino, R Gessaroli, A Quareni-Vignudelli, F Viaggi
CERN – G Vanderhaeghe
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Accelerator CERN-SPS *Detector* Emulsion, Spectrometer

Reactions
γ nucleus → charm X 70–200 GeV/c

Particles studied Λ_c^+, charm

Comments A hybrid experiment, using the particle identification power and microstrip vertex detector of the NA-14 spectrometer to speed and enrich the detection of charmed particles.

CERN-IS-010 (1982) Approved Apr 1982.

DETERMINATION OF THE ν_e MASS FROM EXPERIMENTS ON ELECTRON-CAPTURE BETA DECAY (EC)

AARHUS U – J U Andersen, P G Hansen, E Laegsgaard, K Riisager
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RISO NATIONAL LAB. DENMARK – B Elbek, P Knudsen, J Pedersen
LUND U – H A Gustafsson
ZFK, ROSSENDORF – G J Beyer
MADRID, CONSEJO SUPERIOR – M J G Borge

Accelerator CERN-SC *Detector* ?

Particles studied ν_e

Comments Measures the shape of the internal bremsstrahlung spectrum in electron capture near its upper end point. Uses ^{193}Pt, ^{163}Ho, and ^{81}Kr. Taking data (November 86).

CERN-LEP-ALEPH (1982) Approved Nov 1982.

THE ALEPH DETECTOR

ALEPH COLLABORATION

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HEIDELBERG U, IHEP – O Braun, R Brazioli, C Geweniger, P Hanke, V Hepp, E E Kluge, M Panter, H Plothow-Besch, B Rensch, K Tittel
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LANCASTER U – C Bowdery, A Finch, F Foster, G Hughes, T Sloan
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MAINZ U, INST PHYS – L Bauerdick, G Hubricht, K Kleinnecht, J Knobloch, E Mueller, D Pollmann, B Renk, J Richstein, K Schmitz

MARSEILLE U, LUMINY – J P Albanese, J J Aubert, R Bazzoli, M Belliard, C Benchouk, A Bonissent, G D'Agostini, A Ealet, F Etienne, Y Gally, V Mallet, R Nacasch, P Payre, B Pietrzyk
MUNICH, MAX PLANCK INST – W Blum, M Bosman, H Brettel, M Comin, H Dietl, P Holl, G Lutjens, G Lutz, W Maenner, R Richter, R Settles, U Stiegler, U Stierlin, G Stimpfl, W Tribanek, P K Weissbach
ORSAY, LAL – G De Bouard, O Callot, A Cordier, M Davier, S Dugeay, D Fournier, J F Grivaz, P Heusse, J Lefrancois, A M Lutz, G Rahal-Callot, G Raso, J J Veillet
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PISA U – S R Amendolia, G Bagliesi, G Batignani, A Bigi, L Bosisio, U Bottigli, P L Braccini, C Bradaschia, F Fidecaro, L Foa, E Focardi, F Forti, M Giorgi, A Lusiani, I Mannelli, G Pierazzini, G Sanguinetti, S Scapellato, R Tenchini, G Tonelli, G Triggioni
ROYAL HOLLOWAY COLL – E H Bellamy, M G Green, M Landon, P V March, A McKemey, T Medcalf, M Saich, J R Strong
RUTHERFORD – D R Botterill, R Clifft, M Edwards, S M Fisher, J Harvey, P Norton, J C Thompson, B J Whittaker
SACLAY – P Bloch, H Desportes, D Lloyd-Owen, S Loucatos, P Perez, F Perrier, B Peyaud, B Pignard, J Rander, J F Renardy, J P Schuller, B Vallage
SHEFFIELD U – F Combley, C Wells, S Wheeler
SIEGEN U – D Arnold, S Brandt, H Burkhardt, C Grupen, M Holder, H Meinhard, H J Meyer, E Neugebauer, M Rost, R Stuecher, K H Stupperich
TRIESTE U – M Budinich, F Liello, E Milotti, L Rolandi
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Accelerator CERN-LEP *Detector* ALEPH

Reactions
$e^+ e^-$ < 120 GeV (Ecm)

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

Comments A 4π detector designed to give as much detailed information as possible about complex events. For a description of the apparatus, see the LBL-91 supplement on detectors. In preparation.

Papers NIM 225 (1984) 481, and NIM 226 (1984) 82.

CERN-LEP-DELPHI (1982) Approved Nov 1982.

DELPHI

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DUBNA – G D Alekseev, P N Bogolubov, Yu N Denisov, V M Golovatyuk, R B Kadyrov, V V Kruglov, G V Mitselmakher, J Rydky, A N Sissakian, L G Tkachov, E N Tsyganov, A A Tyapkin, I A Tyapkin, A S Vodopyanov, V Vrba
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SERPUKHOV – A A Borovikov, V V Bryzgalov, P Chliapnikov, R I Dzhelyadin, A Fenjuk, L N Gerdyukov, S A Gumenyuk, V V Lapin, V F Obraztsov, Yu L Petrovykh, N E Tyurin, E V Vlasov, A P Vorobiev, A M Zajtsev
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Accelerator CERN-LEP *Detector* DELPHI

Reactions
$e^+ e^-$ < 120 GeV (Ecm)

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

Comments For a description of the apparatus, see the LBL-91 supplement on detectors. In preparation.

Papers NIM 225 (1984) 606.

CERN-LEP-L3 (1982) Approved Nov 1982.

L3 EXPERIMENT

L3 COLLABORATION

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SIEGEN U – U Biermann, D Mattern, E Roderburg, H Walenta
YALE U – M Zeller
BERLIN, DAW – K Deiters, M Klein, R Leiste, W D Nowak, J Schreiber, H Vogt
ZURICH, ETH – H Anderhub, P Le Coultre, J Fehlmann, H Hofer, M G Jongmanns, P Lecomte, L Li, X Lue, M Pohl, D Ren, P G Seiler, H Suter, V L Telegdi, J Ulbricht, G Viertel

Accelerator CERN-LEP *Detector* L3

Reactions
$e^+ e^-$ < 120 GeV (Ecm)

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

Comments For a description of the apparatus, see the LBL-91 supplement on detectors. In preparation.

Papers NIM 225 (1984) 493.

CERN-LEP-OPAL (1982) Approved Nov 1982.

OPAL COLLABORATION LEP

OPAL COLLABORATION

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SACLAY – P Le Du, B Gandois, F X Gentit, B Lesquoy, J Mallet, A Muller, P Rougevin, S Zylberajch
TEL AVIV U – G Alexander, G Bella, J Grunhaus, A Levy
TOKYO U – C Fukunaga, M Imori, T Kawamoto, T Kobayashi, M Koshiba, T Mashimo, M Minowa, M Nozaki, S Orito, H Takeda, T Takeshita

Accelerator CERN-LEP *Detector* OPAL

Reactions

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

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

Comments A general-purpose detector. For a description of the apparatus, see the LBL-91 supplement on detectors. In preparation.

CERN-NA-001 Approved Mar 1975, Oct 1976, Jun 1982; Completed Jun 1984.

MEASUREMENT OF THE PHOTOPRODUCTION OF VECTOR AND SCALAR BOSONS

FRASCATI – F Celani, M Enorini, F L Fabbri, P Laurelli, L Satta, P Spillantini, A Zallo
MILAN U – G Bellini, S Bonetti, P F Manfredi, D Menasce, E Meroni, L Moroni, L Perasso, S Sala
PISA U – S R Amendolia, E Bertolucci, D Bettoni, L Bosisio, C Bradaschia, M Dell'Orso, L Foa (Spokesperson), E Focardi, A Giazotto, M Giorgi, P S Marrocchesi, A Menzione, L Ristori, A Scribano, R Tenchini
TURIN U – G A Beck, H Bilokon, G Bologna, G Mannocchi, B D'Ettorre Piazzoli, P Picchi
TRIESTE U – G Batignani, M Budinich, F Liello, F Ragusa, L Rolandi, A Stefanini
WESTFIELD COLL – E H Bellamy, F Fidecaro, G Heath, M J Landon, P V March, J R Strong

Accelerator CERN-SPS *Detector* Spectrometer

Reactions

γ nucleon → meson hadrons	10–180 GeV/c
γ nucleus → meson nucleus	"

Particles studied η', $\eta_c(2980)$, D^+, D^-

Comments Measurement of coherent photoproduction on nuclei to study (1) photoproduction of charmed particle pairs and determine the lifetimes of charmed particles, and (2) the spectroscopy of charmed particles in hadronic and radiative decay channels.

Papers PL 110B (1982) 339, NIM 196 (1982) 351, NIM 204 (1983) 299, NIM 226 (1984) 78, and NIM 226 (1984) 117.

CERN-NA-002 (Jul 1974) Approved Mar 1975, Oct 1976, Feb 1979; Completed Aug 1985.

ELECTROMAGNETIC INTERACTIONS OF MUONS

THE EUROPEAN MUON COLLABORATION
AACHEN, TECH HOCHSCH, III PHYS INST – G Berghoff, M Dueren, F J Hasert, D Lanske, K Schultze, L Urban
ANNECY – Y Bertsch, G Coignet, J Favier
CERN – J W Beaufays, P Grafstrom, T Niinikoski, A M Osborne, J M Rieubland, E J Watson, S Wimpenny
FREIBURG U – T Dreyer, T Ernst, J Haas, H Hartenthaler, H Jung, E M Kabuss, G Kroesen, U Landgraf, W Mohr, K Rith, A Schlagboehmer, T Schroeder, H E Stier, E Tieck, W Wallucks
HAMBURG U – J Figiel, C Hoppe, F Janata, H Schiemann, M Studt, A De La Torre
HEIDELBERG, MAX PLANCK INST – D von Harrach, H Kniess, B Povh, T A Shibata, T Walcher
LANCASTER U – I Bird, J Coughlan, N Dyce, T Sloan (√ Spokesperson)
LIVERPOOL U – S Brown, G R Court, D Frances, E Gabathuler, R Gamet, P Hayman, J R Holt, T Jones, M Matthews
MARSEILLE U, LUMINY – J J Aubert, C Benchouk, G D'Agostini, F Montanet, P Payre, B Pietrzyk
MONS U – R Windmolders
OXFORD U – N Geddes, V Gibson, J Gillies, J Loken, P Renton, G Taylor, W S C Williams, J Womerseley
RUTHERFORD – J Alner, C P Bee, D Botterill, S Chima, R Clifft, M Edwards, R Gray, P R Norton, G Oakham, J C Thompson
SHEFFIELD U – F Combley, J Foster, D Salmon, S Wheeler
TURIN U – M Arneodo, M I Ferrero, P Guibellino, S Maselli, C Peroni, A Staiano
UPPSALA U – A Arnidson, H Calen, S Dahlgren, E Hagberg, S Kullander, F Lettenstrom, T Lindquist
WARSAW U, IEP – B Badelek, J Ciboroski, J Gajewski, J Nassalski, E Rondio, A Sandacz
WUPPERTAL U – K H Becks, J Drees, A Edwards, H Forsbach, K Hamacher, B Korzen, N Pavel, H Peschel, U Pietrzyk, A Schneider, W Stockhausen, H Wahlen
YALE U – G Baum, S Dhawan, V Hughes, R Oppenheim, V Papavassiliou, M C Caputo di Piegaia, R Piegaia, P Schueler
BONN U – M Leenen
BUDAPEST, CRIP – G Eszes, G Jancso, E Nagy, P Ribarics, J Toth, L Urban

Accelerator CERN-SPS *Detector* EMC

Reactions

$\mu^- p \rightarrow \mu^-$ hadrons	120–280 GeV/c

Comments See also NA-009 and NA-028. Studies deep-inelastic muon scattering. For a description of the apparatus, see the LBL-91 supplement on detectors.

Papers See NA-028 for papers.

CERN-NA-003 (Oct 1974, Sep 1980) Approved Mar 1975, Feb 1979, May 1979, Dec 1979, Nov 1980, Mar 1984; Completed Sep 1984.

DIRECT PHOTON PRODUCTION IN HADRON-HADRON COLLISIONS AT THE SPS.

CERN – M Hansroul, A Michelini (Spokesperson), G Rahal-Callot, O Runolfsson
COLLEGE DE FRANCE – M Crozon, P Delpierre, P Espigat, J Maillard, A Tilquin
ORSAY, LAL – M Bardadin-Otwinowska, J Boucrot, O Callot, M Cohen, D Decamp, M Moniez
ECOLE POLYTECHNIQUE – J Badier, H Bienvenue, J Bourotte, Y Karyotakis, E Pare, S Weisz
PISA U & INFN, PISA – C Bemporad, A M Cnops, F Costantini, G R Giannini, P Lariccia
SACLAY – P Charpentier, J F Detoeuf, P Le Du, B Gandois

Accelerator CERN-SPS *Detector* Spectrometer

Reactions

π^+ nucleus $\rightarrow \gamma$ X	150, 200, 280 GeV/c
π^+ nucleus $\rightarrow \mu^+ \mu^-$ X	"
π^- nucleus $\rightarrow \gamma$ X	"
π^- nucleus $\rightarrow \mu^+ \mu^-$ X	"
p nucleus $\rightarrow \mu^+ \mu^-$ X	400 GeV/c

Comments Aims are (1) a measurement of the direct γ cross section and a search for the annihilation process $q\bar{q} \rightarrow \gamma g$ from the charge asymmetry, (2) a determination of the gluon structure function of the pion and nucleon, and (3) use of the π^-/π^+ difference on carbon to get the gluon fragmentation from the γ-hadron correlations.

Papers PL 86B (1979) 98, PL 114B (1982) 457, ZPHY C18 (1983) 281, PL 122B (1983) 441, PL 124B (1983) 535, NIM 225 (1984) 463, PL 142B (1984) 446, PL 158B (1985) 85, PL 164B (1985) 184, ZPHY C26 (1985) 489, ZPHY C30 (1986) 45, ZPHY C31 (1986) 21, and ZPHY C31 (1986) 341.

CERN-NA-004 Approved May 1975, May 1977, Feb 1979; Completed Aug 1985.

INCLUSIVE DEEP INELASTIC MUON SCATTERING

BOLOGNA U – G Bari, A Benvenuti, D Bollini, G Bruni, G Laurenti, L Monari, F Navarria
CERN – A Argento, Y Sacquin, R Voss (√ Spokesperson)
DUBNA – D Yu Bardin, J Cvach, N G Fadeev, I A Golutvin, V Karzhavin, Yu T Kiryushin, V G Krivokhizhin, V V Kukhtin, W Lohmann, J Nemechek, P Reimer, I A Savin, G I Smirnov, D A Smolin, J Strachota, G Sultanov, P Todorov, I Veress, A G Volodko
MUNICH U, EXP PHYS – D Jamnik, R Kopp, U Meyer-Berkhout, A Staude, K M Teichert, R Tirler, C Zupancic
SACLAY – M Cribier, J Feltesse, A Milstajn, A Ouraou, P Rich-Hennion, G Smadja, M Virchaux

Accelerator CERN-SPS *Detector* Spectrometer

Reactions

μ^- nucleus $\rightarrow \mu^-$ hadrons	100–280 GeV/c
μ^- nucleus $\rightarrow \mu^-$ muon(s) hadrons	"

Comments Aims include the study of nuclear structure functions and their dependence on atomic number, and of weak-electromagnetic interference phenomena.

Papers PL 104B (1981) 403, NIM 204 (1982) 333, NP B199 (1982) 27, NIM 212 (1983) 125, PL 120B (1983) 245, NIM 226 (1984) 330, PL 140B (1984) 142, ZPHY C28 (1985) 171, PL 158B (1985) 531, and PL 163B (1985) 282.

CERN-NA-005 Approved Jun 1976; Completed May 1980.

A STUDY OF HARD HADRON-HADRON COLLISIONS WITH A STREAMER CHAMBER VERTEX SPECTROMETER AND A CALORIMETER TRIGGER

BARI U – A Distante, C Favuzzi, G Germinario, L Guerriero, P Lavopa, G Maggi, C de Marzo, M de Palma, F Posa, A Ranieri, G Selvaggi, P Spinelli, F Waldner
CRACOW – A Bialas, T Coghen, W Czyz, A Eskreys, K Eskreys, K Fialkowski, D Kisielewska, B Madeyski, P Malecki, K Olkiewicz, B Pawlik, K Sliwa
LIVERPOOL U – W H Evans, J R Fry, C Grant, M A Houlden, A Morton, H Muirhead, J Shiers, S L Wong
MUNICH, MAX PLANCK INST – M Antic, W Baker, H Bechteler, T Coghen, F Dengler, I Derado, V Eckardt, J Fent, P Freund, H J Gebauer, T Kahl, R Kalbach, A Manz, P Polakos, K P Pretzl, N Schmitz, T Schouten, P Seyboth (√ Spokesperson), J Seyerlein, P Stopa, D Vranic, G Wolf
NIJMEGEN U – F Crijns, W Metzger, C Pols, T Spuijbroek

Accelerator CERN-SPS *Detector* Streamer chamber, Calorimeter

Reactions

π^- p	150, 300 GeV/c
p p	300 GeV/c
p p	200 GeV/c
p Ar	"
p Xe	"
$\bar{p}$ p	"
$\bar{p}$ Ar	"
$\bar{p}$ Xe	"

Comments The first two reactions are to study high transverse energies, the others are to study multiparticle production.

Papers PL 112B (1982) 173, PR D26 (1982) 1019, NP B211 (1983) 375, NP B227 (1983) 189, NIM 217 (1983) 405, NP B234 (1984) 1, PR D29 (1984) 263, PR D29 (1984) 2476, and ZPHY C33 (1986) 187.

CERN-NA-006 (1976) Approved Jan 1977; Completed Apr 1980.

NEUTRON ELASTIC SCATTERING AT VERY SMALL ANGLES

FREIBURG U – A Bamberger, U Fischer, D Friedrich, W Grosshans, W Heck, R Maier, K Runge (Spokesperson), O Schaile, H Skodzek, B Thomauske, G Volk, H C Weber
MOSCOW, ITEP – A Arefiev, A Babaev, G Eliseev, Yu Galaktionov, Y Gorodkov, Yu Kamyshkov, V Lubimov, W Pliaskine, V E Pogidaev, V Shevchenko, M Vlasov

Accelerator CERN-SPS *Detector* Combination

Reactions

$n\ p \rightarrow n\ p$	0–400 GeV/c

Comments The range of $-t$ covered is 10^{-5} to 10^{-2} GeV^2.

CERN-NA-007 (1977) Approved Sep 1977; Completed Jun 1982.

MEASUREMENT OF THE ELECTROMAGNETIC FORM FACTORS OF π AND K MESONS AT THE SPS

CERN – P Laurelli
WESTFIELD COLL – E H Bellamy, M G Green, G Heath, E van Herwiznen, M Landon, P V March, C G Saltmarch, W Von Schlippe, A Soucha, J R Strong, R Tenchini
SOUTHAMPTON U – S G F Frank (√ Spokesperson), J Harvey, D Storey
FRASCATI – A Codino, F L Fabbri, P Laurelli, L Satta, P Spillantini, A Zallo
MILAN U – D Menasce, E Meroni, L Moroni
PISA U – S R Amendolia, B Badelek, G Batignani, F Bedeschi, E Bertolucci, D Bettoni, L Bosisio, C Bradaschia, M Dell'Orso, F Fidecarro, L Foa, E Focardi, A Giazotto, M Giorgi, P S Marrocchesi, A Menzione, L Ristori, A Scribano, G Tonelli
TURIN U – G A Beck, H Bilokon, G Bologna, G Mannocchi, B D'Ettorre Piazzoli, P Picchi
TRIESTE U – M Budinich, F Liello, E Milotti, F Ragusa, L Rolandi, A Stefanini

Accelerator CERN-SPS *Detector* Spectrometer

Reactions

$\pi^- e^- \rightarrow \pi^- \pi^0 e^-$	300 GeV/c
$\pi^- e^- \rightarrow \pi^- e^-$	250, 300 GeV/c
$K^- e^- \rightarrow K^- e^-$	250 GeV/c
$e^+ e^- \rightarrow \pi^+ \pi^-$	100, 125, 150, 175 GeV/c

Particles studied pion, kaon

Comments Uses the forward spectrometer of CERN-NA-001.

Papers PL 138B (1984) 454, PL 146B (1984) 116, PL 155B (1985) 457, PL 178B (1986) 435, and NP B277 (1986) 168. No other papers expected.

CERN-NA-008 (Sep 1977) Approved Dec 1977; Completed May 1980.

HADRON ELASTIC SCATTERING AT SMALL ANGLES

CLERMONT-FERRAND U – S Maury, J L Paumier, M Querrou, M Verbeken
LENINGRAD, INP – A S Denisov, A P Kashchuk, A V Kulikov, V A Schegelsky, I I Tkach, A A Vorobyov
LYON, IPN – J P Burq, M Chemarin, M Chevallier, J Fay, B Ille, M Lambert, J P Martin
UPPSALA U – T Ekelof, P Grafstrom (√ Spokesperson), L Gustafsson, E Hagberg, S Kullander

Accelerator CERN-SPS *Detector* Double-arm spectrometer

Reactions

$\pi^- p \rightarrow \pi^- p$	100–345 GeV/c
$\pi^- He \rightarrow \pi^- He$	50–300 GeV/c
$\pi^+ He \rightarrow \pi^+ He$	100–150 GeV/c
$p p \rightarrow p p$	100–300 GeV/c
$p He \rightarrow p He$	"

Comments An extension of experiment WA-009 to higher energies.

Papers NIM 177 (1980) 353, NIM 187 (1981) 407, NP B187 (1981) 205, PL 109B (1982) 111, PL 109B (1982) 124, and NP B217 (1983) 285. No other papers expected.

CERN-NA-009 (Nov 1977) Approved Feb 1978, Mar 1979; Completed Dec 1983.

STUDY OF FINAL STATES IN DEEP INELASTIC MUON SCATTERING

THE EUROPEAN MUON COLLABORATION
AACHEN, TECH HOCHSCH, III PHYS INST – G Berghoff, M Duren, F Hasert, D Lanske, K Schultze, L Urban
ANNECY – Y Bertsch, X de Bouard, G Coignet, J Favier, G Jancso, M Maire, H Minssieux, M Moynot, H Pessard, M Schneegans, J M Thenard, M Vivargent
CERN – R Dobinson, C Goessling, L Gustafsson, G von Holtey, G Kellner, H Muller, A M Osborne, L Osborne, T Sloan (√ Spokesperson), E Watson
FREIBURG U – T Dreyer, T Ernst, J Haas, H Hartenthaler, H Jung, E M Kabuss, G Kroesen, U Landgraf, W Mohr, K Rith, A Schlagbohmer, T Schroeder, R Smith, H E Stier, E Tieck, W Walluchs
DESY – F W Brasse, W Flauger, J Gayler, V Korbel, J Nassalski, B Poensgen
HAMBURG U – G Bucholtz, J Figiel, B Hoppe, F Janata, E Rondio, M Studt, A de la Torre
KIEL U – O C Allkofer, E Bohm, W Dau
LANCASTER U – C Bee, I Bird, J Coughlan
LIVERPOOL U – S Brown, G R Court, E Gabathuler, R Gamet, P Hayman, J R Holt, J Pettingale, S Wimpenny
MARSEILLE U, LUMINY – G d'Agostini, J P Albanese, J J Aubert, C Benchouk, M Mermet-Guyennet, F Montanet, P Payre, B Pietrzyk
MONS U – J Beaufays, D Callebaut, F Grard, J Hanton, R Windmolders
MUNICH, MAX PLANCK INST – F Dengler, I Derado, V Eckardt, A Manz, B Pawlik, N Schmitz, M Schouten, J Shiers, G Wolf
ORSAY, LAL – D Blum, P Heusse, A Jacholkowska, M Jaffre, C Pascaud
OXFORD U – N Geddes, A S Johnson, J Loken, K Long, P Renton, G Taylor, W S C Williams
RUTHERFORD – D Botterill, J Chima, R Clifft, M Edwards, P R Norton, G Oakham, M Sproston, J.C Thompson
SHEFFIELD U – F Combley, J Foster, S Wheeler
TURIN U – M Arneodo, F Costa, U Dosselli, M I Ferrero, P Giubellino, S Maselli, C Peroni, A Staiano
UPPSALA U – A Arvidson, B Badelek, H Calen, S Dahlgren, P Grafstrom, E Hagberg, S Kullander
WUPPERTAL U – K Becks, H Braun, H Bruck, J Drees, A Edwards, H Forsbach, K Hamacher, B Korzen, J Kruger, L Paul, N Pavel, H Peschel, U Pietrzyk, M Poetsch, H Preissner, A Schneider, W Stockhausen, H Wahlen
BUDAPEST, CRIP – G Eszes, E Nagy, P Ribarics, J Toth

Accelerator CERN-SPS *Detector* EMC

Reactions

$\mu^- \overset{(-)}{p} \rightarrow \mu^- X$	120–280 GeV/c

Particles studied charm

Comments An extension of experiment NA-002, with addition of a vertex detector to see what accompanies the μ^-. Studies charm production, jets, and inclusive hadron distributions. See also NA-028. For a description of the apparatus, see the LBL-91 supplement on detectors.

Papers See NA-028 for papers.

CERN-NA-010 (Nov 1977) Approved Mar 1978, Jan 1980; Started Sep 1981; Completed Aug 1985.

HIGH RESOLUTION STUDY OF THE INCLUSIVE PRODUCTION OF MASSIVE MUON PAIRS BY INTENSE PION BEAMS

ANNECY – J J Blaising, A Degre, R Morand
CERN – K Freudenreich
NAPLES U, IFS & INFN, NAPLES – L Carotenuto, A Ereditato, E Gorini, P Strolin
ECOLE POLYTECHNIQUE – P Bordalo, S Borenstein, Ph Busson, L Kluberg (Spokesperson), A Romana, R Salmeron, C Vallee
STRASBOURG – P Juillot, M Winter
ZURICH, ETH – P Le Coultre, M Grossmann, M Guanziroli, H Hofer, P Lecomte, H Suter, V L Telegdi
SOFIYA U – B Betev

Accelerator CERN-SPS *Detector* Spectrometer

Reactions

π^- nucleus $\rightarrow \mu^+ \mu^- X$	140–300 GeV/c
π^+ nucleus $\rightarrow \mu^+ \mu^- X$	"

Particles studied Υ(unspec)

Comments Studies the differential cross section and angular and transverse-momentum distributions of muon pairs in the mass range 4-to-15 GeV.

Papers PL 104B (1981) 416, NIM 223 (1984) 26, ZPHY C28 (1985) 9, ZPHY C28 (1985) 15, PL 157B (1985) 463, PL 158B (1985) 92, ZPHY C31 (1986) 513, and PL 179B (1986) 170.

CERN-NA-011 (Feb 1978) Approved May 1978; Completed Dec 1982.

MEASUREMENT OF CHARMED PARTICLE PRODUCTION IN HADRONIC REACTIONS

NIKHEF, AMSTERDAM – C Daum, H Dijkstra, J Hardwick, W Hoogland, G De Rijk, W Spierenburg, H Tiecke, L Wiggers
BRISTOL U – R Gilmore, J Malos, R Tapper
CERN – R Bailey, T Boehringer, M Bosman, V Chabaud, B D Hyams, P Weilhammer
CRACOW – L Gorlich, J Michalowski, H Palka, G Polok, M Rozanska, K Rybicki, M Turala
MUNICH, MAX PLANCK INST – E Belau, Z Hajduk, R Klanner (√ Spokesperson), G Lutjens, G Lutz, W Manner, E Neugebauer, H Seebrunner, U Stierlin, A Wylie, T Zeludziewicz
RUTHERFORD – C Damerell, S Gill, A Gillman, F J Wickens

Accelerator CERN-SPS *Detector* Spectrometer

Reactions

π^- Be → charm X	100–200 GeV/c
p Be → charm X	"

Particles studied D^+, D^0, D^-, D_s^+, D_s^-, charmed-baryon

Comments Uses a silicon microstrip vertex detector.

Papers PL 132B (1983) 230, PL 132B (1983) 237, NP B223 (1983) 1, ZPHY C18 (1983) 1, NIM 205 (1983) 99, NIM 205 (1983) 141, NIM 214 (1983) 253, NIM 217 (1983) 224, NIM 217 (1983) 261, ZPHY C22 (1984) 125, NP B239 (1984) 15, PL 139B (1984) 320, ZPHY C24 (1984) 111, NIM 226 (1984) 56, ZPHY C28 (1985) 357, ZPHY C29 (1985) 1, ZPHY C30 (1986) 51, ZPHY C31 (1986) 375, ZPHY C31 (1986) 391, ZPHY C32 (1986) 349, and ZPHY C32 (1986) 353.

CERN-NA-012 (Aug 1978) Approved Nov 1978; Completed Jun 1984.

STUDY OF $\pi^- p$ INTERACTIONS WITH NEUTRAL FINAL STATES

ANNECY – J Dufournaud, M Gouanere, D Lac, J P Peigneux, D Sillou, M Spighel
BRUSSELS U, IISN – F G Binon, C Bricman, J P Lagnaux, T Mouthuy, J P Stroot
LOS ALAMOS – D Alde, E A Knapp, R Martin, J Potter
SERPUKHOV – S V Donskov, A V Inyakin, D B Kakauridze, V A Katchanov, G V Khaustov, A V Kulik, A A Lednev, Yu V Mikhailov, V F Obraztov, Yu D Prokoshkin (√ Spokesperson), Y V Rodnov, S A Sadovsky, P M Shagin, A V Singovsky, V P Sugonyaev
LOUVAIN U – A Possoz

Accelerator CERN-SPS *Detector* GAMS-4000

Reactions

$\pi^- p \rightarrow n\ \gamma$'s	100, 230 GeV/c
$\pi^- p \rightarrow n$ meson^0	"
$\pi^- p \rightarrow n\ \pi^0$	"
$\pi^- p \rightarrow n\ \eta$	"
$\pi^- p \rightarrow n\ \omega$	"
$\pi^- p \rightarrow n\ \eta'$	"
$\pi^- p \rightarrow n\ f_2(1270)$	"
$\pi^- p \rightarrow n\ a_2(1320)^0$	"
$\pi^- p \rightarrow n\ f_4(2030)$	"
$\pi^- p \rightarrow n\ \eta_c(2980)$	"
$\pi^- p \rightarrow n\ f_0(1590)$	"

Particles studied meson^0, glueball

Comments Only some of the many reactions to be studied in detail are listed above.

Papers NC 71A (1982) 497, NIM 206 (1983) 373, NC 78A (1983) 313, NIM 214 (1983) 269, NP B269 (1986) 485, and PL 177B (1986) 120.

CERN-NA-012-2 (Aug 1985) Approved Feb 1986.

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

ANNECY – M Boutemeur, M Gouanere, J P Peigneux, M Spighel
BRUSSELS U, IISN – F Binon, C Bricman, J P Lagnaux, J P Stroot (√ Spokesperson)
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, V A Kachanov, D B Kakauridze, G V Khaustov, A V Kulik, A A Lednev, Yu D Prokoshkin (√ Spokesperson), V I Rykalin, S A Sadovsky, P M Shagin, A V Singovsky

Accelerator CERN-SPS *Detector* GAMS-4000

Reactions

π^- nucleus → γ's X	300 GeV/c

Particles studied glueball, meson^0, $\eta_c(2980)$, χ(unspec)

Comments Scheduled to run in 1987.

CERN-NA-014 (Jun 1978, Oct 1982) Approved Dec 1978, Dec 1979; Completed Sep 1984.

PHOTOPRODUCTION AT HIGH ENERGY AND HIGH INTENSITY

ATHENS, TECH UNIV – A Filippas, E Fokitis, E Karpathopoulos, Th Papadapoulou, Ch Trakkas
CERN – L Andersson, R Barate, H Burmeister, J Engelen, S Hancock, F James, E C Katsoufis, J C Lassalle, K Maeshima, J B Pattison, D Treille (√ Spokesperson)
IMPERIAL COLL – P Astbury, A Duane, P Gregory, P Kyberd, D Miller, J W Morris, R Namjoshi, I Siotis, T S Virdee, D M Websdale
ORSAY, LAL – B Bouquet, B D'Almagne, A Ferrer, P Petroff, F Richard, P Roudeau, J Six, W Wojcik, G Wormser
ECOLE POLYTECHNIQUE – P Benkheiri, S Costa Ramos, A Rouge, J P Wuthrick
COLLEGE DE FRANCE – A de Bellefon, J M Brunet, B Lefievre, S Orenstein, D Poutot, G Tristram
SACLAY – P Bareyre, P Bonamy, M David, Y Lemoigne, J Mouchet, G Villet, Y Zolnierowski
SOUTHAMPTON U – G McEwen, H Shooshtari
STRASBOURG – D Bloch, J P Engel, J L Guyonnet, M Schaeffer
WARSAW U, IEP & WARSAW, INR – M Gorski, T Hofmokl, A Jacholkowska, C Sobczynski
INFN, MILAN – P G Rancoita

Accelerator CERN-SPS *Detector* Spectrometer

Reactions

$\gamma\ p$	< 200 GeV/c

Comments Studies the point-like behavior of the photon. Deep-inelastic Compton scattering is observed at the level expected from fractionally charged quarks. QCD expectations are accurately verified.

Papers PL 152B (1985) 419, PL 168B (1986) 163, PL 174B (1986) 458, PL 182B (1986) 409, and ZPHY C (accepted).

CERN-NA-014-2 Approved Apr 1983.

A PROGRAM OF HEAVY FLAVOR PHOTOPRODUCTION

ATHENS, TECH UNIV – A Filippas, E Fokitis, E N Gazis, E C Katsoufis, A Maltezos, Th Papadapoulou, H Rahmani
BARCELONA, AUTONOMA U – M P Alvarez, F Calvino, J M Crespo
CERN – R Barate (√ Spokesperson), H Burmeister, L di Ciaccio, Y Giomataris, B Pattison, D Treille, Y Zolnierowski
IMPERIAL COLL – M Cattaneo, A Duane, R Forty, M Koratzinos, D M Websdale
ORSAY, LAL – B D'Almagne, P Druet, C Krafft, P Roudeau, J Six, M Wayne, G Wormser
COLLEGE DE FRANCE – J M Brunet, B Lefievre, D Poutot, P Triscos, G Tristram, A Volte
SACLAY – P Bonamy, P Borgeaud, M David, Y Lemoigne, C Magneville, M Primout, G Villet
SOUTHAMPTON U – J G McEwen
STRASBOURG – D Bloch, J P Engel, P Foucault, M Schaeffer, R Strub
WARSAW U, IEP – T Hofmokl

Accelerator CERN-SPS *Detector* Spectrometer

Reactions

$\gamma\ p$	< 200 GeV/c

Particles studied D_s^+, Λ_c^+, charm, bottom

Comments Running with a silicon active target and microstrip hodoscopes. Taking data (November 86).

CERN-NA-016 (Aug 1979) Approved Sep 1970; Completed Jun 1980.

STUDY OF THE HADRONIC PRODUCTION AND PROPERTIES OF NEW PARTICLES WITH A LIFETIME $10^{-13} < \tau < 10^{-10}$ s USING LEBC-EHS

AMSTERDAM U – R Blokzijl, F G Hartjes, D J Holthuizen, T E Schouten, D Toet
BRUSSELS U, IIHE – M Van Immerseel, J Lemonne, R Roosen, S Tavernier
CERN – F Bruyant, P Gavillet, Y Goldschmidt-Clermont, P Gusewell, A Herve, D Jacobs, P Lecoq, H Leutz, L Montanet, A Poppleton, B Powell, S Reucroft
MADRID, JEN – M Aguilar-Benitez, A Ferrando, P Ladron de Guevara, R Llosa, J A Rubio, C Willmott
MONS U – F Grard, Ph Herquet, J Kesteman, J M Lesceux, P Pilette
NIJMEGEN U – F I G H Crijns, W Kittel, M C Th Raaymakers, A Stergiou, R T Van de Walle
OXFORD U – W W M Allison, P Hughes, L Lyons, J H Mulvey
PADUA U – A Bettini, S Centro, M Cresti, M De Giorgi, M Mazzucato, D Pascoli, L Peruzzo, P Rossi, G Sartori, L Ventura, G Zumerle
PARIS, CURIE UNIV VI – M Boratav, D Burlaud, J Duboc, M C Touboul
ROME U – P Bagnaia, B Baldo, L Barone, R Bizzarri, E Di Capua, G Ciapetti, C Dionisi, F Marzano, G Piredda, D Zanello, L Zanello
RUTHERFORD – D Crennell, C Fisher (Spokesperson), K Paler
SERPUKHOV – V V Boseeva, P V Chliapnikov, A G Kholodenko, E P Kistenev, B F Poljakov, V A Yarba
STOCKHOLM U – S O Holmgren, K E Johansson, S Nilsson
STRASBOURG – F Etienne, N Kurtz, A Michalon, C Voltolini
TURIN U – G Borreani, F Marchetto, E Menichetti, G Rinaudo
TRIESTE U – E Castelli, P Checchia, P Poropat, M Sessa, C Troncon
VIENNA, OAW – W Bartl, H Dibon, R Fruhwirth, J Hrubec, M Markytan, G Neuhofer, P Porth, M Regler
MUNICH, MAX PLANCK INST – R Settles

Accelerator CERN-SPS *Detector* HBC-LEBC, EHS

Reactions

π^- p	360 GeV/c
p p	"

Particles studied D^+, D^-, $\overline{D}^0$

Papers PL 102B (1981) 285, NIM 198 (1982) 217, NIM 205 (1983) 79, PL 122B (1983) 312, PL 123B (1983) 98, PL 123B (1983) 103, NIM 215 (1983) 377, ZPHY C19 (1983) 83, PL 135B (1984) 237, and PL 160B (1985) 217.

CERN-NA-017 (Sep 1979) Approved Sep 1979; Completed Sep 1982.

MOMENTUM AND ANGULAR CORRELATIONS STUDY IN π^- NUCLEI JETS AT HIGH ENERGIES USING AN EMULSION TELESCOPE TECHNIQUE WITH MAGNETIC FIELD

LYON, IPN – R Schmitt
JADAVPUR U – M Basu, D Ghosh, S Naha, J Roy, K Sengupta
SANTANDER U – M Lopez-Quelle, R Niembro, A Ruiz, E Villar (Spokesperson)
STRASBOURG – C Jacquot, J N Suren

Accelerator CERN-SPS *Detector* Emulsion

Reactions

π^- nucleus → jet(s) X	300 GeV/c

CERN-NA-018 Approved Nov 1979; Completed Feb 1980.

SEARCH FOR SHORT-LIVED PARTICLES PRODUCED ON NUCLEI WITH A HEAVY LIQUID MINI BUBBLE CHAMBER

BERN U – A Badertscher, B Hahn, E Hugentobler (✓ Spokesperson), T Marti, U Moser, L Muller, E Ramseyer
MUNICH, MAX PLANCK INST – I Derado, V Eckardt, P Freund, H J Gebauer, T Kahl, K Pretzl, P Seyboth, J Seyerlein

Accelerator CERN-SPS *Detector* Heavy-liquid b.c.

Reactions

pion nucleus → charm X

Particles studied D^+, D^-, D^0

Papers PL 123B (1983) 471. No other papers expected.

CERN-NA-019 Approved Nov 1979; Completed Apr 1980.

DIRECT OBSERVATION OF BEAUTY PARTICLES SELECTED BY MUONIC DECAY IN EMULSION

BARI U – N Armenise, M Calicchio, O Erriquez, M T Muciaccia, S Natali, S Nuzzo, F Romano, F Ruggieri
BRUSSELS U, IIHE – M Barth, G Bertrand-Coremans, D Bertrand, R Roosen, J Sacton, J H Wickens
CERN – J P Albanese, C Matteuzzi, P Musset (Spokesperson), F Piuz, G Poulard, H Sletten
UNIVERSITY COLL, DUBLIN – A Breslin, A Montwill
BIRKBECK COLL – M Coupland, I Roberts, P Trent
UNIVERSITY COLL, LONDON – J H Bartley, D G Davis, D H Davis, B G Duff, M J Esten, F F Heymann, D C Imrie, G J Lush, D N Tovee
OPEN U, ENGLAND – F R Stannard
ROME U – G Baroni, M Conversi, S Di Liberto, A Manfredini, S Petrera, G Romano, G Rosa, R Santonico, F Sebastiani
TURIN U – D Allasia, D Gamba, A Marzari-Chiesa, L Riccati, A Romero

Accelerator CERN-SPS *Detector* Emulsion

Reactions

pion nucleus → bottom X 350 GeV/c

Particles studied bottom, charm

Comments Search for beauty identified by cascade decay through charm. Events scanned are associated with three muons in final state.

Papers PL 122B (1983) 197.

CERN-NA-020 Approved Nov 1979; Completed Dec 1983.

MEASUREMENTS OF π^+, π^-, K^+, K^-, p, AND $\overline{p}$ YIELDS IN 400 GeV PROTON BERYLLIUM AND COPPER COLLISIONS

CERN – H W Atherton, H Wachsmuth (Spokesperson)
RUTHERFORD – W Venus

Accelerator CERN-SPS *Detector* Counter

Reactions

p Be → π^+ X	400 GeV/c
p Be → π^- X	"
p Be → K^+ X	"
p Be → K^- X	"
p Be → p X	"
p Be → $\overline{p}$ X	"
p Cu → π^+ X	"
p Cu → π^- X	"
p Cu → K^+ X	"
p Cu → K^- X	"
p Cu → p X	"
p Cu → $\overline{p}$ X	"

CERN-NA-022 (Jun 1980) Approved Oct 1980; Completed Aug 1983.

THE INFLUENCE OF PARTON STRUCTURE ON HADRONIC INTERACTIONS IN EHS WITH A $K^+/\pi^+/p$ BEAM AT 250 GeV/c

AACHEN, TECH HOCHSCH, III PHYS INST – H Graessler, P Schmitz, W Schmitz
ANTWERP U & BRUSSELS U, IIHE – B Michalowska, A De Roeck, F Verbeure, E A De Wolf

BERLIN, DAW – H Boettcher, C Dreher, W Friebel, H Roloff, R Wischnewski
HELSINKI U – R Poellaenen, E Riipinen, H Saarikko
CRACOW – K Dziunikowska, A Eskreys, T Haupt, D Kis, D Kisielewska, M Kowalski, K Olkiewicz, P Stopa, L Suszycki, W Zielinski
MOSCOW STATE U – P Ermolov, V G Gavrjusev, I V Gorelov, B B Levcheno, N A Sotnikova, L Tikhonova, S A Zotkin
NIJMEGEN U – F G H Crijns, P van Hal, W Kittel (√ Spokesperson), F Meijers, L Scholten
RIO DE JANEIRO, CBPF – A M Freire-Endler, F M L DeAlmeida Jr, L C S Oliveira
SERPUKHOV – I Ajinenko, Y Belokopytov, V A Berezhnoy, P V Chliapnikov, S A Gumenyuk, E P Kistenev, V Kniasev, A I Kurnosenko, A G Minaev, V I Nikolaenko, L P Petrovich, V H Ronjin, A M Rybin, V A Stopchneko, O G Tchikilev, B A Utochkin, V Uvarov, A P Vorobjev
WARSAW U, IEP & WARSAW, INR – M Adamus, H Bialkowska, J Stepaniak, A K Wroblewski
YEREVAN PHYS INST – N M Agababyan, M R Atayan, G V Gevorkyan, J K Karamyan, N S Khalatian, S S Megrabian

Accelerator CERN-SPS *Detector* EHS

Reactions

$K^+ p$	250 GeV/c
$\pi^+ p$	"
$p p$	"
K^+ nucleus	"
π^+ nucleus	"
p nucleus	"

Comments The aims are a good particle identification study of (1) the influence of parton structure on low p_t hadron-hadron collisions, (2) strangeness flow and correlations in fragmentation, and (3) hadron-nucleus collisions.

Papers PL 177B (1986) 239, and ZPHY C32 (1986) 475.

CERN-NA-023 (Jun 1980) Approved Oct 1980; Completed Aug 1982.

STUDY OF DIFFRACTIVE DISSOCIATION ESPECIALLY INTO STRANGE AND CHARMED PARTICLES WITH EHS

TATA INST – S Banerjee, S Ganguli, A Gurtu, P Malhotra, R Raghavan, K Shankar, A Subramanian, K Sudhakar
CERN – M Benot, F Bruyant, M Dykes, D Gusewell, A Herve, J Hrubec, E Johansson, P Lecoq, J C Marin, L Montanet, B Pijlgroms, A Poppleton, S Reucroft, S Squarcia
GENOA U & INFN, GENOA – C Caso, R Contri, F Fontanelli, R Monge, U Trevisan
INNSBRUCK U – B Epp, P Girtler, D Kuhn, J Weiss
JAPAN U GROUP COLLAB – Y Chiba, T Emura, R Hamatsu, T Hirose, S Kaneko, I Kita, S Kitamura, H Kohno, S Matsumoto, K Takahashi, T Yamagata
MADRID, JEN – A Ferrando, P Ladron de Guevara, M T Rodrigo, J A Rubio
MONS U – J Beaufays, F Grard, P Herquet
RUTGERS U – E B Brucker, P Jacques, E L Koller, P Miller, R Plano, P Stamer, S Taylor, T L Watts
SERPUKHOV – Yu Fisjak, G Iolobov, A G Kholodenko, E Kistenev, N G Minaev, B S Poliakov, V Stopchenko, V A Yarba
TENNESSEE U – W M Bugg, H O Cohn, G T Condo, T Handler, E I Hart, A H Rogers
VIENNA, OAW – W Bartl, H Dibon, J MacNaughton, M Markytan (Spokesperson), G Neuhofer, P Porth, M Regler
COLLEGE DE FRANCE – M Aguilar-Benitez
STOCKHOLM U – H Rohringer

Accelerator CERN-SPS *Detector* EHS

Reactions

$p p \rightarrow p$ strange $\overline{\text{strange}}$	> 360 GeV/c
$p p \rightarrow p$ charm $\overline{\text{charm}}$	"

Comments Uses a rapid-cycling bubble chamber. Compares diffractive associated production of strange and charmed pairs.

Papers NIM 219 (1984) 66, ZPHY C22 (1984) 119, ZPHY C23 (1984) 205, ZPHY C27 (1985) 11, ZPHY C28 (1985) 339, ZPHY C30 (1986) 381, and ZPHY C31 (1986) 367.

CERN-NA-024 (Aug 1980) Approved Nov 1980; Completed Aug 1985.

DEEP INELASTIC SCATTERING PROCESSES INVOLVING LARGE-p_t DIRECT PHOTONS IN THE FINAL STATE

BARI U – C Favuzzi, G Maggi, C De Marzo, E Nappi, M De Palma, F Posa, A Ranieri, G Selvaggi, P Spinelli
FREIBURG U – A Bamberger, M Fuchs, W Heck, R Marx, K Runge, E Skodzeck, H Ch Weber, M Wulker
MOSCOW, ITEP – V Artemiev, Y Galaktionov, A Gordeev, Y Gorodkov, Y Kamyshkov, M Kossov, V Lubimov, V Plyaskin, V Pojidaev, V Shevchenko, E Shoumilov, V Tchudakov
MUNICH, MAX PLANCK INST – J Bunn, J Fent, P Freund, H J Gebauer, M Glas, P Polakos, K P Pretzl (√ Spokesperson), T E Schouten, P Seyboth, J Seyerlein, G Vesztergombi

Accelerator CERN-SPS *Detector* Calorimeter

Reactions

$\pi^+ p \rightarrow \gamma$(s) X	300 GeV/c
$\pi^+ p \rightarrow \gamma$ jet X	"
$\pi^- p \rightarrow \gamma$(s) X	"
$\pi^- p \rightarrow \gamma$ jet X	"
$p p \rightarrow \gamma$(s) X	"
$p p \rightarrow \gamma$ jet X	"

CERN-NA-025 (Nov 1980) Approved Apr 1981; Completed Sep 1982.

STUDY OF CHARM AND BOTTOM PARTICLE PRODUCTION USING A HOLOGRAPHIC BUBBLE CHAMBER

BARI U – N Armenise, M Calicchio, O Erriquez, M Muciaccia-Fogli, S Natali, S Nuzzo, F Romano, F Ruggieri
BRUSSELS U, IIHE – M Barth, R Roosen, S Tavernier (√ Spokesperson)
CERN – H Drevermann, I Gjerpe, A Herve, K E Johansson, P Lecoq, P Olivier
UNIVERSITY COLL, LONDON – F W Bullock, M Coupland, R Cranfield, D H Davis, B G Duff, M J Esten, F F Heymann, P Hobson, D C Imrie, G Lush, D N Tovee, R Williams
MONS U – J F Baland, F Grard, V Henri, J Kesteman
PARIS, CURIE UNIV VI – M Boratav, M C Touboul, A M Touchard
STRASBOURG – R Arnold, G Maurer
VIENNA, OAW – J Hrubec, G Neuhofer, A Taurok

Accelerator CERN-SPS *Detector* HLBC-HOBC-HYB

Reactions

$p p \rightarrow$ charm X	200, 360 GeV/c

Particles studied charm

Comments A first attempt to study production and decay of charmed particles (and later on particles with beauty) using a small rapid-cycling holographic heavy-liquid bubble chamber. Also uses the muon filter from NA-019.

Papers NIM 202 (1982) 417, NIM 214 (1983) 245, and PS 33 (1986) 202.

CERN-NA-027 (Nov 1981) Approved Dec 1981; Started Apr 1982; Completed Jun 1984.

AN EXPERIMENT TO MEASURE ACCURATELY THE LIFETIMES OF THE D^0, D^+, D^-, F^+, F^-, Λ_c CHARM PARTICLES AND TO STUDY THEIR HADRONIC PRODUCTION AND DECAY PROPERTIES

AACHEN, TECH HOCHSCH, III PHYS INST – M Deutschmann, G Otter, H Schluetter, R Schulte, W Struczinski

BERLIN, DAW – W Friedel, U Gensch, D Knauss, T Naumann, H Nowak, R Wischnewski
BRUSSELS U, IIHE – G Bertrand-Coremans, J Lemonne, P Vilain, B Vonck, J H Wickens
TATA INST – S Ganguli, A Gurtu, P K Malhotra, R Raghavan, A Schrankar, K Shankar, A Subramanian, K Sudhakar
COLLEGE DE FRANCE – P Beilliere, J Dolbeau, M Laloum
CERN – J A Hernandez, H Leutz, L Montanet (√ Spokesperson), A Poppleton
DUKE U – A T Goshaw, W Kowald, W J Robertson, W D Walker, C Wild
GENOA U – C Caso, R Contri, F Fontanelli, R Monge, S Squarcia, U Trevisan
JAPAN U GROUP COLLAB – Y Chiba, T Emura, R Hamatsu, S Hirose, S Kaneko, I Kita, S Kitamura, H Kono, S Matsumoto, N Oshima, K Takahashi, T Tsugurai, K Yamagata, F Yuasa
LIVERPOOL U – J R Fry, M A Houlden, G P Patel, K Roberts, B Whyman
MADRID U – M Aguilar-Benitez, B Castano, N Colino, F Diez, P Ladron de Guevara
MONS U – J Baily, J F Baland, F Grard, P Herquet, P Pilette
OXFORD U – W W M Allison, D Gibaut, L Lyons, P Wright
PADUA U – A De Angelis, A Bettini, P Checchia, M Cresti, U Gasparini, M Mazzucato, L Peruzzo, C Pinori, P Rossi, G Sartori, L Ventura, P Zotto, G Zumerle
PARIS, CURIE UNIV VI – L De Billy, H Briand, J Duboc, J Dumarchez, J Laberrigue, H K Nguyen, T P Yiou
ROME U – R Bizzarri, E Di Capua, S Falciano, A Forni, S Gentile, M Iori, G Marel, F Marzano, G Piredda, L Zanello
RUTGERS U – M Kalekar, R Di Marco, R J Plano, P Stamer
RUTHERFORD – D Crennell, C Fisher, P Hughes, M MacDermott
SERPUKHOV – Y Fisjak, E P Kistenev, V Knyazev, Y Petrovich, V Stopchenko, E Vlasov
STOCKHOLM U – L Haupf, S Hellman, S O Holmgren, T Moa, S Nilsson, B Sellden
STRASBOURG – D Huss, E Jegham, A Michalon, M Michalon, C Voltolini
TENNESSEE U – W M Bugg
TURIN U – G Borreani, F Marchetto, G Rinaudo
TRIESTE U – E Castelli, D Cauz, P Poropat, M Sessa, C Troncon
VIENNA, OAW – W Bartl, B Epp, J Hrubec, G Neuhofer, M Pernika, P Porth, M Regler, H Rohringer, J Schmidmayer

Accelerator CERN-SPS *Detector* HBC-LEBC-HYB

Reactions

$\pi^-\ p \rightarrow$ charm X	360 GeV/c
$p\ p \rightarrow$ charm X	"

Particles studied D^0, D^+, D^-, D_s^+, D_s^-, Λ_c^+

Comments Uses the EHS. The sensitivity is 16 events/μb for π^-, 40 events/μb for p.

Papers PL 146B (1984) 266, PL 156B (1985) 444, PL 161B (1985) 400, PL 164B (1985) 404, PL 168B (1986) 170, PL 169B (1986) 106, and ZPHY C31 (1986) 491.

CERN-NA-028 (Jan 1982) Approved Feb 1982; Completed Dec 1983.

STUDY OF SHADOWING AND HADRON PRODUCTION IN HIGH ENERGY MUON SCATTERING USING NUCLEAR TARGETS

THE EUROPEAN MUON COLLABORATION

AACHEN, TECH HOCHSCH, III PHYS INST – G Berghoff, M Duren, F J Hasert, D Lanske, K Schultze, L Urban
ANNECY – Y Bertsch, X de Bouard, G Coignet, J Favier, G Jancso, M Maire, H Minssieux, M Moynot, H Pessard, M Schneegans, J M Thenard, M Vivargent
CERN – R W Dobinson, C Goessling, L Gustafsson, G Kellner, H R Muller, A M Osborne, L Osborne, T Sloan (√ Spokesperson), E Watson
FREIBURG U – T Dreyer, T Ernst, J Haas, H Hartenthaler, H Jung, E M Kabuss, G Kroesen, U Landgraf, W Mohr, K Rith, A Schlagbohmer, T Schroeder, R Smith, H E Stier, E Tieck, W Wallucks
DESY – F W Brasse, W Flauger, J Gayler, V Korbel, J Nassalski, B Poensgen
HAMBURG U – G Bucholtz, J Figiel, B Hoppe, F Janata, E Rondio, M Studt, A De la Torre
KIEL U – O C Allkofer, E Bohm, W Dau
LANCASTER U – C Bee, I Bird, J Coughlan
LIVERPOOL U – S Brown, G R Court, E Gabathuler, R Gamet, P Hayman, J R Holt, J Pettingale, S Wimpenny
MARSEILLE U, LUMINY – J P Albanese, J J Aubert, C Benchouk, G D'Agostini, M Mermet-Guyennet, F Montanet, P Payre, B Pietrzyk
MONS U – J Beaufays, D Callebaut, F Grard, J Hanton, R Windmolders
MUNICH, MAX PLANCK INST – F Dengler, I Derado, V Eckardt, A Manz, N Schmitz, J Shiers, G Wolf
ORSAY, LAL – D Blum, P Heusse, A Jacholkowska, M Jaffre, C Pascaud
OXFORD U – N Geddes, A S Johnson, J Loken, K Long, R Mount, P B Renton, G Taylor, M Villers, W S C Williams
RUTHERFORD – C Best, D Botterill, J Chima, R Clifft, M Edwards, P R Norton, G Oakham, M Sproston, J C Thompson
SHEFFIELD U – F Combley, J Foster, S Wheeler
TURIN U – M Arneodo, F Costa, M I Ferrero, P Giubellino, S Maselli, C Peroni, A Staiano
UPPSALA U – A Arvidson, B Badelek, H Calen, S Dahlgren, P Grafstrom, E Hagberg, S Kullander
WUPPERTAL U – K H Becks, H Braun, H Bruck, J Drees, A Edwards, H Forsbach, K Hamacher, B Korzen, J Kruger, L Paul, N Pavel, H Peschel, U Pietrzyk, M Poetsch, H Preissner, A Schneider, W Stockhausen, H Wahlen
BUDAPEST, CRIP – G Eszes, E Nagy, P Ribarics, J Toth

Accelerator CERN-SPS *Detector* EMC

Reactions

muon nucleus → muon X	280, 325 GeV/c

Comments See also the earlier EMC experiments NA-002 and -009. Studies the point- and hadron-like components of the photon shadowing, and the evolution of the elementary quark system into hadrons using the distribution of hadrons. For a description of the apparatus, see the LBL-91 supplement on detectors.

Papers This includes papers from the earlier EMC experiments NA-002 and NA-009. NIM 160 (1979) 23, NIM 165 (1979) 113, NIM 166 (1979) 541, PL 89B (1980) 267, NIM 177 (1980) 337, PL 94B (1980) 96, PL 94B (1980) 101, PL 95B (1980) 306, PS 23 (1981) 710, NIM 179 (1981) 445, PL 100B (1981) 433, NIM 187 (1981) 401, ZPHY C10 (1981) 101, PL 103B (1981) 388, PL 105B (1981) 315, PL 105B (1981) 322, PL 106B (1981) 419, PL 110B (1982) 73, PL 114B (1982) 291, PL 114B (1982) 373, PL 119B (1982) 233, NIM 193 (1982) 445, PL 121B (1983) 87, NP B213 (1983) 1, NP B213 (1983) 31, NIM 212 (1983) 111, PL 123B (1983) 123, PL 123B (1983) 275, ZPHY C18 (1983) 189, PL 130B (1983) 118, PL 133B (1983) 370, PL 133B (1983) 461, PL 135B (1984) 225, ZPHY C22 (1984) 341, PL 144B (1984) 302, PL 145B (1984) 156, PL 149B (1984) 415, NP B246 (1984) 381, PL 150B (1985) 458, PL 152B (1985) 433, PL 155B (1985) 461, NP B258 (1985) 249, NP B259 (1985) 189, PL 160B (1985) 417, PL 161B (1985) 203, PL 165B (1985) 222, ZPHY C30 (1986) 23, PL 167B (1986) 127, NP B264 (1986) 739, NP B272 (1986) 158, ZPHY C31 (1986) 1, ZPHY C31 (1986) 175, ZPHY C31 (1986) 275, ZPHY C31 (1986) 333, ZPHY C32 (1986) 1, and ZPHY C33 (1986) 167.

CERN-NA-029 (Oct 1981) Approved Feb 1982; Completed May 1982.

STUDY OF $\pi^-\pi^0$ PRODUCTION VIA THE PRIMAKOFF EFFECT ON NUCLEI

CLERMONT-FERRAND U – L Capraro, P Levy, M Querrou, C Verbeck, M Verbeken
FRASCATI – F Celani, M Enorini, F L Fabbri, P Laurelli, G Rivellini, L Satta, P Spillantini, A Zallo
MILAN U & INFN, MILAN – G Bellini (Spokesperson), S Bonetti, M Di Corato, P F Manfredi, E Meroni, L Moroni, C Palazzi-Cerrina, F Palombo, F Ragusa, S Sala

PISA U & INFN, PISA – S R Amendolia, E Bertolucci, D Bettoni, L Bosisio, C Bradaschia, M Dell'Orso, F Fidecaro, L Foa (Spokesperson), E Focardi, A Giazotto, M Giorgi, A Menzione, L Ristori, A Scribano, R Tenchini
TURIN U – G A Beck, H Bilokon, G Bologna, G Mannocchi, B D'Ettorre Piazzoli, P Picchi
TRIESTE U – G Batignani, M Budinich, F Liello, N Paver, M L Piazzi, L Rolandi, A Stefanini
WESTFIELD COLL – E H Bellamy, G Heath, M Landon, P V March, P S Marrocchesi, J R Strong

Accelerator CERN-SPS *Detector* Spectrometer

Reactions

π^- Pb $\rightarrow \pi^- \pi^0$ Pb	100–200 GeV/c

Particles studied ρ^-

Comments Measures the radiative decay width of the ρ^- and $\pi^-\pi^0$ production near threshold to test the number of quark colors. Uses the spectrometer of experiments NA-001 and NA-007, with modifications.

CERN-NA-030 (Apr 1982) Approved Jun 1982; Completed Jun 1984.

PRECISION DETERMINATION OF THE LIFETIME OF THE NEUTRAL PION

AMES LAB – E W Anderson
CERN – H Atherton, C Bovet, P Coet, R Desalvo, N Doble, R Malleyran
CHICAGO U – J W Cronin, B Milliken
LUND U – G von Dardel (√ Spokesperson), K Kulka
PARIS, CURIE UNIV VI – M Boratav

Accelerator CERN-SPS *Detector* Counter

Reactions

p nucleus $\rightarrow \pi^0$'s X	400, 450 GeV/c

Particles studied π^0

Comments Measures positron flux (1) from a double-foil tungsten target as a function of foil separation, and (2) from three sets of from 1 to 30 gold foils of the same total thickness.

Papers PL 158B (1985) 81.

CERN-NA-031 (Dec 1981) Approved Sep 1982.

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

CERN – H Burkhardt, P Clarke, D Cundy, N Doble, L Gatignon, R Hagelberg, G Kesseler, T Miczaika, H G Sander, A C Schaffer, P Steffen, J Steinberger, H Taureg, H Wahl (Spokesperson), C Youngman
DORTMUND U – G Dietrich, F Eisele, W Heinen
EDINBURGH U – D J Candlin, J Muir, K J Peach, B Pijlgroms, I P Shipsey, B Stephenson
MAINZ U, INST PHYS – H Bluemer, M Kasemann, K Kleinknecht, P Panzer, B Renk
ORSAY, LAL – E Auge, M Corti, D Fournier, P Heusse, A M Lutz, C Pascaud
PISA U & INFN, PISA – G Antonelli, L Bertanza, A Bigi, M Calvetti, R Carosi, R Casali, C Cerri, R Fantechi, I Mannelli, A Nappi, G Pierazzini
SIEGEN U – C Becker, D Heyland, M Holder, G Quast, M Rost, W Weihs, G Zech

Accelerator CERN-SPS *Detector* Calorimeter, Wire chamber

Reactions

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

Particles studied K_L, K_S

Comments Taking data (November 86).

CERN-NA-031-2 (Mar 1986) Approved Jun 1986.

A MEASUREMENT OF THE PHASE DIFFERENCE OF η_{00} AND η_{+-} IN CP VIOLATING $K^0 \rightarrow 2\pi$ DECAYS

CERN – P Clarke, D Coward, D C Cundy, N Doble, L Gatignon, R Hagelberg, T Miczaika, A C Schaffer, J Steinberger, H Taureg, H Wahl (Spokesperson), C Youngman
EDINBURGH U – R Black, D J Candlin, J Muir, K J Peach, B J Pijlgroms, I P Shipsey, B Stephenson
MAINZ U, INST PHYS – H Bluemer, M Kasemann, K Kleinknecht, B Panzer, B Renk
ORSAY, LAL – E Auge, D Fournier, P Heusse, A M Lutz, H G Sander
INFN, PISA – G Antonelli, L Bertanza, A Bigi, M Calvetti, R Carosi, R Casali, C Cerri, I Mannelli, E Massa, A Nappi, G M Pierazzini
SIEGEN U – C Becker, H Burkhardt, D Heyland, M Holder, G Quast, M Rost, W Weihs, G Zech

Accelerator CERN-SPS *Detector* Calorimeter, Wire chamber

Reactions

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

Particles studied K_L, K_S

Comments In preparation (November 86).

CERN-NA-032 (Jul 1982) Approved Nov 1982; Completed Aug 1986.

INVESTIGATION OF CHARM PRODUCTION IN HADRONIC INTERACTIONS USING HIGH-RESOLUTION SILICON DETECTORS

NIKHEF, AMSTERDAM – C Daum, H Tiecke, L Wiggers
BRISTOL U – R Gilmore, T Gooch, W Kwan, J Malos
CERN – V Castillo, V Chabaud, G D Kelsey, P Weilhammer (√ Spokesperson)
CRACOW – Z Hajduk, H Palka, K Rybicki, M Turala, T Zeludziewicz
MUNICH, MAX PLANCK INST – S Barlag, M Bosman, H Dietl, G Luetjens, G Lutz, W Maenner, H Seebrunner, U Stierlin
RUTHERFORD – C Damerell, A Gillman, M Pepe, J Richardson, S Watts, F Wickens
VALENCIA U – P Gras, E Higon
DESY – R Klanner
LAUSANNE U – T Boehringer

Accelerator CERN-SPS *Detector* Spectrometer

Reactions

π^- Si $\rightarrow$ charm X	200 GeV/c
K^- Si $\rightarrow$ charm X	"
p Si $\rightarrow$ charm X	"
π^- Cu $\rightarrow$ charm X	230 GeV/c

Particles studied D^0, D^+, D^-, D_s^+, D_s^-, Λ_c^+

Comments Uses an active target made from segmented silicon detectors, CCD's, and the spectrometer from CERN-NA-011.

Papers NIM 226 (1984) 56.

CERN-NA-033 (Oct 1983) Approved Feb 1984; Completed Jul 1985.

AN EXPERIMENTAL STUDY OF SINGLE-VERTEX (e^-e^+) PAIR CREATION IN A CRYSTAL

SUNY, ALBANY – N Cue, J Kimball, B Marsh, C R Sun
ANNECY – G Bologna, J P Peigneux, D Sillou, M Spighel
LYON, IPN – A Belkacem, M Chevallier, M J Gaillard, R Genre, R Kirsch, J C Poizat, J Remillieux (√ Spokesperson)

Accelerator CERN-SPS *Detector* Spectrometer

Reactions

$e^\pm$ crystal $\rightarrow \gamma$(s) $e^\pm$ crystal	150 GeV/c

γ crystal $\rightarrow e^+ e^-$ crystal 20–200 GeV/c

Comments Investigates a predicted enhancement in pair production and radiation by high-energy photons and electrons directed along an axis of a crystal. See also CERN-NA-042 for a continuation.

Papers PRL 53 (1984) 2371, PRL 54 (1985) 2667, NIM B13 (1986) 9, and PL 177B (1986) 211.

CERN-NA-034 (Aug 1983) Approved Mar 1984.

LEPTON PRODUCTION

HELIOS COLLABORATION

BARI U – S Simone
BROOKHAVEN – H Gordon, T Ludlam, L Olsen, V A Polychronakos, D C Rahm, I Stumer
CERN – T Akesson, H Atherton, D Bettoni, E Chesi, C Dederichs, M Esten, C W Fabjan, G Poulard, F Puiz, A Rudge, P Schotton, J Schukraft, M Seman, H Sletten, J P Vanuxem, R Wigmans, W J Willis
HEIDELBERG U, PHYS INST – P Glaessel, U Goerlach, V Kroh, A Pfeiffer, J Soltani, H J Specht
LEBEDEV INST – I Gavrilenkov, S Mayburov, A Shmeleva, V Tikhomirov
NOVOSIBIRSK, IYF – V Sidorov, Y Tikhonov
LUND U – S Almehed, R Haglund, V Hedberg, G Jarlskog, S Johansson, B Lorstad, U Mjornmark
MOSCOW PHYS ENG INST – V Cherniatin, B Dolgoshein, Yu Golubkov, A Kalinovsky, V Kantserov, P Nevsky, A Sumarakov
RUTHERFORD – N A McCubbin (√ Spokesperson)
TEL AVIV U – O Benary, S Dagan, D Lissauer, Y Oren
BIRKBECK COLL – P Trent
UNIVERSITY COLL, LONDON – A L S Angelis, J H Bartley, J Dodd, F F Heymann, M McCubbin
LOS ALAMOS – N J Di Giacomo, H van Hecke, B Jacak, P L McGaughey, W E Sondheim, J W Sunier
MCGILL U – F Corriveau, L A Hamel, F Lamarche, C Leroy, Y Sirois
MONTREAL U – P Aubry, G Beaudoin, J M Beaulieu, P Depommier, H Jeremie, L Lessard, A Lounis
PITTSBURGH U – W E Cleland, M Clemen, B Collick, M Murray, Y M Park, J Thompson
SACLAY – A Gaidot, F Gibrat, G W London, J P Pansart
STOCKHOLM U – B Erlandsson, S Nilsson, B Sellden
BRUSSELS U, IIHE – R Roosen
KEK – H En'yo
ROME U – S Dell'uomo, S DiLiberto, M Mazzoni, F Meddi, G Romano, G Rosa
TURIN U – V Bisi, P Giubellino, A Marzari-Chiesa, L Ramello, L Riccati

Accelerator CERN-SPS *Detector* Combination

Reactions

p Be $\rightarrow e^{\pm}$(s) X	450 GeV/c
p Be $\rightarrow$ muon(s) X	"
p Be $\rightarrow \nu$(s) X	"
p Be $\rightarrow e^{\pm}$ muon X	"
p Be $\rightarrow e^{\pm}\ \nu$ X	"
p Be $\rightarrow$ muon ν X	"

Particles studied charm

Comments 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 production. For a description of the apparatus, see the LBL-91 supplement on detectors. Taking data (November 86).

CERN-NA-034-2 (May 1984) Approved Nov 1984.

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

HELIOS COLLABORATION

BROOKHAVEN – H Gordon, T Ludlam, L H Olsen, V Polychronakos, D C Rahm, I Stumer, C Woody
CERN – T Akesson, H Atherton, E Chesi, K Dederichs, M J Esten, C Fabjan, U Mjornmark, F Piuz, A Rudge, J Schukraft, M Seman, J P Vanuxem, R Wigmans, W J Willis
HEIDELBERG U, PHYS INST – P Glaessel, U Goerlach, V Koch, A Pfeiffer, J Soltani, H J Specht (√ Spokesperson)
LOS ALAMOS – N J DiGiacomo, H van Hecke, P L McGaughey, W E Sondheim, J W Sunier
LUND U – S Almehed, R Haglund, V Hedberg, G Jarlskog, S Johansson, B Lorstad
MCGILL U – F Corriveau, L A Hamel, C Leroy, Y Sirois
MONTREAL U – G Beaudoin, J M Beaulieu, P Depommier, H Jeremie, L Lessard, A Lounis
LEBEDEV INST – I Gavrilenkov, S Mayburov, A Shmeleva
MOSCOW PHYS ENG INST – V Cherniatin, B Dolgoshein, Yu Golubkov, A Kalinovsky, V Kantserov, P Nevsky, A Sumarakov
NOVOSIBIRSK, IYF – V Sidorov, Yu Tikhonov
PITTSBURGH U – W Clelan, M Clemen, B Collick, M Murray, J Thompson
SACLAY – A Gaidot, F Gibrat, G W London, J P Pansart
STOCKHOLM U – B Erlandsson, S Hellman, S Nielsson, B Sellden
TEL AVIV U – O Benary, S Dagan, D Lissauer, Y Oren
BRUSSELS U, IIHE – R Roosen
SYRACUSE U – D Bettoni

Accelerator CERN-SPS *Detector* Calorimeter, Spectrometer

Reactions

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

Comments Uses a multiwire active target and combines 4π calorimeter coverage with measurements of inclusive spectra, 2-particle correlations, low- and high-mass muon pairs, and photons. The target wires are aluminum, silver, and tungsten. Taking data (November 86).

CERN-NA-035 (1982) Approved Feb 1983, Nov 1984.

STUDY OF RELATIVISTIC NUCLEUS-NUCLEUS COLLISIONS

ATHENS U – S Margetis, A Panagiotou, A Petridis
BARI U – C Favuzzi, P Lapova, G Maggi, C De Marzo, E Nappi, M De Palma, F Posa, A Ranieri, G Slevaggi, P Spinelli
CERN – D Bangert, K Geissler
CRACOW – J Bartke, M Kowalski
DARMSTADT, GSI – R Bock, R Brockmann, C Guerra, T Humanic, A Sandoval, H Stroebele, D Vranic
FRANKFURT U – W Heck, J Pfennig, R Renfordt, R Stock (Spokesperson), S Wenig
FREIBURG U – A Bamberger, K Runge
HEIDELBERG U, IHEP – M Gazdzichi, D Schall
LBL – J Harris, G Odyniec, H G Pugh, L Teitelbaum, M Ticknell
MARBURG U – R Keider, F Puelhofer, D Roehricht
MUNICH, MAX PLANCK INST – I Derado, V Eckardt, J Fendt, P Freund, H J Gebauer, K P Pretzl, N Schmitz, T Schouten, P Seyboth, J Seyerlein, G Vesztergombi
WARSAW U, IEP – H Bialkowska, E Skrzypczak
BOSKOVIC INST, ZAGREB – D Ference, K Kadija, G Paic

Accelerator CERN-SPS *Detector* Streamer chamber, Calorimeter

Reactions

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

Comments Determines for each event the charged-particle multiplicity, the proton and pion rapidity distributions, the π^0 multiplicity around mid-rapidity, the charge-pion mean transverse momentum, the energy flow, and strange-particle production. Studies the stopping power of nuclear matter with different nuclear targets, and searches for evidence of formation of quark matter or quark-gluon plasma. Taking data (November 86).

CERN-NA-036 (Feb 1984) Approved Nov 1984.

THE PRODUCTION OF STRANGE BARYONS AND ANTIBARYONS WITH RELATIVISTIC ION COLLISIONS

LBL - M Cherney, W M Geist (√ Spokesperson), D Greiner, C R Gruhn, M Heiden, H G Pugh
BERGEN U - G Lovhoiden, T F Thorsteinsen
BIRMINGHAM U - M Cohler, G C Morrison, J M Nelson, R Zybert
CARNEGIE MELLON U - P D Barnes, G Franklin, B Quinn, Xia Yi
CERN - B Powell
PANJAB U - V S Bhatia, J M Kohli, I Mittra, J Singh
CRACOW - Z Natkaniec, M Rozanska, K Rybicki, I Sakrejda, J Turnau
STRASBOURG - R Blaes, H Braun, M Huss, A Michalon, M E Michalon, J L Riester, C Voltolini
VIENNA, OAW - J Hrubec, J McNaughton, G Neuhofer, P Porth, H Rohringer
MADRID, JEN - P Ladron de Guevara
SANTIAGO DE COMPOSTELA U - B Castano, C Fernandez, C Garabatos, J Garzon

Accelerator CERN-SPS *Detector* TPC, Wire chamber, Calorimeter

Reactions

^{16}O nucleus → Λ X	< 200 GeV/c (P_{lab}/N)
^{16}O nucleus → Ξ X	"
^{16}O nucleus → Ω^- X	"
^{16}O nucleus → K_S X	"
^{32}Su nucleus → Λ X	"
^{32}Su nucleus → Ξ X	"
^{32}Su nucleus → Ω^- X	"
^{32}Su nucleus → K_S X	"

Comments Also studies production of the antibaryons. Uses an active target. Targets are Al, Cu, and Au. Studies among other things, the quark-gluon plasma. Scheduled to run October 87.

CERN-NA-037 (Feb 1985) Approved Jun 1985.

DETAILED MEASUREMENTS OF STRUCTURE FUNCTIONS FROM NUCLEONS AND NUCLEI

BIELEFELD U - G Baum, F Sever
FREIBURG U - H Engelin, U Landgraf
HEIDELBERG, MAX PLANCK INST - I G Bird, W Brueckner, D von Harrach (Spokesperson), E Kabuss, Y Mizuno, D Nowotry, B Povh, K Rith, N A Simon, A Staiano
INDIANA U - R Crittenden, A Dzierba, A Jacholkowska
MAINZ U, INST PHYS - F Klein, G Mallot, K Roehrich, T Walcher
MONS U - R Windmolders
NEUCHATEL U - C Broggini, L D Fluri, P Gretillat, J L Vuilleumier
NIKHEF, AMSTERDAM - J Beaufays, R von Dantzig, M v d Heijden, M de Jong, K Ketel
UC, SANTA CRUZ - C Huesch
SIN - M Botje, W Burger, J Domingo, Q Ingram, R Schumacher, U Sennhauser
TURIN U & INFN, TURIN - D Allasia, M Arneodo, M I Ferrero, C Peroni, F Truc
UPPSALA U - A Ardvidsson, P Grafstrom, E Hagberg, K Janson, S Kullander, F Lettenstrom, T Lindqvist
WARSAW U, IEP - B Badelek, J Ciborowski, J Nassalski, E Rondio, L Ropelewski, A Sandacz
WUPPERTAL U - B Korzen, N Pavel, H Peschel, U Pietrzyk

Accelerator CERN-SPS *Detector* EMC

Reactions

muon p	120, 280 GeV/c
muon deut	"
muon nucleus	120, 160, 280 GeV/c

Comments Deep inelastic muon scattering for Q^2 from 1 to 200 GeV^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. For a description of the apparatus, see the LBL-91 supplement on detectors. Taking data (November 86).

CERN-NA-038 (Mar 1985) Approved Sep 1985.

STUDY OF HIGH-ENERGY NUCLEUS-NUCLEUS INTERACTIONS WITH THE ENLARGED NA10 DIMUON SPECTROMETER

ANNECY - C Baglin, A Bussiere, J P Guillaud
CERN - P Sonderegger
CLERMONT-FERRAND U - J Arnold, A Baldit, J Castor, F Daudon, A Devaux, J Fargeix, X Felgerolles, P Force, R Hutin, G Landaud
LISBON, CFMC - M C Abreu, G P Barreira, P Bordalo, A Casaca, J M Gago, P Gomes, A Maio, M Pimenta, S Ramos, J Valera
LYON, IPN - M Bedjidian, D Contardo, E Descroix, J Y Grossiord, A Guichard, R Haroutunian, J R Pizzi
ORSAY, IPN - C Gerschel, A Sinquin
ECOLE POLYTECHNIQUE - S Borenstein, P Busson, C Charlot, B Chaurand, L Kluberg (Spokesperson), A Romana, R Salmeron
STRASBOURG - J Britz, P Gorodetzky, L Kraus, I Linck
VALENCIA U - R Cases, J Velasco

Accelerator CERN-SPS *Detector* Spectrometer

Reactions

^{16}O U → μ^+ μ^- X	225 GeV/c (P_{lab}/N)

Comments If a quark-gluon plasma is produced, resulting thermal dimuons should differ from ordinary dimuons in transverse-momentum and rapidity distributions. In preparation (November 86).

CERN-NA-039 (Feb 1986) Approved Apr 1986.

A SEARCH FOR QUARKS PRODUCED IN HEAVY-ION INTERACTIONS

UC, IRVINE - G Shaw (Spokesperson)
LBL - H Matis, H Pugh
SAN FRANCISCO STATE U - R Bland, C Hodges, J Huntington, M Savage, A Steiner

Accelerator CERN-SPS *Detector* Other

Reactions

^{16}O Hg → quark X	225 GeV (T_{lab}/N)

Particles studied quark

Comments Free quarks produced in a mercury target (part of the beam stop for NA-038) are concentrated by distillation of the mercury and searched for using an automated Millikan-like apparatus. In preparation (November 86).

CERN-NA-040 (Feb 1986) Approved Apr 1986.

ELECTROMAGNETIC DISSOCIATION OF TARGET NUCLEI BY ^{16}O AND ^{32}S PROJECTILES

AMES LAB - J C Hill (√ Spokesperson), J A Winger, F K Wohn

Accelerator CERN-SPS *Detector* Photon spectrometer

Reactions

^{16}O nucleus	60, 200 GeV/c (P_{lab}/N)
^{32}Su nucleus	"

Comments The target nucleus is ^{197}Au. Measures in particular one-neutron-removal cross sections. A test of the energy dependence of the electromagnetic dissociation process. The oxygen run was completed in December 86. The sulfur run is scheduled for September 87.

CERN-NA-041 (Feb 1986) Approved Jun 1986.

SEARCH FOR NUCLEI IN HEAVY ION COLLISIONS AT ULTRARELATIVISTIC ENERGIES

SACLAY – B Berthier, J Julien, S Leray, R Lucas, C Mazur, C Ngo (√ Spokesperson), M Ribrag

Accelerator CERN-SPS *Detector* Counter

Reactions

^{16}O Au → nucleus X	226 GeV (T_{lab}/N)

Comments Studies whether nuclei survive the collision of heavy ions at ultrarelativistic energies. This is relevant for a better understanding of possible critical phenomena in nuclear matter. In preparation (October 1986).

CERN-NA-042 (Jul 1986) Approved Oct 1986.

STUDY OF UNEXPLAINED HARD PHOTON PRODUCTION BY ELECTRONS CHANNELED IN A CRYSTAL

LYON, IPN – X Artru, A Belkacem, M Chevallier, M J Gaillard, R Genre, R Kirsch, J-C Poizat, J Remillieux (Spokesperson)
ANNECY – G Bologna, M Gouanere, J-P Peigneux, D Sillou, M Spighel
SUNY, ALBANY – N Cue, J C Kimball, B Marsh

Accelerator CERN-SPS *Detector* Counter, Calorimeter

Reactions

$e^{\pm}$ crystal → γ(s) $e^{\pm}$ crystal	20–200 GeV/c

Comments Continues studies of CERN-NA-033.

CERN-PS-157 (Feb 1977) Approved Mar 1977; Completed Aug 1980.

HIGH PRECISION MEASUREMENT OF $\pi^- p$ TOTAL CROSS SECTION

CERN – P Baillon, J Chauveau, M Ferro-Luzzi, J M Perreau, J Sequinot
ECOLE POLYTECHNIQUE – E Barrelet (Spokesperson), D Lellouch, P Liaud, F Moreau, M Urban
COLLEGE DE FRANCE – M Benayoun, J Kahane, P Leruste, R Sene, J Tocqueville
LBL – D Mettel-Chew

Accelerator CERN-PS *Detector* Wire chamber

Reactions

$\pi^- p$ → X	2–14 GeV/c
$\pi^+ p$ → X	2.5–14 GeV/c
$K^- p$ → X	4.74 GeV/c

Particles studied $N(\text{unspec})^0$, $\Delta(\text{unspec})^0$

Comments An addition to CERN experiment PS-153. A search for narrow resonances. A high-statistics experiment (2×10^{11} events).

Papers PL 94B (1980) 541.

CERN-PS-159 Approved Oct 1977, Nov 1978, Jun 1979, Nov 1979, Jan 1980, Jul 1980, Nov 1980; Completed Sep 1981.

STRANGE DIBARYON SYSTEMS

ROME U – G Marini, G Martellotti, F Massa, A Rambaldi
SACLAY – J P De Brion, J B Cheze, J Derre, G Marel, E Pauli (√ Spokesperson), C Pigot
VANDERBILT U – J Marraffino, C Roos, M Webster
MADRID U – A Ferrando, R Llosa
CERN – S Reucroft, K Schulze
COLLEGE DE FRANCE – J Vrana

Accelerator CERN-PS *Detector* Spectrometer

Reactions

K^- deut → K^+ X	1.0–1.4 GeV/c
K^- deut → π^+ X	"
K^- deut → π^- X	"
π^+ deut → K^+ X	"
π^- deut → K^+ X	"

Particles studied dibaryon($S=-2$), dibaryon($S=-1$)

Comments Measures missing mass against the K^+ and $\pi^{\pm}$ to search for $S=-2$ and $S=-1$ dibaryons.

Papers NIM 158 (1979) 303, NIM 179 (1981) 61, NIM 185 (1981) 49, NIM 188 (1981) 29, PL 104B (1981) 330, NP B209 (1982) 1, and NP B249 (1985) 172.

CERN-PS-160 (1977) Approved Dec 1977; Completed Aug 1980.

MEASUREMENT OF A AND R PARAMETERS IN THE REACTION $\pi^+ p \rightarrow K^+ \Sigma^+$

EDINBURGH U – D Candlin, D Lowe, J Muir, K Peach, L Scotland
RUTHERFORD – G J Alner, C Brankin, I F Corbett, S Fisher, M Gibson, G Ioannidis, E W Kendall, P J Litchfield (√ Spokesperson), L Mapelli, M Morrissey, R Nickson, J Wright
WESTFIELD COLL – E Arik, M Green, G Hallewell, B Pollock, A Shirany

Accelerator CERN-PS *Detector* RMS

Reactions Polarized target

$\pi^+ p \rightarrow K^+ \Sigma^+$	1.5–1.9 GeV/c

Particles studied exotic-nucleon, $\Delta(\text{unspec})^{++}$

Comments The first stage of the experiment, measurement of the differential cross section and polarization, was RHEL-193.

CERN-PS-161 (1977) Approved Jan 1978; Completed Aug 1980.

SEARCH FOR STRONGLY BOUND STATES OF THE $\bar{p}p$, $\bar{p}d$, and $\bar{p}$-FEW-NUCLEON STATES

BASEL U – G Backenstoss, P Pavlopoulos, J Repond, L Tauscher, D Troester
KERNFORSCHUNGSZENTRUM, KARLSRUHE & KARLSRUHE U – P Blum, R Guigas, H Koch (√ Spokesperson), M Meyer, U Raich, B Richter
STOCKHOLM U – L Adiels, I Bergstrom, K Fransson, A Kerek
STRASBOURG – M Suffert
THESSALONIKI U – K Zioutas

Accelerator CERN-PS *Detector* Combination

Reactions

$\bar{p}\,p$ → γ mesons	0–500 MeV/c
$\bar{p}$ deut → γ mesons nucleon	"
$\bar{p}$ nucleus → γ mesons nucleus	"

Particles studied baryonium

Comments A search for high-energy γ transitions between 'atomic' and below-threshold antinucleon-nucleus bound states.

Papers NP B228 (1983) 424, PL 126B (1983) 284, NIM 213 (1983) 251, ZPHY C21 (1984) 315, PL 137B (1984) 323, and PL 138B (1984) 235.

CERN-PS-162 (Feb 1978) Approved May 1978, May 1979, Nov 1979, Jan 1980, Mar 1980, Nov 1980; Completed Jul 1982.

STUDY OF THE STRUCTURE OF EXOTIC LIGHT NUCLEI PRODUCED AT THE PS

ORSAY, RENE BERNAS – G Audi, A Coc, M Epherre, P Guimbal, S K T Mark, A C Mueller, M de Saint-Simon, J M Serre, C Thibault (√ Spokesperson), F Touchard
ORSAY, AIME COTTON – H T Duong, P Jacquinot, P Juncar, S Liberman, J Pinard, J L Vialle
ORSAY, IPN – C Detraz, M C Goffri, D Guillemaud, M Langevin, F Naulin, C Zaidins
BONN U – S Buttgenbach
CERN – R Klapisch

Accelerator CERN-PS *Detector* Combination

Reactions

p U → nucleus X	20 GeV/c

p Ir → nucleus X	"

Comments A further study of an 'island of deformation' around $N = 20$ for $Z = 11$ and 12 (Na and Mg).

Papers PL 94B (1980) 307, JPL 41 (1980) L459, NIM 186 (1981) 87, NIM 186 (1981) 193, NIM 186 (1981) 329, NP A366 (1981) 449, PL 108B (1982) 169, JP 43 (1982) 509, PR C25 (1982) 2756, NP A394 (1983) 378, NP A402 (1983) 301, PL 125B (1983) 116, PL 130B (1983) 251, NP A414 (1984) 151, and NP A426 (1984) 37.

CERN-PS-163-2 (1979) Approved Nov 1979; Completed Jul 1980.

MEASUREMENT OF THE $\bar{p}p$ EXCITATION FUNCTION

CERN – C Amsler
HEIDELBERG, MAX PLANCK INST – K Braune, W Bruckner, H Dobbeling, T J Ketel, K Kilian, B Povh, M Uhrmacher, Th Walcher (√ Spokesperson)
HEIDELBERG U, PHYS INST – R W Frey, R Walczak
SACLAY – P Birien, D Garreta

Accelerator CERN-PS *Detector* Spectrometer

Reactions

$\bar{p}\,p \rightarrow$ X	400–1000 MeV/c
$\bar{p}\,p \rightarrow \bar{p}\,p$	"
$\bar{p}\,p \rightarrow$ annihil	"

Particles studied baryonium

Comments Measures the elastic differential cross section and extracts the total cross section, the slope parameter, and the real-to-imaginary part at 0°

Papers Workshop on Physics at LEAR (Erice, 1982). No other papers expected.

CERN-PS-164 (Sep 1978) Approved Oct 1978; Completed Apr 1980.

THE INFLUENCE OF CHANNELLING ON ATOMIC AND NUCLEAR REACTION YIELDS

AARHUS U – J S Forster, P R Jensen, H Madsboll, S P Moller, H Nielsen, G Petersen, H Schiott
CERN – J Bak, G Melchart, E Uggerhoj (Spokesperson)
STRASBOURG – J J Grob, P Siffert

Accelerator CERN-PS *Detector* Wire chamber

Reactions

p crystal	2–20 GeV/c
$\bar{p}$ crystal	"
π^+ crystal	"
π^- crystal	"
K^+ crystal	"
K^- crystal	"

Comments Continues studies of channelling in Ge and Si crystals of PS-150.

CERN-PS-165 (Sep 1978) Approved Nov 1978; Completed Apr 1980.

MEASUREMENT OF THE K^-p SCATTERING LENGTH AT THRESHOLD BY OBSERVATION OF KAONIC HYDROGEN X-RAYS FROM A CONDENSED TARGET

BIRMINGHAM U – S D Hoath, J Lowe, G J Pyle, G T A Squier
RUTHERFORD – S Baird, C J Batty (√ Spokesperson), P Sharman
SURREY U – P Bird, A S Clough, K Parker

Accelerator CERN-PS *Detector* Counter

Reactions

$K^-\,p \rightarrow K^-\,p\,\gamma$	0 GeV/c

Comments Continues measurements and uses apparatus of RHEL-181.

Papers NP B209 (1982) 16, NP A392 (1983) 297, and NP A404 (1983) 482. No other papers expected.

CERN-PS-166 Approved Nov 1979; Completed Nov 1982.

SEARCH FOR Σ HYPERNUCLEAR STATES USING THE STRANGENESS EXCHANGE REACTIONS (K^-,π^-) AND (K^-,π^+)

HEIDELBERG, MAX PLANCK INST – K Braune, W Brueckner (Spokesperson), H Doebbeling, T J Ketel, H Kneis, B Povh, R Ransome, R Szwed, A Thiessen, M Treichel, M Uhrmacher, T Walcher
HEIDELBERG U, PHYS INST – J Ciborowski, R W Frey, A Majewski, T A Shibata
SACLAY – R Bertini, P Birien, G Bruge, H Catz, A Chaumeaux, J M Durand, D Garreta, S Janouin, B Mayer, J C Peng, J Saudinos
CERN – K Kilian

Accelerator CERN-PS *Detector* Spectrometer

Reactions

K^- nucleus → π^- X	400, 450 MeV/c
K^- nucleus → π^+ X	"

Particles studied hypernuc

Papers PL 136B (1984) 29, and PL (to be published).

CERN-PS-167 (Jan 1980) Approved May 1980; Completed May 1981.

BACKGROUND CALIBRATION FOR A PROTON LIFETIME DETECTOR

CERN – D C Cundy, M Price
FRASCATI – G Battistoni, V Chiarella, E Iarocci, G P Murtas, L Trasatti
MILAN U & INFN, MILAN – E Bellotti, E Fiorini (√ Spokesperson), P Negri, A Pullia, S Ragazzi, M Rollier, L Zanotti
TURIN U – G Bologna, C Castagnoli, G Mannocchi, L Periale, B D'Ettorre Piazzoli, P Picchi, O Saavedra

Accelerator CERN-PS *Detector* Calorimeter

Reactions

ν_μ nucleus	0–6 GeV/c
$\bar{\nu}_\mu$ nucleus	"

Comments Calibrates a module of a nucleon lifetime detector (to be used in a deep underground experiment) with a neutrino flux similar to the atmospheric neutrino flux.

Papers NIM 219 (1984) 300.

CERN-PS-168 (May 1980) Approved May 1980; Completed Jun 1981.

TO TEST A PROTOTYPE OF A PROTON LIFETIME DETECTOR IN A NEUTRINO BEAM AT THE PS

ORSAY, LAL – B Grelaud, S Jullian, C Longuemare, C Poulot, G Szklarz
ECOLE POLYTECHNIQUE – B Degrange, U Nguyen-Khac
SACLAY – R Barloutaud (√ Spokesperson), G Chardin, J Mallet, J C Michau, S Palanque, J Rich, M Spiro, J C Thevenin

Accelerator CERN-PS *Detector* Calorimeter

Reactions

ν_μ nucleus	0–6 GeV/c
$\bar{\nu}_\mu$ nucleus	"

Comments Tests a prototype calorimeter for a proton lifetime experiment. Didn't get enough statistics to be used as background for nucleon decay.

CERN-PS-169 (Aug 1980) Approved Oct 1980; Completed Mar 1983.

SEARCH FOR NEUTRINO OSCILLATIONS

CERN – F Dydak, G Feldman, C Guyot, R Hagelberg, H J Meyer, F Ranjard, J R Rothberg, W von Rueden, J Steinberger, H Taureg, H Wachsmuth, H Wahl, J Wotschack (✓ Spokesperson)
DORTMUND U – H Bluemer, P Buchholz, J Duda, F Eisele, K Kleinknecht, J Knobloch, D Pollmann, B Pszola, B Renk
HEIDELBERG U, IHEP – R Belusevic, B Falkenburg, T Flottmann, C Geweniger, J G H de Groot, H Keilwerth, K Tittel
SACLAY – P Debu, J P Merlo, A Para, P Perez, B Peyaud, J Rander, J P Schuller, R Turlay
WARSAW, INR – H Abramowicz, J Krolikowski

Accelerator CERN-PS *Detector* CDHS

Reactions

$\nu_\mu \rightarrow \nu_\mu$	0.5–3.0 GeV/c

Particles studied ν_μ

Comments Measures the disappearance rate of ν_μ's between two points at 130 and 885 m from the target, using charged current events as the signature. Two detectors with identical structure are used simultaneously. For a description of the apparatus, see the LBL-91 supplement on detectors.

Papers PL 134B (1984) 281. No other papers expected.

CERN-PS-170 (Aug 1980) Approved Nov 1980.

PRECISION MEASUREMENTS OF THE PROTON ELECTROMAGNETIC FORM FACTORS IN THE TIME-LIKE REGION AND VECTOR MESON SPECTROSCOPY

FERRARA U – R Calabrese, P Dalpiaz (Spokesperson), P F Dalpiaz, F Petrucci, M Savrie
PADUA U – R Carlin, U Dosselli, F Gasparini, S Limentani, M Posocco, R Stroeli, C Voci
SACLAY – G Bardin, G Burgun, J Derre, J Duclos, M Huet, C Kochowsky, G Marel, N Zekri
FRASCATI – G Capon
TURIN U – L Tecchio
CERN – E Mazzucato

Accelerator CERN-PS *Detector* Wire chamber

Reactions

$\overline{p}\ p \rightarrow e^+\ e^-$	0–2 GeV/c
$\overline{p}\ p \rightarrow e^+\ e^-$ neutrals	0 GeV/c

Particles studied vmeson^0

Comments Pending (November 86).

CERN-PS-171 (Aug 1980) Approved Nov 1980; Completed Jul 1986.

A STUDY OF $\overline{p}p$ INTERACTIONS AT REST IN A H_2 GAS TARGET AT LEAR

ASTERIX COLLABORATION
CERN – R Armenteros, D Bailey, U Gastaldi
MAINZ U, INST PHYS – K D Duch, M Heel, H Kalinowsky, F Kayser, E Klempt (✓ Spokesperson), R Landua, B May, O Schreiber, M Ziegler
MUNICH U, EXP PHYS – W Dahme, F Feld-Dahme, U Schaefer, R W Wodrich
ORSAY, LAL – J C Bizot, B Delcourt, J Jeanjean, H Nguyen, N Prevot
BRITISH COLUMBIA U – E G Auld, D A Axen, M Comyn, K L Erdman, B Howard, R Howard, G Marshall, B L White
VICTORIA U – G A Beer, L P Robertson
VIENNA, INST RADIUMFORSCH, KERNPHYS – M Botlo, C Laa, H Vonach
ZURICH U – C Amsler, M Doser, J Riedelberger, U Straumann, P Truoel
GENEVA U – C Sabev

Accelerator CERN-LEAR *Detector* Combination

Reactions

$\overline{p}\ p \rightarrow \overline{p}\ p\ \gamma$	0 GeV/c
$\overline{p}\ p \rightarrow$ annihil	"
$\overline{p}\ p \rightarrow \pi^+\ \pi^-$	"
$\overline{p}\ p \rightarrow K^+\ K^-$	"
$\overline{p}\ p \rightarrow$ pions (γ)	"
$\overline{p}\ p \rightarrow$ kaons pion(s)	"

Particles studied baryonium, exotic-meson, glueball, $f_1(1420)$

Papers PL 152B (1985) 135, and PL 157B (1985) 333.

CERN-PS-172 (Jul 1980) Approved Nov 1980; Completed Aug 1986.

$\overline{p}p$ TOTAL CROSS SECTIONS AND SPIN EFFECTS IN $\overline{p}p \rightarrow K^+K^-$, $\pi^+\pi^-$, $\overline{p}p$ ABOVE 200 MeV/c

NIKHEF, AMSTERDAM – R Blokzijl, K Bos, J Kluyver, R A Kunne, L Linssen
GENEVA U – E Heer, R Hess, C Lechanoine-Leluc, Y Onel, D Rapin
QUEEN MARY COLL – D Bugg (✓ Spokesperson), J Hall
SURREY U – A S Clough, R Shypit
TRIESTE U & INFN, TRIESTE – R Birsa, F Bradamante, A Martin, A Penzo, P Schiavon, F Tessarotto, S Dalla Torre, A Villari

Accelerator CERN-LEAR *Detector* Wire chamber

Reactions Polarized target

$\overline{p}\ p \rightarrow \pi^+\ \pi^-$	300–2000 MeV/c
$\overline{p}\ p \rightarrow K^+\ K^-$	"
$\overline{p}\ p \rightarrow \overline{p}\ p$	"
$\overline{p}\ p \rightarrow$ X	200–800 MeV/c
$\overline{p}\ p \rightarrow$ neutrals	"

Particles studied baryonium

Comments The main aim is the study of narrow states (if they exist). Also to study the analyzing power of carbon in small-angle $\overline{p}p$ scattering, and $\overline{p}p$ elastic scattering in the coulomb-nuclear interference region.

Papers PL 155B (1985) 437.

CERN-PS-173 (Aug 1980) Approved Nov 1980; Completed May 1986.

MEASUREMENT OF $\overline{p}p$ CROSS SECTIONS AT LOW $\overline{p}$ MOMENTA

HEIDELBERG, MAX PLANCK INST – W Bruckner, H Doebbeling, K Dworschak, D von Harrach, S Paul, B Povh, M Treichel
HEIDELBERG U, PHYS INST – M Nomachi, T A Shibata
LAVAL U – B Cujec
MAINZ U, INST KERNPHYS – Th Walcher (✓ Spokesperson)
RUTGERS U – R Ransome

Accelerator CERN-LEAR *Detector* Combination

Reactions

$\overline{p}\ p \rightarrow \overline{p}\ p$	150–600 MeV/c
$\overline{p}\ p \rightarrow \overline{n}\ n$	"
$\overline{p}\ p \rightarrow$ annihil	"
$\overline{p}\ p \rightarrow$ X	"

Particles studied baryonium

Comments A search for baryonium and a measurement of differential cross sections.

Papers PL 158B (1985) 180, PL 166B (1986) 113, and PL 169B (1986) 302.

CERN-PS-174 (Aug 1980) Approved Dec 1980; Completed Jul 1986.

PRECISION SURVEY OF X-RAYS FROM $\overline{p}p$ ($\overline{p}d$) ATOMS USING THE INITIAL LEAR BEAM

NIKHEF, AMSTERDAM – E W A Lingeman
BIRMINGHAM U – J D Davies (Spokesperson), J Lowe, J M Nelson, G J Pyle, A Selvarajah, G T A Squier

DELFT UNIV TECH – C Van Eijk, R Hollander, D Langerveld, W J C Okx, A Zoutendijk
RUTHERFORD – C A Baker, C J Batty, S Sakamoto
WILLIAM AND MARY COLL – R E Welsh, R Winter

Accelerator CERN-LEAR *Detector* Photon spectrometer

Reactions

$\bar{p}\,p \rightarrow \bar{p}\,p\,\gamma$	0 MeV/c
$\bar{p}$ deut $\rightarrow \bar{p}$ deut γ	"

Comments The detector is a Si(Li) crystal.

Papers PL 162B (1985) 71.

CERN-PS-175 (1980) Approved Dec 1980; Completed Jul 1986.

MEASUREMENT OF THE ANTIPROTONIC LYMAN AND BALMER X-RAYS OF $\bar{p}$ H AND $\bar{p}d$ ATOMS AT VERY LOW TARGET PRESSURES

KERNFORSCHUNGSZENTRUM, KARLSRUHE & KARLSRUHE U – R Bacher, P Bluem, D Gotta, H Koch, W Kunold, D Rohmann, M Schneider, L M Simons (√ Spokesperson)

Accelerator CERN-LEAR *Detector* Photon spectrometer

Reactions

$\bar{p}\,p \rightarrow \bar{p}\,p\,\gamma$	0 GeV/c
$\bar{p}$ deut $\rightarrow \bar{p}$ deut γ	"

Comments The detectors are Si(Li) crystals.

CERN-PS-176 (Aug 1980) Approved Dec 1980; Completed Jun 1986.

STUDY OF X-RAY AND γ-RAY SPECTRA FROM ANTIPROTONIC ATOMS AT THE SLOWLY EXTRACTED $\bar{p}$ BEAM OF LEAR

BASEL U – G Backenstoss, C Findeisen, L Tauscher
KERNFORSCHUNGSZENTRUM, KARLSRUHE & KARLSRUHE U – P Bluem, G Bueche, D Gotta, D Hancock, J Hauth, H Koch, T Koehler, H Poth (√ Spokesperson), D Rohmann
STOCKHOLM, RES INST ATOMIC PHYS – L Adiels
STOCKHOLM U – I Bergstrom, S Carius, A Nilsson
STRASBOURG – M Suffert
THESSALONIKI U – S Charalambous, M Chardalas, G Dedoussis, K Zioutas
CERN – A Kreissl, P Pavlopoulos, D Troester, A Wolf

Accelerator CERN-LEAR *Detector* Photon spectrometer

Reactions

$\bar{p}$ nucleus $\rightarrow \bar{p}$ nucleus γ	0 MeV/c

Comments The detectors are Ge and Si(Li) crystals.

Papers PL 176B (1986) 327.

CERN-PS-177 (Jul 1980) Approved Dec 1980; Completed Jul 1986.

A SEARCH FOR HEAVY HYPERNUCLEI AT LEAR

NIKHEF, AMSTERDAM – J Konijn
DARMSTADT, GSI – S Polikanov (Spokesperson)
GRENOBLE, CEN – J P Bocquet, M Maurel, E Monnand, H Nifenecker, P Perrin, C Ristori
SACLAY – J Mougey
WARSAW U, IEP – T Krogulski
UPPSALA U – G Eriksson, T Johansson, G Tibell
ORSAY, CSNSM – M Epherre

Accelerator CERN-LEAR *Detector* Wire chamber

Reactions

$\bar{p}$ nucleus	0 GeV/c

Particles studied hypernuc

Comments 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. A K^- then occasionally interacts to produce a Λ, which forms a hypernucleus.

CERN-PS-178 (Aug 1980) Approved Dec 1980; Completed Jul 1986.

$\bar{n}$ PRODUCTION AT LEAR

CAGLIARI U – L Cugusi, M P Macciotta, S Marcello, A Masoni, G Puddu, S Serci
PADUA U – M Morandin, R A Ricci, C Voci
TURIN U – T Bressani (√ Spokesperson), G Della Casa, E Chiavassa, S Costa, M Gallio, F Iazzi, B Minetti, A Musso

Accelerator CERN-LEAR *Detector* Calorimeter

Reactions

$\bar{p}\,p \rightarrow \bar{n}\,n$	0.1–0.6 GeV/c

Comments Studies $\bar{n}$ production near 0°, with an eye toward future experiments on $\bar{n}p$, $\bar{n}n$, and $\bar{n}d$ reactions.

CERN-PS-179 (Aug 1980) Approved Dec 1980; Completed Jul 1986.

STUDY OF THE INTERACTION OF LOW-ENERGY ANTIPROTONS WITH ^{2}H, ^{3}He, ^{4}He, AND Ne NUCLEI USING A STREAMER CHAMBER IN A MAGNETIC FIELD

BERGEN U – A Haatuft, A Halsteinslid, K Myklebost, J M Olsen
BRESCIA U – E Lodi Rizzini
DUBNA – Y A Batusov, S A Bunyatov, I V Falomkin, G B Pontecorvo, M G Sapozhnikov
FRASCATI – C Guaraldo, A Maggiora
OSLO U – F O Breivik, T Jacobsen, S O Sorensen
PADUA U – L Peruzzo, G Sartori, M Vascon
PAVIA U – G Bendiscioli, G Fumagalli, C Marciano, A Rotondi, A Zenoni
TURIN U – F Balestra, S Bossolasco, M P Bussa, L Busso, L Ferrero, R Garfagnini, A Grasso, D Panzieri, G Piragino (√ Spokesperson)

Accelerator CERN-LEAR *Detector* Streamer chamber

Reactions

$\bar{p}\,p$	0–200 MeV/c
$\bar{p}$ deut	"
$\bar{p}$ ^{3}He	"
$\bar{p}$ He	0–600 MeV/c
$\bar{p}$ Ne	"
$\bar{p}$ Ag	"
$\bar{p}$ Br	"

Papers NIM 188 (1981) 69, RNC 5 (1982) NO. 10, LNC 38 (1983) 83, LNC 38 (1983) 211, NC 79A (1984) 193, NIM 222 (1984) 524, LNC 41 (1984) 223, PL 149B (1984) 69, NIM 234A (1985) 30, PL 165B (1985) 265, NP A452 (1986) 573, and EL 2 (1986) 115.

CERN-PS-180 (Oct 1980) Approved Mar 1981; Completed Aug 1984.

SEARCH FOR NEUTRINO OSCILLATIONS AT CERN PS USING BEBC

ATHENS U – A Apostolakis, P Ioannou, P Kostarakis, C Kourkoumelis, P Pramatiotis, L K Resvanis
PADUA U – M Baldo-Ceolin (Spokesperson), F Bobisut, E Calimani, S Ciampolillo, H Huzita, M Loreti, G Miari, G Puglierin, A Sconza
PISA U & INFN, PISA – C Angelini, A Baldini, L Bertanza, A Bigi, R Fantechi, E Flaminio, R Pazzi, C Petri, G Saitta
WISCONSIN U – U Camerini, W Fry, R Loveless, R March, M Procario, D D Reeder
CERN – S Katsanevas

Accelerator CERN-PS *Detector* HLBC-BEBC

Reactions

ν_μ nucleus $\rightarrow \mu^-$ X	0.5–3.0 GeV/c

ν_e nucleus $\rightarrow e^-$ X "

Particles studied ν_e, ν_μ, ν_τ

Papers PL 179B (1986) 307.

CERN-PS-181 (Feb 1981) Approved Mar 1981; Completed Mar 1983.

CONTRIBUTION OF THE CHARM COLLABORATION TO THE CERN NEUTRINO OSCILLATION PROGRAM

CHARM COLLABORATION

NIKHEF, AMSTERDAM – J Dorenbosch, C Nieuwenhuis
CERN – J V Allaby, U Amaldi, F Bergsma, A Capone, W Flegel, L Lanceri, M Metcalf, J Panman, C Santoni, K Winter (√ Spokesperson)
HAMBURG U – I Abt, J Aspiazu, F W Busser, H Daumann, P D Gall, F Niebergall, P Schutt, P Stahelin
MOSCOW, ITEP – E Grigoriev, V Kaftanov, V Khovansky, A Rosanov
INFN, ROME – G Barbiellini, A Baroncelli, L Barone, B Borgia, C Bosio, M Diemoz, U Dore, F Ferroni, E Longo, L Luminari, P Monacelli, F de Notaristefani, L Tortora, V Valente

Accelerator CERN-PS *Detector* CHARM

Reactions

ν_μ nucleus $\rightarrow \mu^-$ X	0.5–1.5 GeV/c

Particles studied ν_μ

Comments Consists of two detectors, one at 150 m, the other at 880 m, from the target. For a description of the apparatus, see the LBL-91 supplement on detectors.

Papers PL 142B (1984) 103.

CERN-PS-182 (Jan 1981) Approved May 1981; Completed Jul 1986.

INVESTIGATIONS ON BARYONIUM AND OTHER RARE $\bar{p}p$ ANNIHILATION MODES USING HIGH-RESOLUTION π^0 SPECTROMETERS

BASEL U – G Backenstoss, M Hugi, U Mall, H O Meyer, R Rickenbach, A Schopper, L Tauscher (√ Spokesperson)
CERN – P Pavlopoulos, D Troester
STOCKHOLM, RES INST ATOMIC PHYS – L Adiels, I Bergstrom, S Carius, A Kerek
THESSALONIKI U – S Charalambous, D Hadjifotiadou, K Papastefanou, K Zioutas

Accelerator CERN-LEAR *Detector* Spectrometer

Reactions

$\bar{p}\,p \rightarrow \pi^0$ X	0 GeV/c
$\bar{p}\,p \rightarrow \eta$ X	"
$\bar{p}\,p \rightarrow \gamma$ X	"

Particles studied baryonium

Comments Uses high-resolution γ detectors, as well as scintillators for charged particles.

Papers NIM A244 (1986) 380, and PL 182B (1986) 405.

CERN-PS-183 (Aug 1980) Approved May 1981; Completed Aug 1986.

SEARCH FOR BOUND $N\bar{N}$ STATES USING A PRECISION γ AND CHARGED-PION SPECTROMETER AT LEAR

ATHENS U – A Angelopoulos, A Apostolakis, P Papailias, H Rozaki, L Sakelliou, M Spyropoulou-Stassinaki
UC, IRVINE – M Fero, M Y Gee, M A Mandelkern, R Ray, D Schultz, J Schultz, T Usher
KERNFORSCHUNGSZENTRUM, KARLSRUHE & KARLSRUHE U – G Bueche, H Koch, W Rohrback, D Walther
PENN STATE U – T A Armstrong, J Biard, R A Lewis, B Y Oh, S M Playfer, G A Smith (√ Spokesperson), M Soulliere, J Whitmore
NEW MEXICO U – B Bassalleck, P Denes, N Graf, N Komninos, M Suffert, D M Wolfe

Accelerator CERN-LEAR *Detector* Spectrometer

Reactions

$\bar{p}\,p \rightarrow \gamma$ X	0 GeV/c
$\bar{p}\,p \rightarrow \pi^+$ X	"
$\bar{p}\,p \rightarrow \pi^-$ X	"
$\bar{p}\,p \rightarrow K^+$ X	"
$\bar{p}\,p \rightarrow K^-$ X	"
$\bar{p}\,p \rightarrow$ annihil	0–300 MeV/c

Particles studied baryonium, meson

Comments Continues studies of BNL-708.

Papers PL 159B (1985) 210, and PL 178B (1986) 441.

CERN-PS-184 (Dec 1980) Approved May 1981; Completed Aug 1985.

STUDY OF $\bar{p}$-NUCLEUS INTERACTION WITH A HIGH RESOLUTION MAGNETIC SPECTROMETER

SACLAY – P Birien, G Bruge, H Catz, A Chaumeaux, D Drake, D Garreta (√ Spokesperson), S Janouin, D Legrand, M C Mallet-Lemaire, B Mayer, J Pain, J C Peng, F Perrot
STRASBOURG – E Aslanides, O Bing
TEL AVIV U – J Lichtenstadt, A I Yavin
GRENOBLE, CEN – M Berrada, J P Bocquet, E Monnand, J Mougey, P Perrin

Accelerator CERN-LEAR *Detector* Spectrometer

Reactions

$\bar{p}$ nucleus $\rightarrow \bar{p}$ nucleus	300–800 MeV/c
$\bar{p}$ nucleus $\rightarrow p$ X	"

Comments The nuclear targets range from deuterium to Pb and Bi.

Papers PL 135B (1984) 266, PL 149B (1984) 64, PL 150B (1985) 95, PR C32 (1985) 1096, NP A451 (1986) 541, PL 169B (1986) 14, and NP A456 (1986) 557.

CERN-PS-185 (Aug 1981) Approved Oct 1981.

STUDY OF THRESHOLD PRODUCTION OF $\bar{p}p \rightarrow \overline{Y}Y$ AT LEAR

CARNEGIE MELLON U – P D Barnes, G Franklin, B Quinn, J Seydoux, J Szymanski
KERNFORSCHUNGSANLAGE, JULICH – K Kilian (√ Spokesperson), W Oelert, G Sehl, T Zeludziewicz
ERLANGEN U – W Eyrich, M Frankenberg, A Hofmann, M Meyerhofer, F Stinzing
FREIBURG U – P Birien, W Dutty, J Franz, N Hamann, E Roessle, H Schledermann, H Schmitt
ILLINOIS U, URBANA – R A Eisenstein, D Hertzog
RICE U – B Bonner
UPPSALA U – G Ericsson, T Johansson, S Ohlsson
VIENNA, INST RADIUMFORSCH, KERNPHYS – W Breunlich, N Naegele, P Pawlek

Accelerator CERN-LEAR *Detector* Wire chamber

Reactions

$\bar{p}\,p \rightarrow \bar{\Lambda}\,\Lambda$	1.2–2.0 GeV/c
$\bar{p}\,p \rightarrow \bar{\Lambda}\,\Sigma^0$	"
$\bar{p}\,p \rightarrow \bar{\Sigma}^-\,\Sigma^+$	"
$\bar{p}\,p \rightarrow \bar{\Sigma}^+\,\Sigma^-$	"
$\bar{p}\,p \rightarrow K_S\,K_S$	"

Particles studied baryonium, $X(2220)$

Comments Measures cross sections, polarizations, and spin correlations. Emphasis is on the $\bar{\Lambda}\Lambda$ channel. Investigates the $Y\overline{Y}$ final-state interaction and decays and compares Λ and $\bar{\Lambda}$ decay asymmetries and lifetimes. Taking data (December 86).

CERN-PS-186 (Aug 1980) Approved Oct 1981; Completed Jul 1986.

NUCLEAR EXCITATIONS BY ANTIPROTONS AND ANTIPROTONIC ATOMS

MUNICH, TECH U – H Daniel, T von Egidy (√ Spokesperson), H Hagn, F J Hartmann, W Kanert, H Plendl
MISSISSIPPI U – J J Reidy
KERNFORSCHUNGSANLAGE, JULICH – H Machner, G Riepe

Accelerator CERN-LEAR *Detector* Photon spectrometer, Spectrometer

Reactions

$\bar{p}$ nucleus → γ charged X	0 GeV/c

Papers PRL 56 (1986) 2368, and PL 179B (1986) 25.

CERN-PS-187 (May 1981, Sep 1981) Approved Oct 1981; Completed Jun 1984.

A GOOD STATISTICS STUDY OF $\bar{p}$ INTERACTIONS WITH NUCLEI

LOS ALAMOS – M Clover, R DeVries, N DiGiacomo (√ Spokesperson), J Kapustinsky, P McGaughey, W Sondheim, J Sunier
GRENOBLE U – M Buenerd, J Chauvin, D Lebrun, P Martin, P De Saintigon

Accelerator CERN-LEAR *Detector* Spectrometer

Reactions

$\bar{p}$ nucleus → annihil	600 MeV/c
$\bar{p}$ nucleus → p nucleus	"

Comments Measures the overall characteristics of $\bar{p}$ annihilations in nuclei. Studies inclusive and multiparticle correlation yields for π, K, p, d, ... ejectiles. Also searches for $\bar{p}$-nucleus bound or resonant states using the $A(\bar{p},p)A^*$ reaction.

Papers NIM A249 (1986) 361, and PRL 56 (1986) 2156.

CERN-PS-188 (Oct 1981) Approved Dec 1981; Completed Aug 1985.

MEASUREMENTS OF CHANNELLING RADIATION AND ITS POLARIZATION, X-RAY EXCITATION, TOGETHER WITH DEVIATIONS FROM LANDAU DISTRIBUTIONS

AARHUS U – J Bak, J A Ellison, F Meyer, S P Moller, K Ostergaard, J Pedersen, R Stensgaard, E Uggerhoj (Spokesperson)
CERN – A Sorensen
STRASBOURG – R Regall, P Siffert, M Suffert

Accelerator CERN-PS *Detector* Wire chamber

Reactions

e^+ crystal	1–10 GeV/c
e^- crystal	"
p crystal	"
π^+ crystal	"
π^- crystal	"

Comments Continues studies of experiments PS-164 and WA-064.

Papers PL 110B (1982) 162, and PL 112B (1982) 83.

CERN-PS-189 (Nov 1981) Approved Feb 1983.

HIGH PRECISION MASS MEASUREMENTS WITH A RADIOFREQUENCY MASS SPECTROMETER — APPLICATION TO THE MEASUREMENT OF THE $p\bar{p}$ MASS DIFFERENCE

ORSAY, CSNSM – A Coc, R Fergeau, R Le Gac, M de Saint-Simon, C Thibault (√ Spokesperson), F Touchard
CERN – E Haebel, H Herr, R Klapisch, G Lebee, G Petrucci, G Stefanini

Accelerator CERN-PS *Detector* Spectrometer

Reactions

$\bar{p}$	20 MeV/c

Particles studied $\bar{p}$

Comments The $\bar{p}$ mass is compared with that of the H^- ion. In preparation (October 86).

CERN-PS-191 (Feb 1983) Approved Mar 1983; Completed Aug 1984.

SEARCH FOR DECAYS OF HEAVY NEUTRINOS WITH THE PS BEAM

DEMOCRITOS NUCLEAR RESEARCH CENTER – M Dris, D Lukas
CERN – M Ferro-Luzzi, J M Perreau, Ch Peyrou
PARIS, CURIE UNIV VI – G Bernardi, J M Levy, Y Pons, M Rivoal, F Vannucci (√ Spokesperson)
ROME U – F Di Carlo, G Carugno
COLLEGE DE FRANCE – J Chauveau

Accelerator CERN-PS *Detector* Calorimeter

Reactions

ν	0–5 GeV/c
$\bar{\nu}$	"

Particles studied ν, $\bar{\nu}$

Comments Aims to detect an e^+e^- or $\gamma\gamma$ pair originating from a point in an empty volume exposed to a flux of neutrinos.

Papers PL 166B (1986) 479, and PL 181B (1986) 173.

CERN-PS-192 (Mar 1983) Approved Mar 1983; Completed Aug 1983.

STUDY OF THE ENERGY DEPENDENCE OF THE ANOMALOUS MEAN FREE PATH EFFECT BY MEANS OF HIGH-ENERGY (> 12 GeV/NUCLEON) HELIUM NUCLEI

LBL – E M Friedlander (Spokesperson), H H Heckman, Y J Karant
FRANKFURT U – B Baican, H G Baumgardt, E Schopper
MARBURG U – R Beckmann, R Brandt, G Dersch, H Mollzahn, R M Weiner

Accelerator CERN-PS *Detector* Combination

Reactions

He nucleus	> 45 GeV/c

Particles studied anomalon

Comments Effects detected in emulsion, in AgCl crystals, and by radiochemical methods.

CERN-PS-194 (Nov 1982) Approved Nov 1984; Completed Jul 1986.

MEASUREMENTS OF THE RATIO BETWEEN DOUBLE AND SINGLE IONIZATION OF HELIUM FOR ANTIPROTONS

AARHUS U – J Bak, P Hvelplund, H Knudsen, E Uggerhoj (Spokesperson)
CERN – S P Moller, A H Sorensen
STOCKHOLM, RES INST ATOMIC PHYS – G Astner, I Bergstrom, L Liljeby

Accelerator CERN-LEAR *Detector* Spectrometer

Reactions

$\bar{p}$ He	> 3 MeV (T_{lab})

CERN-PS-195 (Jan 1985) Approved Sep 1985.

TEST OF CP VIOLATION WITH $\overline{K}^0$ AND K^0 AT LEAR

DEMOCRITOS NUCLEAR RESEARCH CENTER – M Dris, P Kokkinias, P Kostarakis, L Papadolpoulos, S Zevgolatakos
BASEL U – G Backenstoss, M Hugi, U Mall, R Rickenbach, C Santoni, A Schopper, L Tauscher

CERN – P Bloch, M Fidecaro, D Garreta, G Kesseler, P Pavlopoulos (Spokesperson), D A Troester, E Watson
FRIBOURG U – J C Dousse, J Kern, L Schaller
LIVERPOOL U – C Bee, M Dodgson, J R Fry, E Gabathuler, W G Hayes, P Hayman, L Sachs
SACLAY – G Burgun, J Derre, J L Faure, C Guyot, C Kochowski, G Marel, A Milstajn, E Pauli
SIN – P Kettle, T Nakada
STOCKHOLM, RES INST ATOMIC PHYS – L Adiels, I Bergstrom, S Carius, A Kerek, T Lindblad, A Nilsson
THESSALONIKI U – M Chaldaras, S Charalambous, S Dedousis, D Hatzifotiadou
ZURICH, ETH – R Von Dincklage, W Fetscher, H J Gerber, P Grumplinger, M Troege, C Witzig

Accelerator CERN-LEAR *Detector* Spectrometer, Calorimeter

Reactions

$\bar{p}\,p \rightarrow K^0\,X$	0 GeV/c
$\bar{p}\,p \rightarrow \overline{K}^0\,X$	"

Particles studied K^0, $\overline{K}^0$

Comments In preparation (November 86).

CERN-PS-196 (Mar 1985) Approved Nov 1985.

PRECISION COMPARISON OF $\bar{p}$ AND p MASSES IN A PENNING TRAP

FERMILAB – W Kells
MAINZ U, INST PHYS – H Kalinowsky
WASHINGTON U, SEATTLE – G Gabrielse (√ Spokesperson), T A Trainor

Accelerator CERN-LEAR *Detector* ?

Reactions

$\bar{p}$	0.0005 eV (T_{lab})

Particles studied $\bar{p}$, p

Comments Aims to compare p and $\bar{p}$ masses to an accuracy of one part in 10^9. Antiprotons have been trapped below 3 keV.

Papers PRL (accepted).

CERN-PS-197 (Oct 1985) Approved Apr 1986.

THE CRYSTAL BARREL: MESON SPECTROSCOPY AT LEAR WITH A 4π NEUTRAL AND CHARGED DETECTOR

CERN – K Braune
KERNFORSCHUNGSZENTRUM, KARLSRUHE & KARLSRUHE U – E Aker, G Bueche, S Cierjacks, D Engelhardt, T Henkes, H Koch (√ Spokesperson), A Kreissl, F Kroener, M Kunze, H Matthaey, D Rohmann, W Rohrbach, W Schott, D Walther, C Weddigen
ZURICH U – C Amsler, B Schmid, P Truoel
LBL – J Bistirlich, K M Crowe, C A Meyer
QUEEN MARY COLL – D V Bugg, G Hall, P Wells
SURREY U – A S Clough, R L Shypit
MAINZ U, INST PHYS – M Guckes, H Kalinowsky, E Klempt, R Rieger, U Straumann, W Weidenauer
STRASBOURG – M Suffert
VIENNA, INST RADIUMFORSCH, KERNPHYS & VIENNA U – H Vonach
MUNICH U, EXP PHYS – M Faessler, C Zupancic

Accelerator CERN-LEAR *Detector* CRYS-BARREL

Reactions

$\bar{p}\,p \rightarrow$ annihil	0–2000 MeV/c

Particles studied glueball, meson

Comments High detection efficiency for both neutral and charged particles at nearly all angles means nearly all annihilation channels are accessible. In preparation (October 86).

CERN-PS-198 (Oct 1985) Approved Apr 1986.

MEASUREMENT OF SPIN-DEPENDENT OBSERVABLES IN $\bar{p}N$ ELASTIC SCATTERING FROM 300 TO 700 MeV/c

SACLAY – J Arvieux, R Bertini (√ Spokesperson), H Catz, C Cerruti, A Chaumeaux, J M Durand, D Legrand, F Perrot, J Yonnet
KERNFORSCHUNGSZENTRUM, KARLSRUHE & KARLSRUHE U – E Boschitz, W Gyles, C R Ottermann, T Tacik
LYON, IPN – E Descroix, J Y Grossiord, A Guichard, R Harountunian
SIN – B Van den Brandt, J Konter, S Mango

Accelerator CERN-LEAR *Detector* Spectrometer

Reactions Polarized target

$\bar{p}\,p \rightarrow \bar{p}\,p$	300–700 MeV/c
$\bar{p}$ deut $\rightarrow \bar{p}$ deut	"

Comments Scheduled to run in September 87.

CERN-PS-199 (Nov 1985) Approved Apr 1986.

STUDY OF THE SPIN STRUCTURE OF THE $\bar{p}p \rightarrow \bar{n}n$ CHANNEL AT LEAR

CAGLIARI U – M P Macciotta, A Masoni, G Puddu, S Serci
GENEVA U – E Heer, R Hess, C Lechanoine-Leluc, D Rapin
KERNFORSCHUNGSZENTRUM, KARLSRUHE & KARLSRUHE U – E Boschitz, W Gyles, C R Otterman, T Tacik
TRIESTE U & INFN, TRIESTE – R Birsa, F Bradamante (√ Spokesperson), M Giorgi, A Martin, A Penzo, P Schiavon, F Tessarotto, S Dalla Torre, A Villari, A M Zanetti
TURIN POLYTECHNIC & INFN, TURIN – F Iazzi, B Minetti
TURIN U & INFN, TURIN – T Bressani, G Della Casa, E Chiavassa, M Gallio, N De Marco, A Musso

Accelerator CERN-LEAR *Detector* Counter

Reactions Polarized target

$\bar{p}\,p \rightarrow \bar{n}\,n$	500–1500 MeV/c

Particles studied meson

Comments Measures over the whole angular range the polarization parameter P and the polarization transfer parameter D in 100 MeV/c steps. Searches for resonances in the s channel. Uses a frozen-spin polarized target. In preparation (October 86).

CERN-PS-200 (Jan 1986) Approved Apr 1986.

A MEASUREMENT OF THE GRAVITATIONAL ACCELERATION OF THE ANTIPROTON

PISA U – N Beverini, L Bracci, G Torelli
LOS ALAMOS – J H Billen, R E Brown, L J Campbell, K R Crandall, T Goldman, D B Holtkamp, M H Holzscheiter, S D Howe, R J Hughes, M V Hynes (√ Spokesperson), N Jarmie, N S King, M M Nieto, A Picklesimer, W Saylor, E R Siciliano, J E Stovall, T P Wangler
RICE U – B E Bonner
TEXAS A AND M – D A Church, D J Ernst, A L Ford, R A Kenefick, J Reading
GENOA U – V Lagomarsino, G Manuzio
KENT STATE U – P C Tandy
CASE WESTERN RESERVE U – R M Thaler
CERN – M Weiss
NASA, AMES – F C Witteborn

Accelerator CERN-LEAR *Detector* Other

Reactions

$\bar{p}$	—

Comments Measures time of flight of ultra-low-velocity $\bar{p}$'s up a vertical drift tube. In preparation (October 86).

CERN-PS-201 (Jan 1986) Approved Sep 1986.

STUDY OF ANTINUCLEON ANNIHILATIONS AT LEAR WITH OBELIX, A LARGE-ACCEPTANCE AND HIGH-RESOLUTION DETECTOR, BASED ON THE OPEN AXIAL FIELD SPECTROMETER

OBELIX COLLABORATION

BRESCIA U – D Marioli, E Lodi Rizzini
CAGLIARI U – L Cugusi, M P Macciotta, S Marcello, A Masoni, G Puddu, S Serci
CERN – R Armenteros, J Butler, U Gastaldi (√ Spokesperson), R Landua, F Muller
FRASCATI – B Dulak, C Guaraldo, A Maggiora, F Sgamma
GENEVA U – C Sabev
DUBNA – Yu Batusov, S A Bunyatov, I V Falomkin, F Nichitiu, G B Pontecorvo, M G Sapozhnikov
LEGNARO – P Boccaccio, R Cherubini, F Gramegna, G Maron, G Moschini, R A Ricci, L Vannucci
ORSAY, AIME COTTON – H T Duong, S Liberman, J Pinard
ORSAY, RENE BERNAS – A Coc, R Le Gac, M Rey-Campagnolle, M de Saint-Simon, C Thibault, F Touchard
PADUA U – M Morando, G Sartori
PAVIA U – G Bendiscioli, C Marciano, A Rotondi, A Zenoni
TRIESTE U – G Pauli
TURIN U – F Balestra, G C Bonazzola, S Bossolasco, T Bressani, M P Bussa, L Busso, S Costa, A Feliciello, L Ferrero, R Garfagnini, A Grasso, D Panzieri, G Piragino, F Tosello, B Zosi
TURIN POLYTECHNIC – F Iazzi, B Minetti
UDINE U – D Cauz, L Santi, E Toppano
BRITISH COLUMBIA U – K L Erdman

Accelerator CERN-LEAR *Detector* Spectrometer

Reactions

$\bar{p}\ p \rightarrow$ annihil	0–1.8 GeV/c
$\bar{p}$ deut $\rightarrow$ annihil	"
$\bar{p}$ nucleus $\rightarrow$ annihil	"
$\bar{n}\ p \rightarrow$ annihil	"
$\bar{n}$ deut $\rightarrow$ annihil	"

Comments Studies (1) spectroscopy of $q\bar{q}$, exotic, glueball, and hybrid mesons, (2) dynamics of $N\bar{N}$ interactions, (3) strong-interaction effects on $p\bar{p}$ atoms, (4) quark-gluon aspects of nuclear matter, (5) possible highly excited states of nuclear matter, and (6) $\bar{p}$ annihilations with two nucleons. In preparation (October 1986).

CERN-R-110 (1979) Approved Mar 1979; Completed Dec 1983.

STUDY OF HIGH MASS ELECTRON PAIRS AND HIGH p_t PHENOMENA

BROOKHAVEN – C Chasman, P Haustein, J Olness, M Tanaka, M J Tannenbaum, P Thieberger
CERN – H J Besch, L Camilleri (Spokesperson), P T Cox, Ch von Gagern, C Grosso-Pilcher, C Newman-Holmes
OXFORD U – A L S Angelis, R Nickerson, N Phinney, K J Powell, A M Segar, J M Yelton
ROCKEFELLER U – R Breedon, T J Chapin, R L Cool, D S Hanna, J T Linnemann, S H Pordes, R W Rusack
MICHIGAN STATE U – B M Humphries, B G Pope, C W Salgado, S Stampke
FRASCATI – G Basini

Accelerator CERN-ISR *Detector* Spectrometer

Reactions

$p\ p \rightarrow$ neutrals X	30–62 GeV (E_{cm})
$p\ p \rightarrow e^+\ e^-$ X	"
$p\ p \rightarrow \pi^0$ X	"
$p\ p \rightarrow e^+\ e^-\ \gamma$ X	"
$p\ p \rightarrow \gamma$(s) X	"
$\bar{p}\ p$	"
p He	"
He He	"

Particles studied Υ(unspec), χ_b(unspec), $\eta_c(2980)$

Comments Uses modified apparatus of and extends studies of CERN-R-108. The listed final states are also studied in the $p\bar{p}$, p-He, and He-He reactions.

Papers PL 116B (1982) 379, PL 118B (1982) 217, PL 126B (1983) 132, PL 141B (1984) 140, NP B244 (1984) 1, PL 147B (1984) 472, PL 147B (1984) 477, and PL 168B (1986) 158.

CERN-R-210 (Apr 1979) Approved Jul 1979; Completed Dec 1983.

PRECISE MEASUREMENT OF THE $\bar{p}p$ TOTAL CROSS SECTION AT THE CERN-ISR

CERN – G Carboni, D Lloyd Owen
NAPLES U, IFS – M Ambrosio, G Barbarino, M Paternoster, S Patricelli
PISA U – V Cavasinni, M Morganti, T Del Prete (Spokesperson), F Schiavo, M Valdata-Nappi
SUNY, STONY BROOK – G Anzivino, P Grannis

Accelerator CERN-ISR *Detector* Combination

Reactions

$\bar{p}\ p \rightarrow$ X	23.5–62.7 GeV (E_{cm})
$\bar{p}\ p \rightarrow \bar{p}\ p$	"
$p\ p \rightarrow$ X	"
$p\ p \rightarrow p\ p$	"
p He $\rightarrow$ X	"
p He $\rightarrow p$ He	"
He He $\rightarrow$ X	"
He He $\rightarrow$ He He	"

Comments The apparatus consists of scintillation counter hodoscopes and a drift chamber central detector. Measures total and small-t elastic cross sections, and for the pp and $\bar{p}p$ reactions the topological cross sections and pseudo-rapidity distributions and correlations.

Papers PL 108B (1982) 145, PL 113B (1982) 87, PL 113B (1982) 347, PL 115B (1982) 495, ZPHY C21 (1984) 299, and ZPHY C28 (1985) 487.

CERN-R-211 (Apr 1979) Approved Jul 1979; Completed Jun 1982.

MEASUREMENT OF THE $\bar{p}p$ TOTAL CROSS SECTION AT THE CERN-ISR

LOUVAIN U – D Favart (√ Spokesperson), C Leroy, P Lipnik, J P Matheys
NORTHWESTERN U – N Amos, M M Block, D Miller, S Zucchelli
CERN – G J Bobbink, K Potter, C Van der Velde-Wilquet
UTRECHT U – M Botje

Accelerator CERN-ISR *Detector* Counter

Reactions

$\bar{p}\ p \rightarrow \bar{p}\ p$	30, 52, 62 GeV (E_{cm})
$p\ p \rightarrow p\ p$	23, 30, 52, 62 GeV (E_{cm})

Comments Measures the elastic scattering differential cross sections at small t and determines the total cross sections, the slopes of the elastic cross sections, and the ratios of the real and imaginary parts of the elastic amplitudes at $t = 0$.

Papers PRL 47 (1981) 1191, PL 120B (1983) 460, PL 128B (1983) 343, and NP B262 (1985) 689. No other papers expected.

CERN-R-416 (Oct 1975) Approved Apr 1976, Nov 1979; Completed Mar 1981.

STUDY OF RARE EVENTS AT THE SPLIT FIELD MAGNET

ANNECY – D Linglin, M Della Negra
CERN – D Drijard, H G Fischer, H Frehse, W Geist (√ Spokesperson), M Heiden, R Messerli, A Norton, O Ullaland, H Wahl
COLLEGE DE FRANCE – G Fontaine, P Frenkiel, C Ghesquiere, G Sajot
DORTMUND U – W Hofmann, M Panter, K Rauschnabel, J Spengler, D Wegener

HEIDELBERG U, IHEP – P Hanke, W Herr, E E Kluge, T Nakada, A Putzer
WARSAW U, IEP & WARSAW, INR – R Gokieli, R Sosnowski

Accelerator CERN-ISR *Detector* SFM

Reactions

$p\,p \rightarrow e^+\,X$	44–62 GeV (E_{cm})
$p\,p \rightarrow e^-\,X$	"
$p\,p \rightarrow \pi^+\,X$	"
$p\,p \rightarrow \pi^-\,X$	"
$p\,p \rightarrow K^+\,X$	"
$p\,p \rightarrow K^-\,X$	"
$p\,p \rightarrow p\,X$	"
$p\,p \rightarrow \bar{p}\,X$	"

Particles studied charm

Comments Triggers on (1) an electron produced near 90° with a transverse momentum p_t greater than 0.3 GeV/c, or (2) an identified hadron produced near 45° with p_t greater than 4 GeV/c. Generally the full event associated with these triggers is identified. For a description of the apparatus, see the LBL-91 supplement on detectors.

Papers PL 85B (1979) 452, ZPHY C11 (1981) 203, ZPHY C12 (1982) 217, PL 108B (1982) 361, NP B208 (1982) 1, PL 121B (1983) 433, PL 123B (1983) 467, ZPHY C21 (1984) 321, ZPHY C23 (1984) 1, PL 135B (1984) 505, PL 135B (1984) 510, ZPHY C23 (1984) 9, ZPHY C24 (1984) 31, ZPHY C25 (1984) 21, PR D30 (1984) 528, and ZPHY C27 (1985) 205.

CERN-R-418 (Apr 1979) Approved Mar 1980; Completed Dec 1983.

STUDY OF LIGHT ION COLLISIONS

AMES LAB – A Breakstone, H B Crawley, A Firestone, M Gorbics, J W Lamsa, W T Meyer
BOLOGNA U – G M Dallavalle, F Fabbri, G Giacomelli, F Rimondi
CERN – W Bell, D Drijard, M A Faessler, H G Fischer, W Geist, M Heiden, G Mornacchi, M Panter, M Szczecowski, O Ullaland
DORTMUND U – T Lohse, R Mankel, K Rauschnabel, M Schmelling, D Wegener
LUND U – G Claesson, S Garpman, I Lund, I Otterlund (√ Spokesperson), E Stenlund
HEIDELBERG U, IHEP – P Hanke, W Herr, E E Kluge, T Nakada, A Putzer, B Rensch, M Wunsch
LBL – C R Gruhn, H Pugh, L Schroeder, T J M Symons
WARSAW U, IEP & WARSAW, INR – K Doroba, R Gokieli, R Sosnowski, R Szwed, R Walzcak
UC, RIVERSIDE – S Y Fung
AMSTERDAM U – T J Ketel

Accelerator CERN-ISR *Detector* SFM

Reactions

deut deut → X	31 GeV (E_{cm})
p He → p He	44 GeV (E_{cm})
p He → X	"
He He → He He	31 GeV (E_{cm})
He He → X	"

Comments Several different triggers are used. For a description of the apparatus, see the LBL-91 supplement on detectors.

Papers PL 112B (1982) 271, PL 117B (1982) 131, PL 123B (1983) 467, PL 128B (1983) 349, NP A400 (1983) 525C, ZPHY C22 (1984) 109, NP B254 (1985) 475, ZPHY C27 (1985) 191, NP A324 (1986) 67, ZPHY C30 (1986) 507, ZPHY C30 (1986) 513, ZPHY C32 (1986) 335, PL 183B (1987) 227, and ZPHY C33 (1987) 333.

CERN-R-419 (Jan 1980) Approved Mar 1980; Completed May 1983.

STUDY OF EVENTS WITH IDENTIFIED FORWARD PARTICLES AT THE SPLIT FIELD MAGNET

CERN – D Drijard, F Fabbri, H G Fischer, H Frehse, W Geist (√ Spokesperson), M Heiden, P G Innocenti, G Mornacchi, M Panter, M Szczekowski, O Ullaland
BOLOGNA U – R Campanini, G M Dallavalle, M M Deninno, G Giacomelli, F Rimondi
HEIDELBERG U, IHEP – P Hanke, W Herr, E E Kluge, T Nakada, A Putzer
WARSAW U, IEP & WARSAW, INR – K Doroba, R Gokieli, R Sosnowski
AMES LAB – A Breakstone, H B Crawley, A Firestone, M Gorbics, J W Lamsa, W T Meyer
DORTMUND U – T Lohse, R Mankel, K Rauschnabel, M Schmelling, D Wegener

Accelerator CERN-ISR *Detector* SFM

Reactions

$p\,p \rightarrow K^-\,X$	62 GeV (E_{cm})
$p\,p \rightarrow \pi^+\,X$	"
$p\,p \rightarrow \pi^-\,X$	"
$p\,p \rightarrow p\,X$	"
$p\,p \rightarrow \bar{p}\,X$	"

Particles studied charm, bottom

Comments Studies heavy hadron production with a medium p_t K^- trigger, and hard scattering dynamics with a high p_t trigger away from 90°. For a description of the apparatus, see the LBL-91 supplement on detectors.

Papers PL 132B (1983) 463, PL 147B (1984) 237, ZPHY C28 (1985) 335, PL 162B (1985) 400, ZPHY C30 (1986) 507, ZPHY C31 (1986) 185, and PL 183B (1987) 227.

CERN-R-420 (Apr 1980) Approved May 1980; Completed Dec 1983.

STUDY OF ln(s) PHYSICS IN $\bar{p}p$ INTERACTIONS AT THE SPLIT FIELD MAGNET

AMES LAB – A Breakstone, H B Crawley, A Firestone, M Gorbics, J W Lamsa, W T Meyer (√ Spokesperson)
BOLOGNA U – R Campanini, M M Deninno, G Giacomelli, F Rimondi
CERN – D Drijard, F Fabbri, H G Fischer, H Frehse, W Geist, M Heiden, P G Innocenti, G Mornacchi, M Panter, M Szczekowski, O Ullaland
DORTMUND U – T Lohse, K Rauschnabel, D Wegener
HEIDELBERG U, IHEP – G M Dallavalle, P Hanke, W Herr, E E Kluge, T Nakada, A Putzer, B Rensch, M Wuensch
WARSAW U, IEP & WARSAW, INR – K Doroba, R Gokieli, R Sosnowski

Accelerator CERN-ISR *Detector* SFM

Reactions

$\bar{p}\,p \rightarrow \bar{p}\,p$	20, 52, 63 GeV (E_{cm})
$\bar{p}\,p \rightarrow X$	"
$p\,p \rightarrow p\,p$	"
$p\,p \rightarrow X$	"

Comments Studies elastic, total, and topological cross sections, inclusive spectra, and 2-body correlations. For a description of the apparatus, see the LBL-91 supplement on detectors.

Papers NP B248 (1984) 253, PRL 54 (1985) 2180, and PL 162B (1985) 400.

CERN-R-421 (Jun 1980) Approved Jul 1980, Dec 1980; Completed Dec 1983.

STUDY OF pp AND $\bar{p}p$ COLLISIONS AT THE SFM FACILITY OF THE CERN ISR

BOLOGNA U – M Basile, L Cifarelli, G D'Ali, G Sartorelli
INFN, BOLOGNA – G Bonvicini, P Giusti, T Massam, F Palmonari, G Cara Romeo
CERN – A Contin, R Nania, G Susinno, A Zichichi (√ Spokesperson)
FRASCATI – M Curatolo, B Esposito, M Spinetti, L Votano

Accelerator CERN-ISR *Detector* SFM

Reactions

$p\ p$	30, 44, 62 GeV (E_{cm})
$\bar{p}\ p$	"

Comments A comparison of pp and $\bar{p}p$ multiparticle events, suitably adjusted, with e^+e^- inelastic events. For a description of the apparatus, see the LBL-91 supplement on detectors.

Papers LNC 32 (1981) 210, NC 65A (1981) 414, NC 65A (1981) 421, NC 67A (1982) 53, NC 67A (1982) 244, LNC 36 (1983) 303, LNC 36 (1983) 555, LNC 36 (1983) 563, NC 73A (1983) 329, LNC 37 (1983) 246, LNC 37 (1983) 289, LNC 38 (1983) 289, LNC 38 (1983) 359, LNC 38 (1983) 367, NC 79A (1984) 1, LNC 41 (1984) 293, and LNC 41 (1984) 298.

CERN-R-422 (Oct 1981) Approved Feb 1982; Completed Dec 1983.

STUDY OF HEAVY FLAVORS PRODUCTION IN pp INTERACTIONS AT E_{cm} =62 GeV

CERN – A Contin, R Nania, G Susinno, A Zichichi (√ Spokesperson)
BOLOGNA U – M Basile, L Cifarelli, G D'Ali, F Palmonari, G Sartorelli
INFN, BOLOGNA – G Bonvicini, P Giusti, T Massam, C Del Papa, G Cara Romeo
FRASCATI – M Curatolo, B Esposito, M Spinetti, L Votano

Accelerator CERN-ISR *Detector* SFM

Reactions

$p\ p \rightarrow e^-\ X$	62 GeV (E_{cm})
$p\ p \rightarrow e^+\ X$	"

Particles studied charm, bottom

Comments Continues studies of experiment R-415. For a description of the apparatus, see the LBL-91 supplement on detectors.

CERN-R-501 Approved Jan 1978; Started Sep 1978; Completed Dec 1983.

SEARCH FOR MAGNETIC MONOPOLES

ANNECY – B Aubert
CERN – P Musset (Spokesperson), M Price
ORSAY, LAL – J P Vialle

Accelerator CERN-ISR *Detector* Emulsion

Reactions

$p\ p \rightarrow$ monopole X	30–62 GeV (E_{cm})
$\bar{p}\ p \rightarrow$ monopole X	"

Particles studied monopole

Comments The detectors are inside the vacuum pipe.

CERN-R-608 (Jun 1978) Approved Nov 1978, Mar 1979, Oct 1980; Completed Dec 1983.

LARGE-x HADRON PHYSICS AND CORRELATIONS WITH CENTRAL REGION PHENOMENA

CERN – S Erhan, A Smith
CLERMONT-FERRAND U – L Meritet, M Reyrolle, F Vazeille
SACLAY – J Alitti, B Bloch-Devaux, J B Cheze, J Mallet, A Montag, J Zsembery
UCLA – R Bonino, A Castellina, M Medinnis, P Schlein (√ Spokesperson), P Sherwood, S Vernetto, J Zweizig

Accelerator CERN-ISR *Detector* Spectrometer

Reactions

$p\ p$	30, 53, 62 GeV (E_{cm})
$\bar{p}\ p$	"

Particles studied Λ_c^+, $f_1(1285)$, $f_1(1420)$, $f_2(1270)$

Comments Extends the program of CERN-R-603, to study Cerenkov-identified multiparticle systems in the forward direction and at 90°. The main studies are of (1) diffractive excitation of glueballs, (2) inclusive excitation of charmed particles, (3) differences in leading-baryon production in pp and $\bar{p}p$ interactions, (4) C-invariance in $\bar{p}p$ interactions (at 90°), (5) Λ and $\bar{\Lambda}$ polarization, both inclusively and diffractively, and (6) evidence for pomeron-single quark scattering and the longitudinal structure of diffraction.

Papers PL 127B (1983) 384, PL 148B (1984) 382, PL 152B (1985) 131, PL 163B (1985) 267, PL 163B (1985) 273, and PL 167B (1986) 248.

CERN-R-703 (Feb 1979) Approved May 1979; Completed Apr 1981.

EVALUATION OF A LARGE STREAMER CHAMBER DETECTION SYSTEM AND A STUDY OF $\bar{p}p$-pp DIFFERENCES AT ISR ENERGIES

BONN U – K Bockmann, L Burow, B Eckart, K v Holt, R Hospes, T P K Kokott, R Meinke, Th Muller, M Rosenberg, H Saarikko, T Saarikko
BRUSSELS U, IIHE – D Bertrand, J Gaudaen, M Gijsen, D Johnson, H Mulkens, G Wilquet
CAMBRIDGE U – R E Ansorge, C N Booth, J R Carter, K French, M N Maggs, D J Munday, J G Rushbrooke (Spokesperson), C P Ward, D R Ward, A R Weidberg, T O White
CERN – A Odian, F A Triantis, G Weber
STOCKHOLM U – K Alpgard, B Asman, S Berglund, P Carlson, G Ekspong, K Jon-And, C Walck, N Yamdagni

Accelerator CERN-ISR *Detector* Streamer chamber

Reactions

$p\ p$	30–62 GeV (E_{cm})
$\bar{p}\ p$	"

Comments The main aim is to test and evaluate the equipment to be used in experiment UA-005.

Papers PL 112B (1982) 183. No other papers expected.

CERN-R-704 (Apr 1980) Approved Oct 1980; Completed Jun 1984.

CHARMONIUM SPECTROSCOPY AT THE ISR USING A $\bar{p}$ BEAM AND A HYDROGEN JET TARGET

ANNECY – C Baglin, G Bassompierre, J C Brient, C Broll, C Girard, J P Guillaud, M Poulet
CERN – R Cester, L Leistam, A Lundby, M Macri (√ Spokesperson), B Mouellic
GENOA U – A Buzzo, S Ferroni, V Gracco, L Mattera, M G Pia, A Pozzo, A Santroni, F Tomasini, U Valbusa
LYON, IPN – J P Burq, M Chemarin, M Chevallier, J Fay, B Ille, M Lambert, J P Martin
OSLO U – L Bugge, T Buran, T Fearnley, K Kirsebom, G Skjevling, S O Sorensen
ROME U – L Petrillo, M Severi
TURIN U – G Borreani, F Marchetto, E Menichetti, N Pastrone, G Rinaudo
STRASBOURG – J M Brom, B Escoubes

Accelerator CERN-ISR *Detector* Combination

Reactions

$\bar{p}\ p \rightarrow \gamma\ \gamma$	3.5–7.5 GeV/c
$\bar{p}\ p \rightarrow e^+\ e^-$	"
$\bar{p}\ p \rightarrow e^+\ e^-\ \gamma$	"
$\bar{p}\ p \rightarrow \bar{p}\ p$	"
$\bar{p}\ p \rightarrow \pi^+\ \pi^-$	"
$\bar{p}\ p \rightarrow K^+\ K^-$	"

Particles studied $\eta_c(2980)$, $\chi_1(3510)$, $\chi_2(3555)$

Comments Studies formation of charmonium states not accessible in the s channel of e^+e^-, and measures 2-body hadron channels at 90° in the c.m.

Papers PL 163B (1985) 400, PL 171B (1986) 135, and PL 172B (1986) 455.

CERN-R-806 Approved Jul 1974, Nov 1975, May 1976; Completed Aug 1980.

STUDY OF LARGE TRANSVERSE MOMENTUM PHENOMENA

ATHENS U – T Filippas, E Fokitis, C Kourkoumelis, L Resvanis
BROOKHAVEN – R Palmer, D Rahm, P Rehak, I Stumer
CERN – C Fabjan, T Fields, D Lissauer, I Mannelli, P Mouzourakis, A Nappi, W J Willis (Spokesperson)
SYRACUSE U – M Goldberg

Accelerator CERN-ISR *Detector* Combination

Reactions

$p\,p \rightarrow \gamma(s)\,X$	30–63 GeV (E_{cm})
$p\,p \rightarrow e^+\,X$	"
$p\,p \rightarrow e^-\,X$	"
$p\,p \rightarrow e^+\,e^-\,X$	"
$p\,p \rightarrow \gamma\,\gamma\,X$	"
$p\,p \rightarrow \pi^0\,X$	"
$p\,p \rightarrow \eta\,X$	"
$p\,p \rightarrow \omega\,X$	"
$p\,p \rightarrow J/\psi\,X$	"

Papers ZPHY C13 (1982) 277, ZPHY C16 (1982) 101, and PL 127B (1983) 384.

CERN-R-807 (Jan 1977) Approved Apr 1977, Jun 1977, Jul 1979, Nov 1979, Oct 1981; Completed Dec 1983.

A STUDY OF LARGE TRANSVERSE MOMENTUM PHENOMENA

AXIAL FIELD SPECTROMETER COLLABORATION
BROOKHAVEN – H Gordon, T Ludlam, I Stumer, M Winik, C Woody
CERN – T Akesson, R Batley, H Breuker, V Burkert, Ch Fabjan, U Goerlach, S Katsanevas, G Kesseler, J van der Lans, B S Nielsen, L H Olsen, E Rosso, A Rudge, J Schukraft, H Specht, W J Willis, W Witzeling
COPENHAGEN U – H Boggild (√ Spokesperson), O Botner, E Dahl-Jensen, I Dahl-Jensen, P Dam, G Damgaard, K H Hansen, J E Hooper, R Moller, H H Thodberg
LUND U – S Almehed, G von Dardel, V Hedberg, G Jarlskog, K Kulka, B Lorstad, U Mjornmark, A Nilsson, G Thorstenson
PENN U – H Brody, B Callen, S Frankel, W Frati, W Molzon, E Vella, W Zajc
RUTHERFORD – M G Albrow, W M Evans, N A McCubbin, J Williamson
TEL AVIV U – O Benary, S Dagan, D Lissauer, Y Oren
QUEEN MARY COLL – A A Carter
CAMBRIDGE U – J R Carter, P Cecil
PITTSBURGH U – Y Choi, W Cleland, R Kroeger, M Sullivan, J Thompson

Accelerator CERN-ISR *Detector* AFS

Reactions

$p\,p$	31–62 GeV (E_{cm})
$\bar{p}\,p$	"
He He	"

Particles studied charm, quark, glueball, gluon

Comments For a description of the apparatus, see the LBL-91 supplement on detectors. A study of the structure of pp and $\bar{p}p$ collisions having a very high transverse momentum flow (> 30 GeV/c) in the central region. Studies high p_t jets, and direct photons and leptons. Searches for glueballs and other new states.

Papers PL 91B (1980) 301, NIM 196 (1982) 303, NIM 196 (1982) 315, IEEE TNS 29 (1982) 373, PL 108B (1982) 58, NP B203 (1982) 27, PL 110B (1982) 344, NP B209 (1982) 309, NP B209 (1982) 321, PL 118B (1982) 178, PL 118B (1982) 185, PL 118B (1982) 193, PL 119B (1982) 464, PL 121B (1983) 439, PL 123B (1983) 133, ZPHY C18 (1983) 5, PL 123B (1983) 367, PR D28 (1983) 2736, PL 128B (1983) 354, PL 129B (1983) 269, NP B228 (1983) 409, PL 133B (1983) 268, NP B246 (1984) 1, NP B246 (1984) 408, ZPHY C25 (1984) 13, PR D31 (1985) 976, PL 152B (1985) 140, PL 152B (1985) 411, PL 155B (1985) 128, PL 158B (1985) 282, PRL 55 (1985) 2535, NIM A241 (1985) 17, NIM A242 (1985) 75, ZPHY C30 (1986) 27, NP B264 (1986) 154, PS 34 (1986) 106, PL 178B (1986) 447, ZPHY C32 (1986) 317, and ZPHY C32 (1986) 491.

CERN-R-808 (Jun 1981) Approved Jul 1981; Completed Dec 1983.

A STUDY OF DIRECT PHOTON PRODUCTION

ATHENS U – P Ioannou, A Karabarbounis, C Kourkoumelis, T Markou, L Resvanis, S Tzamarias
BONN U – V Burkert
BROOKHAVEN – R Palmer, D Rahm, I Stumer
CERN – R Batley, Ch Fabjan, U Goerlach, I Mannelli, W J Willis (Spokesperson)
LEBEDEV INST – I Gavrilenko, A Shmeleva, P Vasiljev
MOSCOW PHYS ENG INST – V Chernyatin, B Dolgoshein, V Kantserov
NOVOSIBIRSK, IYF – S Eidelman, M Minakov, G Piskounov, V Sidorov
PISA U & INFN, PISA – R Carosi, G M Pierazzini
PITTSBURGH U – W Cleland, M Sullivan, J Thompson

Accelerator CERN-ISR *Detector* Calorimeter

Reactions

$p\,p \rightarrow \gamma(s)\,X$	30–62 GeV (E_{cm})
$p\,p \rightarrow e^+\,e^-\,X$	"
$\bar{p}\,p \rightarrow \gamma(s)\,X$	"
$\bar{p}\,p \rightarrow e^+\,e^-\,X$	"
He He $\rightarrow \gamma(s)\,X$	"
He He $\rightarrow e^+\,e^-\,X$	"

Comments Uses two arrays of NaI blocks together with the CERN-R-807 calorimeter. Studies both single and double direct photon production, and electron pair production.

CERN-SC-077 (1977) Approved Dec 1977, Mar 1980; Completed Aug 1981.

DETERMINATION OF THE BRANCHING RATIO FOR THE DECAY $\pi^0 \rightarrow e^+e^-$

AMSTERDAM, VRIJE U – W Van Doesburg, H Verheul, A G Zephat
BIRMINGHAM U – J D Davies (Spokesperson), J Lowe, S M Playfer
CAGLIARI U – T Bressani, M Caria
CERN – E G Michaelis
DELFT UNIV TECH – C W E van Eijk, W Lourens
LJUBLJANA U – G Kernel, F Sever, A Stanovnik
MANITOBA U – J V Jovanovich
OXFORD U – F Siohan, N W Tanner
TURIN U – G Della Casa, E Chiavassa, S Costa, M Gallio, A Musso
GLASGOW U – D Frame
RUTHERFORD – J Harvey

Accelerator CERN-SC *Detector* OMICRON

Reactions

$\pi^0 \rightarrow e^+\,e^-$	< 300 MeV/c

Particles studied π^0

Papers NIM 196 (1982) 393.

CERN-SC-094 (Sep 1980) Approved Oct 1981; Completed Nov 1982.

STUDY OF THE PRODUCTION OF SINGLE PIONS IN πp COLLISIONS NEAR THRESHOLD

AMSTERDAM, VRIJE U – H Verheul
BIRMINGHAM U – J D Davies, J Lowe, S M Playfer
CERN – E G Michaelis
DELFT UNIV TECH – C W E van Eijk, R Hollander, W Lourens
LJUBLJANA U – G Kernel (√ Spokesperson), D Korbar, P Krizan, M Mikuz, F Sever, A Stanovnik, M Staric, D Zavrtanik
OXFORD U – N W Tanner
MANITOBA U – J V Jovanovich
RUTHERFORD – A S Clark

Accelerator CERN-SC *Detector* OMICRON

Reactions

$\pi^- p \rightarrow \pi^- \pi^+ n$	300–460 MeV/c
$\pi^- p \rightarrow p \pi^0 \pi^-$	"
$\pi^+ p \rightarrow \pi^+ \pi^+ n$	"
$\pi^+ p \rightarrow p \pi^0 \pi^+$	"

Comments A full-kinematics experiment. The transformation properties of the chiral-symmetry-breaking part of the $\pi\pi$ Lagrangian are obtained from the data at threshold.

Papers NIM 214 (1983) 273, NIM 216 (1983) 67, NIM 227 (1984) 237, NIM A239 (1985) 202, NIM A244 (1986) 367, and NIM A248 (1986) 451.

CERN-UA-001 (Jan 1978) Approved Jun 1978, Jun 1983, Sep 1983, Feb 1984, Nov 1984.

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 – K Eggert, P Erhard, H Faissner, A Geiser, H Grassmann, E Isiksal, H Moser, A Moulin, T Redelberger, H Reithler, E Tscheslog, K Wacker
NIKHEF, AMSTERDAM – K Bos, J Dorenbosch, B van Eijk, D Holthuizen, I Ten-Have, I Zacharov
ANNECY – B Aubert, Ph Catz, J Colas, P Ghez, C Ghiglino, J-P Lees, D Linglin, M N Minard, B Mours, C Perrault, J P Vialle, I Wingerter, M Yvert
BIRMINGHAM U – N Bains, R Bonino, D G Charlton, M Corden, G Cox, J Dowell (Spokesperson), R Edgecock, N Ellis, J Garvey, D Grant, S J Haywood, M Jimack, I Kenyon, J Streets, P Watkins, J Wilson
CERN – C Albajar, L Bassi, A Bezaguet, P Cennini, S Cittolin, M Demoulin, E Duchovni, J Feyt, A Gonidec, W Jank, G Jorat, W Kienzle, E Locci, K Long, G Maurin, T Meyer, T Muller, L Naumann, M Della Negra, A Norton, F Pauss, E Petrolo, A Placci, J P Porte, E Radermacher, J Richman, C Rubbia (Spokesperson), W Ruhm, D Samyn, J Sass, D Schinzel, V Vuillemin, S Winpenny, C Wulz
HARVARD U – G Bauer, E Buckley, S Geer, J Kroll, J Rohlf, A Schwartz, K C T O Sumorok
HELSINKI U – V Karimaki, R Kinnunen, E Pietarinen, M Pimia, J Tuominiemi
KIEL U – O C Allkofer, D Dau, R Leuchs, S Levergrun, D Ohlendorf, M Preischel, M Schroeder
IMPERIAL COLL – T Bacon, A Khan, C Markou, D Robinson, C Seez, I Siotis, T S Virdee, A Wildish
QUEEN MARY COLL – R Batley, D Clarke, E Eisenhandler, I Fensome, W R Gibson, P Kalmus, P Kyberg, M Landon, W Von Schlippe, G Thompson
MADRID, JEN – F Diez-Hedo, A Ferrando, M Marquina, T Rodrigo
MIT – J Hunt, J P Revol, P Sphicas, S Tether, X Wu
PADUA U – A Bettini, G Busetto, S Centro, R Conte, M De Giorgi, A Meneguzzo, R Pavanello, P Rossi, P L Zotto
COLLEGE DE FRANCE – L Dobrzynski, G Fontaine, C Ghesquiere, Y Giraud-Heraud, D Kryn, D Marchand, J-P Mendiburu, P Nedelec, A Orkin-Lecourtois, G Sajot, D Salin, C Tao, J Vrana
UC, RIVERSIDE – L Gately, D Gee, M Ikeda, D Joyce, A Kernan, M Lindgren, J P Merlo, K Morgan, J Ransdell, I Sheer, D Smith
ROME U – C Bacci, F Ceradini, A Di Ciaccio, G Ciapetti, F Ghio, F Lacava, M Moricca, G Piano-Mortari, G Salvini, A Tusi, C Zacardelli, L Zanello
RUTHERFORD – M Albrow, R Apsimon, G Arnison, J Coughlan, B Denby, P Flynn, W J Haynes, D Hill, W Scott, T Shah
SACLAY – J P De Brion, C Cochet, P Colas, D Denegri, A Givernaud, J P Laugier, C Pigot, A Savoy-Navarro, C Stubenrauch, N Zaganidis
VICTORIA U – A Astbury, S Beingessner, M Keeler, R Keeler, S Li, R Sobie
VIENNA, OAW – P Liba, M Markytan, J Strauss, F Szoncso, A Taurok, J Traxler, G Walzel, E Warmuth
WISCONSIN U – J Bellinger, D Cline, T Markiewicz, M Mohammadi, J Rhoades, T Smart, D Summers, L Villasenor

Accelerator CERN-PBAR/P *Detector* UA1

Reactions

$\bar{p} p$	540, 630 GeV (Ecm)

Particles studied W^+, W^-, Z^0, higgs, s-particle

Comments Has discovered the W and Z bosons and also found a few events compatible with the existence of the top quark. The present program includes a search for various high-mass particles such as new quarks and supersymmetric particles, and an investigation of quark and gluon interactions, etc. For a description of the apparatus, see the LBL-91 supplement on detectors. Taking data (November 86).

Papers NIM 176 (1980) 217, NIM 176 (1980) 225, NIM 176 (1980) 233, PL 118B (1982) 167, PL 118B (1982) 173, PL 121B (1983) 77, PL 122B (1983) 103, PL 122B (1983) 189, PL 123B (1983) 108, PL 123B (1983) 115, PL 126B (1983) 398, PL 128B (1983) 336, PL 129B (1983) 273, PL 132B (1983) 214, PL 132B (1983) 223, NP B224 (1983) 523, IEEE TNS 30 (1983) 71, PL 134B (1984) 469, PL 135B (1984) 250, PL 136B (1984) 294, PL 139B (1984) 115, PL 147B (1984) 222, PL 147B (1984) 241, PL 147B (1984) 493, NIM 224 (1984) 153, PL 155B (1985) 442, PL 158B (1985) 494, LNC 44 (1985) 1, PL 166B (1986) 484, PL 172B (1986) 461, PL 177B (1986) 244, EL 1 (1986) 327, and NIM A243 (1986) 4557.

CERN-UA-002 (Jan 1978) Approved Dec 1978, Sep 1984, Feb 1985; Started Nov 1981.

STUDY OF $\bar{p}p$ INTERACTIONS AT 630-GeV C.M. ENERGY

BERN U – K Borer, B Hahn, E Hugentobler, R Moning, L Mueller, J Schacher
CAMBRIDGE U – R Ansorge, S Katvars, M Lefebvre, B McCluskey, D J Munday, M Pentney, J Rushbrooke, W Tsang, T White, S Wotton
CERN – P Bagnaia, G Blaylock, C Booth, M Borghini, P Cenci, A G Clark, P Darriulat (√ Spokesperson), K Einsweiler, O Gildemeister, C Goessling, S Hellman, K Hultqvist, P Jenni, L Di Lella, L Linssen, L Mapelli, K H Meier, C Onions, T Pal, A Parker, C Petridou, A Poppleton, L Rasmussen, S Stapnes, H H Thodberg, A Weidberg
HEIDELBERG U, IHEP – K Bernlohr, S Gruenendalh, K Jacobs, E E Kluge, N Kurz, H Plothow-Besch, K Tittel, M Wunsch
BOHR INST – J Dines-Hansen, J R Hansen, P Hansen, O Kofoed-Hansen, B Madsen, R Mollerud
MILAN U & INFN, MILAN – M Bonesini, D Cavalli, G Costa, F Gianotti, L Mandelli, M Mazzanti, M S Pepe, L Perini, G Polesello
ORSAY, LAL – R Ansari, J C Chollet, L Fayard, D Froidevaux, J M Gaillard, B Merkel, M Moniez, G Parrour, J P Repellin
PAVIA U – C Conta, R Ferrari, M Fraternali, G Fumagalli, V G Goggi, M Livan, B De Lotta, F Pastore, A Rimoldi, V Vercesi
PERUGIA U – R Battiston, G C Mantovani
PISA U – G Carboni, V Cavasinni, C Corona, F Costantini, E Iacopini, S Lami, P Lariccia, M Morganti, T Del Prete, M Valdata-Nappi
SACLAY – M Banner, P Bareyre, P Bonamy, J Crittenden, E Lancon, S Loucatos, B Mansoulie, J P Meyer, M Polverel, A Roussarie, V Ruhlmann, J Teiger, H Zaccone

Accelerator CERN-PBAR/P *Detector* UA2

Reactions

$\bar{p} p \rightarrow e^{\pm}$ X	630 GeV (Ecm)
$\bar{p} p \rightarrow$ jet(s) X	"

Particles studied W^+, W^-, Z^0

Comments The main aim is an investigation of the W and Z bosons. For a description of the apparatus, see the LBL-91 supplement on detectors. Presently being upgraded for better hermiticity and electron identification. Scheduled to run again Autumn 87.

Papers PL 115B (1982) 59, PL 118B (1982) 203, PL 121B (1983) 187, PL 122B (1983) 322, PL 122B (1983) 476, ZPHY

C20 (1983) 117, PL 129B (1983) 130, PL 138B (1984) 430, PL 139B (1984) 105, NIM 224 (1984) 65, NIM 224 (1984) 360, ZPHY C24 (1984) 1, PL 144B (1984) 283, NIM 227 (1984) 29, PL 144B (1984) 291, PL 154B (1985) 338, PL 156B (1985) 129, PL 160B (1985) 349, PL 165B (1985) 441, ZPHY C25 (1985) 329, ZPHY C27 (1985) 329, PL 176B (1986) 239, ZPHY C30 (1986) 1, and ZPHY C30 (1986) 341.

CERN-UA-003 (Feb 1978) Approved Dec 1978; Completed Dec 1983.

SEARCH FOR MAGNETIC MONOPOLES AT THE $\bar{p}p$ COLLIDING RING

ANNECY – B Aubert, J P Vialle
CERN – P Musset (Spokesperson), M Price

Accelerator CERN-PBAR/P *Detector* Emulsion

Reactions

$\bar{p}\ p \rightarrow$ monopole X	540 GeV (E_{cm})

Particles studied monopole

Papers PL 120B (1983) 465.

CERN-UA-004 (Oct 1978) Approved Jan 1979, Mar 1984; Completed Jun 1985.

MEASUREMENT OF ELASTIC SCATTERING IN THE COULOMB INTERFERENCE REGION AT THE CERN $\bar{p}p$ COLLIDER

NIKHEF, AMSTERDAM – B Koene, R Van Swol, J Timmermans
CERN – D Bernard
INFN, GENOA & GENOA U – M Bozzo, G Sette
NAPLES U, IFS & INFN, NAPLES – F Carbonara, G Chiefari, E Drago, S Lanzano, G Matthiae (Spokesperson), L Merola, M Napolitano, V Palladino, C Sciacca, F Visco
ECOLE POLYTECHNIQUE – J Badier, M Haguenauer, V Innocente
PISA U & INFN, PISA – P L Braccini, R Castaldi, F Cervelli, G Sanguinetti, S Scapellato, C Vannini, P G Verdini
VALENCIA U – J Velasco

Accelerator CERN-PBAR/P *Detector* Wire chamber

Reactions

$\bar{p}\ p \rightarrow$ X	100–540 GeV (E_{cm})
$\bar{p}\ p \rightarrow \bar{p}\ p$	"

Papers PL 115B (1982) 333, PL 117B (1982) 126, PL 127B (1983) 472, NIM 207 (1983) 365, PL 136B (1984) 217, PL 147B (1984) 385, PL 147B (1984) 392, NC 81A (1984) 737, PL 155B (1985) 197, and PL 166B (1986) 459.

CERN-UA-005 (May 1978, Oct 1982) Approved Feb 1979, Feb 1983; Completed Sep 1982.

INVESTIGATION OF $\bar{p}p$ EVENTS AT 540-GeV C.M. ENERGY WITH A STREAMER CHAMBER DETECTION SYSTEM

BONN U – P Anderer, K Boeckmann, L Burow, B Eckart, A Eyring, M Fischer, C Geich-Gimbel, K von Holt, R Hospes, T P K Kokott, M Langer, R Meinke, Th Mueller, H Schmickler
BRUSSELS U – C De Clercq, J Gaudaen, M Gijsen, D Johnson, G Wilquet
CAMBRIDGE U – R E Ansorge, C N Booth, K French, V P Kenney, D J Munday, J Ovens, J G Rushbrooke (Spokesperson), C P Ward, D R Ward, T O White, R S De Wolf
CERN – G J Alner, J L Chevalley, I Evangelou, J P Fabre, J Gareyte, G von Holtey, R Mackenzie, F Triantis, L Vos, G Weber
STOCKHOLM U – K Alpgard, B Asman, P Carlson, G Ekspong, K Jonand, F Lotse, C Walck, N Yamdagni

Accelerator CERN-PBAR/P *Detector* Streamer chamber

Reactions

$\bar{p}\ p$	540 GeV (E_{cm})
$\bar{p}\ p \rightarrow$ centauro	"

Comments A brief visual survey, with emphasis on a search for centauro events. See UA-005/2 for the second phase.

Papers PS 23 (1981) 642, PL 107B (1981) 310, PL 107B (1981) 315, PL 115B (1982) 65, PL 115B (1982) 71, PL 121B (1983) 209, PL 123B (1983) 361, PL 138B (1984) 304, PL 151B (1985) 309, PL 160B (1985) 193, PL 160B (1985) 199, ZPHY C33 (1986) 1, and ZPHY C33 (1986) 175.

CERN-UA-005-2 Approved Feb 1983; Completed Apr 1985.

AN EXPLORATORY INVESTIGATION OF $\bar{p}p$ INTERACTIONS AT 800–900 C.M. ENERGY AT THE SPS COLLIDER

BONN U – K Boeckmann, L Burow, A Drees, B Eckart, A Eyring, L Froebel, C Geich-Gimbel, B Hall, R Hospes, T P K Kokott, M Langer, R Meinke, W Pelzer, H Schmickler
BRUSSELS U – C De Clercq, J Gaudaen, L van Hamme, G Wilquet
CAMBRIDGE U – R E Ansorge, D J Munday, J Ovens, J G Rushbrooke (Spokesperson), C P Ward, D R Ward, C J S Webber, T O White, R S De Wolf
CERN – G J Alner, J L Chevalley, I Evangelou, J P Fabre, J Gareyte, G von Holtey, R Mackenzie, F Triantis, L Vos, G Weber
STOCKHOLM U – K Alpgard, K Jon And, B Asman, P Carlson, G Ekspong, C Fuglesang, F Lotse, C Walck, N Yamdagni

Accelerator CERN-PBAR/P *Detector* Streamer chamber

Reactions

$\bar{p}\ p$	800–900 GeV (E_{cm})

Comments A second phase at higher energies of UA-005.

Papers ZPHY C32 (1986) 153, PL 167B (1986) 476, and PL 180B (1986) 415.

CERN-UA-006 (Aug 1980) Approved Apr 1981.

AN INTERNAL HYDROGEN JET TARGET IN THE SPS TO STUDY INCLUSIVE ELECTROMAGNETIC FINAL STATES AT LARGE TRANSVERSE MOMENTA AND Λ PRODUCTION IN $\bar{p}p$ AND pp INTERACTIONS AT E_{cm} =24.3 GeV

CERN – L Camilleri, L Dick, E C Dukes, W Kubischta, A Vacchi
LAUSANNE U – A Bernasconi, F Gaille, C Joseph (Spokesperson), J F Loude, E Malamud, C Morel, J Pages, J P Perroud, D Ruegger, G Sozzi, M T Tran
MICHIGAN U – O E Overseth, G Valenti
ROCKEFELLER U – R E Breedon, R L Cool, P T Cox, P Giacomelli, P Petersen, R Rusack, G A Snow
LUND U – G Von Dardel

Accelerator CERN-PBAR/P *Detector* Double-arm spectrometer

Reactions

$\bar{p}\ p \rightarrow e^+\ e^-$ X	24.3 GeV (E_{cm})
$\bar{p}\ p \rightarrow \pi^0$ X	"
$\bar{p}\ p \rightarrow \gamma$ X	"
$\bar{p}\ p \rightarrow \Lambda$ X	"
$\bar{p}\ p \rightarrow \bar{\Lambda}$ X	"
$\bar{p}\ p \rightarrow \bar{p}\ p$	"
$\bar{p}\ p \rightarrow$ X	"
$p\ p \rightarrow e^+\ e^-$ X	"
$p\ p \rightarrow \pi^0$ X	"
$p\ p \rightarrow \gamma$ X	"
$p\ p \rightarrow \Lambda$ X	"
$p\ p \rightarrow \bar{\Lambda}$ X	"
$p\ p \rightarrow p\ p$	"
$p\ p \rightarrow$ X	"

Particles studied J/ψ

Comments The $\bar{p}$ and p beams in the collider are in turn incident upon a gas jet target. In the reactions above, the

emphasis is on high e^+e^- masses, the π^0 and γ inclusive cross sections at high p_t, the Λ and $\overline{\Lambda}$ polarizations at high p_t, and the elastic and inelastic cross sections at low t. Taking data (November 86).

CERN-UA-007 (Jan 1985) Approved Apr 1985; Completed Apr 1986.

MEASUREMENT BY SILICON SHOWER DETECTORS OF THE INVARIANT CROSS SECTION OF π^0's EMITTED CLOSE TO 0°

NAPLES U, IFS & INFN, NAPLES – V Innocente, S Lanzano
TOKYO U, COSMIC RAY LAB – K Kasahara, Y Muraki (√ Spokesperson), T Nakada, T Yuda
RIKKYO U – H Murakami, A Nakamoto
WASEDA U – T Doke, T Kashiwagi, J Kikuchi, K Masuda
ECOLE POLYTECHNIQUE – M Haguenauer, E Pare

Accelerator CERN-PBAR/P *Detector* Calorimeter

Reactions

$\overline{p}\ p \rightarrow \pi^0\ X$	630 GeV (Ecm)
$\overline{p}\ p \rightarrow K_S\ X$	"
$\overline{p}\ p \rightarrow \eta\ X$	"

Comments Measures the invariant cross section and the transverse momentum distribution of π^0's produced at large Feynman x. Uses finely segmented silicon shower calorimeters placed inside the Roman pots of CERN-UA-004.

CERN-UA-008 (Oct 1984) Approved Apr 1985.

STUDY OF JET STRUCTURE IN HIGH MASS DIFFRACTION AT THE SPS COLLIDER

UCLA – J B Cheze, S Erhan, R Jackson, M Medinnis, P Schlein (√ Spokesperson), J Zsembery, J Zweizig

Accelerator CERN-PBAR/P *Detector* UA2, Wire chamber

Reactions

$\overline{p}\ p \rightarrow$ jet(s) X	630 GeV (Ecm)

Particles studied pomeron

Comments Studies jet structure in high-mass diffraction to investigate the pomeron and its possible parton structure. Uses a fast trigger processor. Works in collaboration with CERN-UA-002. First run scheduled to begin November 87.

CERN-WA-001 (Jul 1973) Approved Apr 1974, Dec 1975, Feb 1979, May 1979; Completed Dec 1983.

HIGH-ENERGY NEUTRINO INTERACTIONS

CERN – F Dydak, R Hagelberg, M Krasny, J May, A Para, F Ranjard, W von Rueden, J Steinberger (Spokesperson), H Taureg, H Wachsmuth, H Wahl, J Wotschack
DORTMUND U – H Bluemer, H Brummel, P Buchholz, J Duda, F Eisele, B Kampschulte, K Kleinknecht, J Knobloch, D Pollmann, B Pszola, B Renk
HEIDELBERG U, IHEP – R Belusevic, B Falkenburg, M Fiedler, R Geiges, C Geweniger, V Hepp, H Keilwerth, K Tittel
SACLAY – P Debu, C Guyot, J P Merlo, P Perez, F Perrier, J Rander, J P Schuller, R Turlay, B Vallage
WARSAW, INR – H Abramowicz, J Krolikowski, A Lipniacka

Accelerator CERN-SPS *Detector* CDHS

Reactions

ν_μ Fe $\rightarrow \mu^-$ X	0–260 GeV/c
ν_μ Fe $\rightarrow \nu_\mu$ X	"
$\overline{\nu}_\mu$ Fe $\rightarrow \mu^+$ X	"
$\overline{\nu}_\mu$ Fe $\rightarrow \overline{\nu}_\mu$ X	"
$\nu_\mu\ p \rightarrow \mu^-$ X	"
$\overline{\nu}_\mu\ p \rightarrow \mu^+$ X	"
ν_μ deut $\rightarrow \mu^-$ X	"
$\overline{\nu}_\mu$ deut $\rightarrow \mu^+$ X	"

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

Comments Studies inclusive neutrino reactions in iron, including rare processes such as multilepton production, and compares neutrino interactions in hydrogen and iron. For a description of the apparatus, see the LBL-91 supplement on detectors.

Papers ZPHY C12 (1982) 225, ZPHY C12 (1982) 289, PL 109B (1982) 115, ZPHY C13 (1982) 179, ZPHY C13 (1982) 199, ZPHY C15 (1982) 19, IEEE TNS 29 (1982) 360, ZPHY C17 (1983) 283, AND ZPHY C25 (1984) 29.

CERN-WA-001-2 (1983) Approved Sep 1983; Completed Aug 1984.

MEASUREMENT OF $\sin^2(\theta_W)$ IN SEMILEPTONIC ν-Fe INTERACTIONS WITH HIGH PRECISION

CDHSW COLLABORATION
CERN – A Blondel, P Boeckmann, H Burkhardt, F Dydak (√ Spokesperson), A Grant, R Hagelberg, E Hughes, M Krasny, A Para, F Ranjard, H Taureg, H Wachsmuth, J Wotschack
DORTMUND U – H Bluemer, H Brummel, P Buchholz, J Duda, B Kampschulte, K Kleinknecht, J Knobloch, E Mueller, D Pollmann, B Renk
HEIDELBERG U, IHEP – R Belusevic, B Falkenburg, M Fiedler, R Geiges, C Geweniger, V Hepp, H Keilwerth, N Kurz, K Tittel
SACLAY – P Debu, C Guyot, J P Merlo, P Perez, F Perrier, J P Schuller, R Turlay, B Vallage
WARSAW, INR – H Abramowicz, J Krolikowski, A Lipniacka

Accelerator CERN-SPS *Detector* CDHS

Reactions

ν_μ Fe	0–160 GeV/c
$\overline{\nu}_\mu$ Fe	"

Papers PRL 57 (1986) 298, ZPHY C28 (1985) 51, and ZPHY C31 (1986) 39.

CERN-WA-006 (Feb 1974) Approved Sep 1974; Completed Apr 1980.

POLARIZATION IN pp AND πp ELASTIC SCATTERING

CERN – G Fidecaro (√ Spokesperson), M Fidecaro, L Lanceri, L Piemontese, C Poyer, A Vascotto
PADUA U – F Gasparini, S Limentani, M Nigro, L Pescara, M Posocco, P Sartori, C Voci
TRIESTE U & INFN, TRIESTE – R Birsa, F Bradamante, M Giorgi, A Penzo, P Schiavon, A Villari
VIENNA, OAW – W Bartl, R Fruhwirth, Ch Gottfried, G Leder, W Majerotto, G Neuhofer, M Pernicka, M Regler, M Steuer, H Stradner
SERPUKHOV – S Nurushev, V Solovyanov

Accelerator CERN-SPS *Detector* Spectrometer

Reactions Polarized target

$p\ p \rightarrow p\ p$	50–200 GeV/c
$\pi^+\ p \rightarrow p\ \pi^+$	"

Papers NP B173 (1980) 513, and PL 105B (1981) 309.

CERN-WA-007 (Mar 1974) Approved Sep 1974, Oct 1976, Jan 1979; Completed May 1982.

TWO-BODY REACTIONS AT LARGE TRANSVERSE MOMENTUM

ANNECY – C Baglin, J P Guillaud, M Poulet
CERN – R Bock, L Bugge, T Buran, A Lundby, B Mouellic
COPENHAGEN U – J Myrheim
GENOA U – A Buzzo, S Ferroni, V Gracco (Spokesperson), M Macri, A Santroni
UNIVERSITY COLL, LONDON – Z Asa'd, M Coupland, D Davis, B G Duff, F F Heymann, D C Imrie, G J Lush, M H Phillips
OSLO U – K Brobakken, A Eide, T Fearnley, I Gjerpe, J Haldorsen, T Jacobsen, K Kirsebom, G Skjevling, S O Sorensen

Accelerator CERN-SPS *Detector* Double-arm spectrometer

Reactions

$\pi^- p \to \pi^- p$	20, 40, 60, 80 GeV/c
$p p \to p p$	"
$K^- p \to K^- p$	"
$\bar{p} p \to \bar{p} p$	"
$\bar{p} p \to \pi^- \pi^+$	"
$\bar{p} p \to K^- K^+$	"

Papers PL 108B (1982) 51, PL 118B (1982) 442, PL 123B (1983) 265, PL 128B (1983) 124, PL 130B (1983) 335, and NP B216 (1983) 1.

CERN-WA-011 (Jan 1976) Approved Feb 1976, Oct 1976; Completed Jun 1980.

SEARCH FOR HIGH MASS STATES PRODUCED WITH THE $\psi(3.1)$

INDIANA U - B Brabson, R Crittenden, R Heinz, J Krider, T Marshall, T R Palfrey

IMPERIAL COLL - P Astbury, A Duane, G King, R Namjoshi, B Nandi, D M Websdale, J S Wiejak

SACLAY - R Barate, P Bareyre, P Bonamy, P Borgeaud, J C Brisson, M David (√ Spokesperson), J Ernwein, F X Gentit, G Laurens, Y Lemoigne, J Pascual, J Poinsignon, A Roussarie, G Villet, S Zaninotti

SOUTHAMPTON U - J G McEwen

Accelerator CERN-SPS *Detector* Wide-angle spectrometer

Reactions

$\pi^- p \to \mu^+ \mu^- X$	140 GeV/c
$\pi^- p \to e^+ e^- X$	"

Particles studied J/ψ, $\psi(3685)$, χ(unspec)

Comments Reaction given is trigger only. Muons are from J/ψ decay, and accompanying particles are also detected.

Papers PL 82B (1979) 145, PRL 43 (1979) 1541, PR D24 (1981) 2994, PL 113B (1982) 105, PL 113B (1982) 509, PL 121B (1983) 198, and PL 121B (1983) 449.

CERN-WA-018 (Oct 1975) Approved Jul 1976; Completed Dec 1983.

STUDY OF SEMILEPTONIC AND LEPTONIC NEUTRAL-CURRENT PROCESSES AND OF MUON POLARIZATION PRODUCED IN ν AND $\bar{\nu}$ INTERACTIONS USING COUNTER TECHNIQUES

CHARM COLLABORATION

CERN - J V Allaby, U Amaldi, L Barone, A Capone, W Flegel, L Lanceri, M Metcalf, J Panman, K Winter (√ Spokesperson)

HAMBURG U - I Abt, J Aspiazu, F W Busser, H Daumann, P D Gall, F Niebergall, P Schutt, P Stahelin

NIKHEF, AMSTERDAM - F Bergsma, J P Dorenbosch, C Nieuwenhuis

ROME U - G Barbiellini, A Baroncelli, B Borgia, C Bosio, M Diemoz, U Dore, F Ferroni, E Longo, L Luminari, P Monacelli, F de Notaristefani, C Santoni, L Tortora, V Valente

MOSCOW, ITEP - P Gorbunov, E A Grigoriev, V S Kaftanov, V D Khovansky, A Rosanov

Accelerator CERN-SPS *Detector* CHARM

Reactions

ν_μ nucleus $\to \nu_\mu$ hadrons	0–260 GeV/c
ν_μ nucleus $\to \mu^-$ hadrons	"
ν_μ nucleus $\to \mu^- \mu^- X$	"
$\bar{\nu}_\mu$ nucleus $\to \bar{\nu}_\mu$ hadrons	"
$\bar{\nu}_\mu$ nucleus $\to \mu^+$ hadrons	"
$\bar{\nu}_\mu$ nucleus $\to \mu^+ \mu^+ X$	"
$\nu_\mu e^- \to \nu_\mu e^-$	"
$\nu_\mu e^- \to \mu^- \nu_e$	"
$\bar{\nu}_\mu e^- \to \bar{\nu}_\mu e^-$	"
$\bar{\nu}_\mu$ Fe $\to \mu^+$ hadrons	"

Particles studied charm, hvy-lepton

Comments Both narrow and wide band beams are used. Measures total cross sections and x and y distributions of neutral and charged current interactions. Several rare processes have been seen. This apparatus follows behind that of experiment WA-001, and part of this experiment is to measure the polarization of μ^+'s produced in that one (these latter reactions have Fe as target). The upgraded detector incorporating 78 planes of streamer tubes will be used for future measurements. For a description of the apparatus, see the LBL-91 supplement on detectors.

Papers PL 86B (1979) 229, PL 93B (1980) 203, NIM 176 (1980) 189, NIM 178 (1980) 27, PL 96B (1980) 435, PL 99B (1981) 265, PL 102B (1981) 67, PL 105B (1981) 242, PL 107B (1981) 241, PL 109B (1982) 133, NIM 200 (1982) 183, PL 117B (1982) 272, PL 121B (1983) 429, PL 122B (1983) 185, PL 122B (1983) 465, PL 123B (1983) 269, ZPHY C17 (1983) 211, PL 128B (1983) 117, PL 128B (1983) 361, NIM 215 (1983) 361, NIM 217 (1983) 291, IEEE TNS 30 (1983) 122, IEEE TNS 30 (1983) 138, PL 141B (1984) 129, PL 147B (1984) 481, ZPHY C24 (1984) 217, PL 153B (1985) 111, PL 157B (1985) 469, and PL 180B (1986) 303.

CERN-WA-018-2 (1983) Approved Feb 1984; Completed Sep 1984.

HIGH-PRECISION MEASUREMENT OF THE RATIO σ_ν(n.c.)/σ_ν(c.c.)

CHARM COLLABORATION

CERN - J V Allaby, U Amaldi, M Baubillier, W Flegel, F Grancagnolo, L Lanceri, M Metcalf, C Nieuwenhuis, J Panman, R Plunkett, C Santoni, K Winter (√ Spokesperson)

HAMBURG U - I Abt, J Aspiazu, F W Buesser, H Daumann, P D Gall, T Hebbeker, F Niebergall, P Schuett, P Stahelin

NIKHEF, AMSTERDAM - F Bergsma

MOSCOW, ITEP - P Gorbunov, E Grigoriev, V Khovansky, A Rosanov

INFN, ROME - G Barbiellini, A Baroncelli, L Barone, B Borgia, C Bosio, A Capone, M Diemoz, C Dionisi, U Dore, F Ferroni, E Longo, P Loverre, L Luminari, P Monacelli, S Morganti, F de Notaristefani, L Tortora, V Valente

Accelerator CERN-SPS *Detector* CHARM

Reactions

ν_μ nucleus	0–160 GeV/c
$\bar{\nu}_\mu$ nucleus	"

Comments A high-precision measurement of the neutral-to-charged-current ratio on an isoscalar target to determine the electroweak mixing $\sin^2\theta$.

Papers PL 177B (1986) 446, and PL 179B (1986) 301.

CERN-WA-021 (Nov 1974) Approved Aug 1976; Completed Dec 1983.

HIGH-ENERGY ν AND $\bar{\nu}$ INTERACTIONS IN BEBC FILLED WITH H_2

BIRMINGHAM U - D C Colley, G T Jones, S W O'Neale, F Votruba

BONN U - C Geich-Gimbel, T P K Kokott, B Nellen

CERN - A Grant, D R O Morrison, L Pape, C Peyrou, P Schmid, H W Wachsmuth

IMPERIAL COLL - E F Clayton, D B Miller, M Mobayyen

UNIVERSITY COLL, LONDON - J Bartley, F W Bullock, M Esten, D J Miller

MUNICH, MAX PLANCK INST - M Aderholz, N Schmitz, W Wittek

OXFORD U - G Corrigan, G Myatt (√ Spokesperson), D Radojicic

Accelerator CERN-SPS *Detector* HBC-BEBC-HYB

Reactions

$\nu_\mu\ p \rightarrow \mu^-\ X$	0–150 GeV/c
$\nu_\mu\ p \rightarrow \mu^-\ \Delta(1232\,P_{33})^{++}$	"
$\nu_\mu\ p \rightarrow \mu^-\ \pi^+\ p$	"
$\nu_\mu\ p \rightarrow \mu^-\ \Delta(\text{unspec})^{++}$	"
$\nu_\mu\ p \rightarrow \mu^-\ \pi^+\ \pi^0\ p$	"
$\nu_\mu\ p \rightarrow \mu^-\ \pi^+\ \pi^+\ n$	"
$\nu_\mu\ p \rightarrow \mu^-\ \pi^+\ \pi^+\ \pi^-\ p$	"
$\nu_\mu\ p \rightarrow \mu^-\ \rho^+\ p$	"
$\nu_\mu\ p \rightarrow \nu_\mu\ p$	"
$\nu_\mu\ p \rightarrow \nu_\mu\ \pi^+\ n$	"
$\nu_\mu\ p \rightarrow$ charm X	"
$\nu_\mu\ e^- \rightarrow \mu^-\ \nu_e$	"
$\overline{\nu}_\mu\ p \rightarrow \mu^+\ X$	"
$\overline{\nu}_\mu\ p \rightarrow \mu^+\ \pi^-\ p$	"
$\overline{\nu}_\mu\ p \rightarrow \mu^+\ \Delta(1232\,P_{33})^0$	"
$\overline{\nu}_\mu\ p \rightarrow \mu^+\ N^*(\text{unspec})^0$	"
$\overline{\nu}_\mu\ p \rightarrow \mu^+\ \pi^-\ \pi^0\ p$	"
$\overline{\nu}_\mu\ p \rightarrow \mu^+\ \pi^+\ \pi^-\ n$	"
$\overline{\nu}_\mu\ p \rightarrow \mu^+\ \pi^+\ \pi^-\ \pi^-\ p$	"
$\overline{\nu}_\mu\ p \rightarrow \mu^+\ \rho^-\ p$	"
$\overline{\nu}_\mu\ p \rightarrow \overline{\nu}_\mu\ p$	"
$\overline{\nu}_\mu\ p \rightarrow \overline{\nu}_\mu\ \pi^+\ n$	"
$\overline{\nu}_\mu\ p \rightarrow$ charm X	"
$\overline{\nu}_\mu\ p \rightarrow \mu^+\ n$	"
$\overline{\nu}_\mu\ p \rightarrow \mu^+\ \Lambda$	"
$\nu_\mu\ n \rightarrow \mu^-\ p$	"
$\nu_\mu\ n \rightarrow \mu^-$ hadrons	"
$\nu_\mu\ n \rightarrow \nu_\mu$ hadrons	"
ν_μ deut	"
$\overline{\nu}_\mu\ p \rightarrow \mu^+\ n$	"
$\overline{\nu}_\mu\ p \rightarrow \mu^+$ hadrons	"
$\overline{\nu}_\mu\ p \rightarrow \overline{\nu}_\mu$ hadron(s)	"
$\overline{\nu}_\mu\ n \rightarrow \mu^+$ hadrons	"
$\overline{\nu}_\mu\ n \rightarrow \overline{\nu}_\mu$ hadrons	"
$\overline{\nu}_\mu$ deut	"

Particles studied charm

Comments Most of the flux is below 50 GeV/c. Uses the EMI and the IPF. The principal aims are (1) the study of charmed particle production in fully constrained events, (2) the study of neutral current interactions on free protons, (3) the measurement of N^* and Δ production cross sections, (4) studies of hadronic final states in charged and neutral current reactions, and (5) the measurement of inclusive charged-current cross sections and structure functions.

Papers PL 86B (1979) 108, PL 87B (1979) 281, PL 88B (1979) 381, PL 96B (1980) 209, NP B176 (1980) 269, NP B176 (1980) 333, PL 99B (1981) 159, PL 103B (1981) 71, NP B181 (1981) 385, NP B188 (1981) 1, PL 112B (1982) 88, NP B194 (1982) 1, NP B194 (1982) 373, PL 109B (1982) 234, NP B214 (1983) 369, NP B223 (1983) 269, ZPHY C25 (1984) 121, ZPHY C27 (1985) 43, ZPHY C28 (1985) 23, PL 173B (1986) 211, PL 178B (1986) 329, and NP B264 (1986) 221.

CERN-WA-025 (Jun 1974) Approved Aug 1976; Completed Dec 1983.

NEUTRINO AND ANTINEUTRINO INTERACTIONS IN DEUTERIUM

NIKHEF, AMSTERDAM – G van Apeldoorn, S Barlag, P van Dam, B Jongejans, A Tenner (Spokesperson), C Visser, M Wigmans
BERGEN U – A G Frodesen, B Grung, A Haatuft, A Halsteinslid, K Myklebost, A Rognebakke, O Skjeggestad, R Time
BOLOGNA U – P Capiluppi, G Giacomelli, G Graziani, P Serra Lugaresi, G Mandrioli, A Rossi
PADUA U – M Baldo-Ceolin, P Bobisut, E Calimani, S Ciampolillo, J Derkaoui, H Huzita, M Loreti, G Puglierin, A Sconza
PISA U & INFN, PISA – C Angelini, L Bertanza, A Bigi, R Casali, R Fantechi, E Flaminio, A Nappi, R Pazzi, C Petri, G Pierazzini
SACLAY – T Bolognese, A Borg, M L Faccini-Turluer, C Louedec, D Vignaud
TURIN U – D Allasia, F Bianchi, V Bisi, D Gamba, A Marzari-Chiesa, L Riccati, A Romero

Accelerator CERN-SPS *Detector* DBC-BEBC

Reactions

$\nu_\mu\ p \rightarrow \mu^-$ hadrons	0–260 GeV/c
$\nu_\mu\ p \rightarrow \nu_\mu$ hadron(s)	"

Particles studied charm

Comments The main aim is a comparison of cross sections and structure functions on protons and neutrons.

Papers PL 117B (1982) 262, ZPHY C24 (1984) 119, ZPHY C27 (1985) 239, PR D31 (1985) 2996, ZPHY C28 (1985) 321, PL 154B (1985) 231, and PL 174B (1986) 450.

CERN-WA-027 (Feb 1976) Approved Aug 1976; Completed Apr 1980.

K^+p INTERACTIONS IN BEBC AT 70 GeV/c

BRUSSELS U – C de Clercq, M Csejthey-Barth, J J Dumont, D Johnson, J Lemonne, E de Wolf
CERN – R Contri, M Drevermann, Y Goldschmidt-Clermont, G Harigel, J P Porte, R T Ross, P Theocharopoulos
GENOA U – C Caso, F Fontanelli, R Monge, S Squarcia, U Trevisan
MONS U – J F Balland, J Beaufays, F Grard, J Hanton
NIJMEGEN U – F Crijns, W Kittel, W Metzger, P Van der Poel, C Pols, M Raaymakers, J Schotanus, A Stergiou, R T Van de Walle (√ Spokesperson)
SERPUKHOV – Y Belokopytov, P V Chliapnikov, A B Fenjuk, L N Gerdyukov, I Gritsaenko, V M Kubic, V Lugovsky, V I Nikolaenko, Y Petrovich, V Ronjin, O G Tchikilev, A P Vorobjev, V A Yarba

Accelerator CERN-SPS *Detector* HBC-BEBC

Reactions

$K^+\ p \rightarrow X$	70 GeV/c

Comments A general survey experiment. Studies low-p_t inclusive production of low-mass particles and resonances.

Papers ZPHY C2 (1979) 285, ZPHY C7 (1981) 89, ZPHY C7 (1981) 187, NP B191 (1981) 39, ZPHY C10 (1981) 205, NP B192 (1981) 289, PL 115B (1982) 329, PL 117B (1982) 267, ZPHY C16 (1982) 111, PL 121B (1983) 183, ZPHY C16 (1983) 291, NP B223 (1983) 296, NIM 207 (1983) 399, PL 141B (1984) 276, ZPHY C22 (1984) 1, ZPHY C22 (1984) 23, NP B246 (1984) 431, and ZPHY C31 (1986) 13.

CERN-WA-028 (Dec 1975) Approved Aug 1976; Completed Apr 1980.

K^-p INTERACTIONS IN BEBC AT 110 GeV/c

TATA INST – S Banerjee, S N Ganguli
CERN – Y Goldschmidt-Clermont, D R O Morrison
CRACOW – T Coghen, K Dziunikowska, A Eskreys, T Haupt, M W Krasny
IMPERIAL COLL – K W J Barnham, P Wright
VIENNA, OAW – F Mandl (√ Spokesperson), M Markytan, E Shaaban
WARSAW U, IEP & WARSAW, INR – M Bardadin-Otwinowska, A Jacholkowska, M Szczekowski
JAMMU U – G L Kaul, Y Prakash
INNSBRUCK U – P Girtler, D Kuhn

Accelerator CERN-SPS *Detector* HBC-BEBC

Reactions

$K^-\ p \rightarrow X$	108.6 GeV/c

Comments A general survey experiment.

Papers NP B155 (1979) 307, ZPHY C3 (1979) 89, NP B167 (1980) 285, ZPHY C9 (1981) 17, ZPHY C9 (1981) 21, ZPHY C11 (1981) 189, NP B178 (1981) 392, NP B189 (1981) 421, ZPHY C12 (1982) 323, NP B206 (1982) 349, ZPHY C19

(1983) 283, ZPHY C22 (1984) 205, ZPHY C28 (1985) 57, ZPHY C31 (1986) 401, and ZPHY C31 (1986) 409.

CERN-WA-038 (Apr 1977) Approved Jun 1977; Completed Dec 1983.

MAGNETIC MONOPOLE SEARCH AT THE SPS

CERN – P Lazeyras
KURCHATOV INST, MOSCOW – I I Gurevich, S Kh Khakimov, V P Martemianov (Spokesperson), A P Mishakora, V V Ogurtzov, V G Tarasenkov
NOVOSIBIRSK, IYF – J Barkov
SERPUKHOV – A P Bugorsky
BOLOGNA U – G Giacomelli

Accelerator CERN-SPS *Detector* Other

Reactions

p nucleus → monopole X	400 GeV/c

Particles studied monopole

Comments Targets are bombarded and the monopoles (if produced) are to be pulled out by a pulsed magnetic field and detected in emulsion and plastic.

CERN-WA-042 (Mar 1977) Approved Nov 1977; Completed Jun 1982.

AN EXPERIMENT ON THE STRONG INTERACTIONS AND RADIATIVE DECAYS OF HYPERONS

BRISTOL U – W M Gibson, R Owen, V J Smith, A Wood
GENEVA U – M Bourquin, P Extermann (✓ Spokesperson), T Modis, P Muhlemann, J Perrier, K Ragan, P Schirato
HEIDELBERG U, PHYS INST – H Burckhart, H W Siebert, K P Streit
LAUSANNE U – C Dore, M Gailloud, P Jacot, P Rosselet, R Weill
QUEEN MARY COLL – S Biagi
RUTHERFORD – R M Brown, C N P Gee, R Gray, P W Jeffreys, B Saunders, J J Thresher, C Yanagisawa

Accelerator CERN-SPS *Detector* Spectrometer

Reactions

$\Sigma^- p \to X$	74, 137 GeV/c
$\Sigma^- p \to \Lambda \pi^- p$	"
$\Sigma^- p \to \Sigma^0 \pi^- p$	"
$\Sigma^- p \to \Sigma^+ \pi^- \pi^- p$	"
$\Sigma^- p \to \Sigma^- \pi^+ \pi^- p$	"
Σ^- deut → X	"
$\Xi^- p \to X$	"
$\Xi^- p \to \Xi^- p$	"
$\Xi^- p \to \Lambda K^- p$	"
$\Xi^- p \to \Sigma^0 K^- p$	"
$\Xi^- p \to \Xi^- \pi^+ \pi^- p$	"
Ξ^- deut → X	"
$\bar{p} p \to X$	"
$\bar{p}$ deut → X	"
Ξ^- Be → Ξ^- X	116 GeV/c
Ξ^- Be → Ω^- X	"
Ξ^- Be → Y^*(unspec) X	"
Ξ^- Be → Ξ^*(unspec) X	"
Ξ^- Be → Ω^*(unspec) X	"

Particles studied Λ, Σ^+, Σ(unspec)$^-$, Ξ(unspec)$^-$

Comments The main aim is to study Σ^*, Ξ^*, and Ω^* production in $\Xi^- N$ collisions. Hyperon radiative decays, mainly $\Lambda \to n\gamma$ and $\Sigma^+ \to p\gamma$, are also studied.

Papers NP B186 (1981) 1, ZPHY C9 (1981) 305, PL 112B (1982) 265, PL 112B (1982) 277, ZPHY C17 (1983) 113, PRPL 114 (1984) 100, ZPHY C28 (1985) 495, ZPHY C30 (1986) 201, ZPHY C31 (1986) 33, and ZPHY C (submitted).

CERN-WA-044 (Feb 1977, Aug 1977) Approved Dec 1977; Completed Dec 1983.

SEARCH FOR QUARKS IN HIGH-ENERGY NEUTRINO INTERACTIONS

INFN, BOLOGNA – G Bonvicini, P Giusti, T Massam, C Del Papa, G Cara Romeo
BOLOGNA U – M Basile, G D'Ali, F Palmonari, G Sartorelli
CERN – L Cifarelli, A Contin, R Nania, F Rohrback, A Zichichi (✓ Spokesperson)
FRASCATI – M Curatolo, B Esposito, M Spinetti, G Susinno, L Votano
INFN, ROME & ROME U – I Laakso

Accelerator CERN-SPS *Detector* Combination

Reactions

ν_μ Pb → quark X	0–200 GeV/c

Particles studied quark

Papers LNC 29 (1980) 251.

CERN-WA-047 (Feb 1978) Approved Jun 1978; Completed Feb 1980.

CONTINUATION OF THE STUDY OF NEUTRINO INTERACTIONS WITH DICHROMATIC BEAMS AT THE SPS, USING BEBC FILLED WITH NEON

AACHEN, TECH HOCHSCH, III PHYS INST – H Deden, M Deutschmann, P Fritze, H Grassler, F J Hasert, J Morfin, R Schulte, K Schultze, H H Seyfert
DEMOCRITOS NUCLEAR RESEARCH CENTER – M Mermikidis, E Simopoulou, A Vayaki
BONN U – K Bockmann, C Geich-Gimbel, H G Heilmann, T P K Kokott, B Nellen, R Pech
CERN – P Bosetti, V T Cocconi, D C Cundy, P O Hulth, D R O Morrison, E Pagiola, L Pape, C Peyrou, P Schmid, W G Scott, H W Wachsmuth
IMPERIAL COLL – K W J Barnham, R Beuselinck, I Butterworth, J Chima, E F Clayton, D B Miller, K Powell
OXFORD U – R Giles, P Grossmann, J Lloyd, R McGow, G Myatt, D H Perkins, D Radojicic, P Renton, B Saitta
SACLAY – M Bloch, T Bolognese, B Tallini (Spokesperson), D Vignaud

Accelerator CERN-SPS *Detector* HLBC-BEBC

Reactions

ν_μ nucleus → μ^- X	10–200 GeV/c
ν_μ nucleus → ν_μ X	"
$\bar{\nu}_\mu$ nucleus → μ^+ X	"
$\bar{\nu}_\mu$ nucleus → $\bar{\nu}_\mu$ X	"

Comments A continuation of CERN-WA-019.

Papers NP B198 (1982) 365, PL 110B (1982) 167, NP B203 (1982) 362, PRL 50 (1983) 224, and NP B217 (1983) 1.

CERN-WA-056 (Oct 1978) Approved Dec 1978; Completed Apr 1980.

STUDY OF $N\bar{N}$ STATES PRODUCED VIA BARYON EXCHANGE IN $\pi^+ p$ INTERACTIONS USING THE OMEGAPRIME SPECTROMETER

CERN – A Ferrer (✓ Spokesperson), P Sonderegger
NEUCHATEL U – L Bachman, M Bogdanski, L Dorsaz, L Fluri, E Jeannet, D Perrin, R Schwarz
ECOLE POLYTECHNIQUE – Z Ajaltouni, P Benkheiri, B Chaurand, A Rouge, J P Wuthrick
COLLEGE DE FRANCE – A de Bellefon, P Billoir, J M Brunet, P Frenkiel, B Lefievre, D Poutot, G Tristram, A Volte
LISBON U – J M Gago

Accelerator CERN-SPS *Detector* OMEGAPRIME

Reactions

$\pi^+ p \to \Delta(1232\,P_{33})^{++}\, p\, \bar{p}$	20 GeV/c
$\pi^+ p \to p\, p\, \bar{n}$	"
$\pi^+ p \to p\, p\, \bar{p}\, \pi^+$	"
$\pi^+ p \to \Delta(1232\,P_{33})^0\, p\, \bar{n}\, \pi^+$	"
$\pi^+ p \to \Delta(1232\,P_{33})^0\, p\, \bar{p}\, \pi^+\, \pi^+$	"

$\pi^+ n \rightarrow p p \overline{p}$	"
$\pi^- p \rightarrow p p \overline{p} \pi^-$	12 GeV/c

Particles studied baryonium, $N\overline{N}(2020)^0$, $N\overline{N}(2200)^0$

Comments Searches in the recoil from a fast proton or Δ for narrow mesons (neutral or singly or doubly charged). For a description of the apparatus, see the LBL-91 supplement on detectors.

Papers NP B209 (1982) 301.

CERN-WA-058 (Nov 1978) Approved Mar 1979; Completed Jan 1980.

MEASUREMENT OF THE LIFETIME OF CHARMED PARTICLES IN NUCLEAR EMULSION EXPOSED TO AN 80 GeV BREMSSTRAHLUNG BEAM IN CONJUNCTION WITH THE OMEGAPRIME SPECTROMETER

BOLOGNA U – A Forino, R Gessaroli, A Quareni
CERN – G Vanderhaeghe
FLORENCE U – G Di Caporiacco, A M Cartacci, B Conforto, A Conti, M G Dagliana, G Parrini
GENOA U – M Dameri, G Diambrini-Palazzi (Spokesperson), B Osculati, M Sannino, G Tomasini
LEBEDEV INST – M I Adamovich, Y A Alexandrov, M M Chernyavsky, S P Kharlamov, V G Larionova, G I Orlova, N G Peresadko, M I Tretyakova
PARIS, CURIE UNIV VI – J Lory, C Meton, D Schune, Tsai-Chu, B Willot
SANTANDER U – L Bravo, A Ruiz, E Villar
VALENCIA U – J M Bolta, E Higon
MADRID, JEN – R Llosa
MOSCOW, STATE RES INST FOR PHOTOCHEM PROJ – K M Romanovskaya

Accelerator CERN-SPS *Detector* OMEGAPRIME

Reactions

γ nucleus $\rightarrow$ charm X	20–80 GeV/c

Particles studied charm

Comments A continuation of experiment WA-045. Candidate events photoproduced in emulsion are tagged by Omegaprime. Single emulsion pellicles with an effective thickness of 6.9 mm were exposed one at a time. Some emulsion remains to be scanned (October 84). For a description of Omegaprime, see the LBL-91 supplement on detectors.

Papers PL 89B (1980) 424, PL 99B (1981) 271, LNC 30 (1981) 166, PL 140B (1984) 119, and PL 140B (1984) 123.

CERN-WA-059 (Nov 1978, Dec 1978) Approved Apr 1979; Completed May 1980.

MEASUREMENT OF NUCLEON STRUCTURE FUNCTIONS IN HORN-FOCUSED ν AND $\overline{\nu}$ BEAMS IN BEBC FILLED WITH NEON

DEMOCRITOS NUCLEAR RESEARCH CENTER – E Simopoulou, A Vayaki, E Zevgolatakos
BARI U – N Armenise, M Calicchio, O Erriquez, M T Fogli-Muciaccia, G Iaselli, S Natali, S Nuzzo, F Romano, F Ruggieri
BIRMINGHAM U – G T Jones, R P Middleton, S O'Neale
BRUSSELS U – G Bertrand-Coremans, D Bertrand, W Van Doninck, P Marage, J Sacton
CERN – A M Cooper, H Klein, D R O Morrison, M A Parker, H W Wachsmuth
IMPERIAL COLL – K Barnham, E F Clayton, D B Miller, M Mobbayyen, A Petridis, M Talebzadeh
UNIVERSITY COLL, LONDON – T Azemoon, J H Bartley, F W Bullock, P J Fitch, S Robertson, R A Sansum
MUNICH, MAX PLANCK INST – M Aderholz, L Deck, N Schmitz, K L Wernhard, W Wittek
OXFORD U – P Allport, D Radojicic, K Varvell, J Wells
ECOLE POLYTECHNIQUE – V Brisson, P Petiau, C Vallee
RUTHERFORD – J G Guy, P Kasper, W Venus (✓ Spokesperson)
SACLAY – J P Baton, G Gerbier, C Kochowski, M Neveu
CRACOW – J Chwastowski, T Coghen
STOCKHOLM U – M Berggren, P-O Hulth

Accelerator CERN-SPS *Detector* HLBC-BEBC

Reactions

ν_μ nucleus	10–100 GeV/c
$\overline{\nu}_\mu$ nucleus	"

Comments Approximately 15000 $\overline{\nu}_\mu$ and 10000 ν_μ charged current events fully measured.

Papers ZPHY C21 (1984) 307, PL 140B (1984) 137, PL 141B (1984) 133, ZPHY C29 (1985) 15, ZPHY C31 (1986) 51, PL 173B (1986) 211, and ZPHY C31 (1986) 191.

CERN-WA-062 Approved Dec 1979; Completed Jun 1980.

SEARCH FOR CHARMED STRANGE BARYONS

BRISTOL U – W M Gibson, V J Smith
GENEVA U – M Bourquin, P Extermann, T Modis, P Muhlemann, P Schirato
HEIDELBERG U, PHYS INST – H J Burckhart, P Igo-Kemenes, H W Siebert, K P Streit (✓ Spokesperson)
LAUSANNE U – C Dore, M Gailloud, P Jacot-Guillarmod, P Rosselet, R Weill
MELBOURNE U – S N Tovey
QUEEN MARY COLL – S F Biagi, A J Britten, A A Carter
RUTHERFORD – R M Brown, C N P Gee, J C Gordon, R J Gray, W C Louis, B J Saunders, J J Thresher

Accelerator CERN-SPS *Detector* Spectrometer

Reactions

Σ^- Be $\rightarrow \Lambda K^- \pi^+$ pions	135 GeV/c
Σ^- Be $\rightarrow \Xi_c^0$ X	"
Σ^- Be $\rightarrow \Xi_c^+$ X	"
Σ^- Be $\rightarrow \Omega_c^0$ X	"
Σ^- Be $\rightarrow \Xi^- K^- \pi^+ \pi^+$	"
Σ^- Be $\rightarrow \Lambda \overline{p} \pi^+$ pions	"

Particles studied Ξ_c^+, J/ψ, Ω_c^0

Comments Uses modified apparatus of CERN-WA-042. Search for final states with strangeness -2 and -3 and positive or zero charge.

Papers PL 122B (1983) 455, PL 150B (1985) 230, ZPHY C28 (1985) 175, and PL 172B (1986) 113.

CERN-WA-063 (Nov 1979) Approved Jan 1980; Completed Jun 1980.

INCLUSIVE BARYON-ANTIBARYON PRODUCTION IN THE CENTRAL REGION USING THE OMEGA SPECTROMETER

CERN – W Beusch
SACLAY – E Lesquoy, L Moscoso, A Muller (✓ Spokesperson), S Zylberajch
ANNECY – A Bussiere
COLLEGE DE FRANCE – A de Bellefon
NEUCHATEL U – D Perrin
ECOLE POLYTECHNIQUE – J P Wuthrick

Accelerator CERN-SPS *Detector* OMEGAPRIME

Reactions

charged$^+$ $p \rightarrow \overline{p} p$ X	40 GeV/c
charged$^-$ $p \rightarrow \overline{p} p$ X	"

Particles studied baryonium

Comments A search for centrally produced baryon-antibaryon resonances. For a description of the apparatus, see the LBL-91 supplement on detectors.

CERN-WA-064 (Apr 1980) Approved May 1980; Completed Jun 1981.

CHANNELLING RADIATION IN A SILICON CRYSTAL

AARHUS U – P Christensen, B Marsh, P Meyer, R Stensgaard, E Uggerhoj (Spokesperson)
BASEL U – P Pavlopoulos

CERN – J Bak, S Pape-Moller
GLASGOW U – P J Bussey
LANCASTER U – D Newton
MANCHESTER U – R J Ellison, R E Hughes-Jones, D Mercer
RUTHERFORD – M Atkinson, D I Giddings, P H Sharp
STRASBOURG – M Suffert

Accelerator CERN-SPS *Detector* Spectrometer

Reactions

e^+	5–20 GeV/c
e^-	"

CERN-WA-065 (Apr 1980) Approved May 1980; Completed Sep 1982.

FURTHER STUDIES OF PROMPT NEUTRINO PRODUCTION IN 400 GeV PROTON NUCLEUS COLLISIONS

CHARM COLLABORATION

CERN – J V Allaby, U Amaldi, L Barone, A Capone, W Flegel, L Lanceri, M Metcalf, J Panman, K Winter (√ Spokesperson)
HAMBURG U – J Aspiazu, F W Busser, H Daumann, P D Gall, F Niebergall, P Schutt, P Stahelin
NIKHEF, AMSTERDAM – F Bergsma, J P Dorenbosch, M Jonker, C Nieuwenhuis, F Udo
ROME U – G Barbiellini, A Baroncelli, B Borgia, C Bosio, M Diemoz, U Dore, F Ferroni, E Longo, L Luminari, P Monacelli, F de Notaristefani, C Santoni, L Tortora, V Valente
MOSCOW, ITEP – P Gorbunov, E A Grigoriev, V S Kaftanov, V D Khovansky, A Rosanov

Accelerator CERN-SPS *Detector* CHARM

Reactions

p nucleus $\rightarrow \nu$ X	400 GeV/c

Particles studied longlived

Comments Continues studies of CERN-WA-018 on properties of prompt neutrino production. A first run with Cu beam dumps of densities 1 and 1/3 and 2.5×10^{18} protons finished in September 82. The dump-to-detector distance is 480 m in a new facility. Also made in parallel a search for penetrating neutral particles in a second detector at 10 mrad to the incident proton beam viewing a 40-m-long decay length. For a description of the apparatus, see the LBL-91 supplement on detectors.

Papers PL 128B (1983) 361, PL 157B (1985) 458, and PL 166B (1986) 473.

CERN-WA-066 (Apr 1980) Approved May 1980; Completed Sep 1982.

FURTHER STUDY OF PROMPT NEUTRINO PRODUCTION IN PROTON-NUCLEUS COLLISIONS USING BEBC

AACHEN, TECH HOCHSCH, III PHYS INST – H Grassler
DEMOCRITOS NUCLEAR RESEARCH CENTER – M Dris, E Simopoulou, A Vayaki
BONN U – W Droge, U Idschok, H Kreutzman, B Nellen, B Wuensch
CERN – A M Cooper-Sarkar, D C Cundy, H Foeth, A Grant, G G Harigel, H Klein, D R O Morrison, M Nikolic, L Pape, A Parker, P Schmid, H W Wachsmuth
IMPERIAL COLL – K W J Barnham, D B Miller, M M Mobayyen, M Talebzadeh
MUNICH, MAX PLANCK INST – M Aderholz, L Deck, N Schmitz, W Wittek
OXFORD U – P Bostock, J Kristic, G Myatt, D Radojicic
SACLAY – T Bolognese, M L Faccini-Turleur, D Vignaud
STOCKHOLM U – K Hultguist, P O Hulth (√ Spokesperson), C Walck
RUTHERFORD – J Guy, W Venus

Accelerator CERN-SPS *Detector* HLBC-BEBC-HYB

Reactions

p nucleus $\rightarrow \nu$ X	400 GeV/c

Comments Continues studies of CERN-WA-052. A beam dump experiment.

Papers PL 160B (1985) 207, PL 160B (1985) 212, and NP B273 (1986) 253.

CERN-WA-067 (Nov 1979) Approved Dec 1980; Completed Nov 1981.

STUDY OF $\pi^- p$ INTERACTIONS AT 85 GeV/c LEADING TO $K^+K^+K^-K^-$ IN THE FINAL STATE — SEARCH FOR NEW STATES

CERN – B R French, J C Lassalle, J A Richardson
GLASGOW U – D Frame, I S Hughes, J G Lynch, A S Thompson, I R M Thompson, R M Turnbull
LIVERPOOL U – P S L Booth, L J Carroll, R A Donald, D N Edwards, M A Houlden, J N Jackson (√ Spokesperson), P A Kilcoyne, J M Myerscough, W H Range, I Rumford

Accelerator CERN-SPS *Detector* OMEGAPRIME

Reactions

$\pi^- p \rightarrow K^+ K^-$ X	85 GeV/c
$\pi^- p \rightarrow K^+ K^+ K^- K^-$ X	"
$\pi^- p \rightarrow \phi K^+ K^-$ X	"
$\pi^- p \rightarrow \phi \phi$ X	"

Particles studied ϕ, $\eta_c(2980)$, $\phi(1680)$, exotic-meson, glueball

Comments For a description of the apparatus, see the LBL-91 supplement on detectors.

Papers NP B242 (1984) 51, NP B273 (1986) 677, and NP B273 (1986) 689. No other papers expected.

CERN-WA-068 (Aug 1980) Approved Mar 1981; Completed Sep 1982.

FURTHER STUDY OF PROMPT NEUTRINO PRODUCTION IN A PROTON BEAM DUMP EXPERIMENT

CERN – F Dydak, R Hagelberg, J Knobloch, J Krolikowski, J May, F Ranjard, W von Rueden, J Steinberger (Spokesperson), H Taureg, H Wahl, J Wotschack
DORTMUND U – P Buchholz, J Duda, F Eisele, K Kleinknecht, D Pollmann, B Pszola, B Renk
HEIDELBERG U, IHEP – T Flottmann, C Geweniger, J G H de Groot, R Herden, H Keilwerth, N Magnussen, K Tittel
SACLAY – P Debu, C Guyot, J P Merlo, P Perez, J Rander, J P Schuller, R Turlay
WARSAW, INR – H Abramowicz, A Para, M Szczekowski, M Szeptycka
FERMILAB – J P Berge

Accelerator CERN-SPS *Detector* CDHS

Reactions

p nucleus $\rightarrow \nu$ X	450 GeV/c

Particles studied charm

Comments An extension of CERN-WA-054 to investigate with much better accuracy the equality of prompt ν_e and ν_μ fluxes. For a description of the apparatus, see the LBL-91 supplement on detectors.

CERN-WA-069 (Mar 1980) Approved Apr 1981, Jun 1982, Jun 1985; Completed Jul 1986.

PHOTOPRODUCTION IN THE ENERGY RANGE 70–200 GeV

BONN U – B Diekmann, C Gapp, K Heinloth, C Hoeger, S Holtzkamp, H-P Jakob, M Jung, G Koersgen, E Paul (√ Spokesperson), H Rotscheidt, S Soeldner-Rembold, A Tetzner-Voightlaender, A S Weigend
CERN – D Barberis, M Davenport, J Eades, R H McClatchey
YEREVAN PHYS INST – L S Bagdassaryan, S Danagulian, P I Galumyan, A G Oganessyan
LANCASTER U – T J Brodbeck, T Charity, A B Clegg, R C W Henderson, N Keemer, D Newton, A O'Conner, G W Wilson

MANCHESTER U – N Brook, P Coyle, B Dickinson, A Donnachie, A T Doyle, R J Ellison, R E Hughes-Jones, M Ibbotson, S D Kolya, G D Lafferty, H McCann, C McManus, D Mercer, P J Ottewell, D Reid, R J Thompson, J Waterhouse, M F Worsell
RUTHERFORD – R Apsimon, P S Flower, G Halliwell, J S Hutton, J A G Morris, J V Morris, C N Patterson, P H Sharp, C Uden
SHEFFIELD U – S Danaher, W Galbraith, N A Thacker, L Thompson

Accelerator CERN-SPS *Detector* OMEGA

Reactions

$\gamma\ p \rightarrow$ hadrons	65–180 GeV/c
$\pi^+\ p \rightarrow$ hadrons	80, 140 GeV/c
$\pi^-\ p \rightarrow$ hadrons	"
$K^+\ p \rightarrow$ hadrons	"
$K^-\ p \rightarrow$ hadrons	"

Particles studied D^0, D^+, D_s^+, Λ_c^+, vmeson

Comments Continues photoproduction studies of WA-004 and WA-057 to higher energies, with comparison to hadronic beam data. Topics include photoproduction of charmed particles, vector mesons, and high-mass multiparticle states, and a search for events due to lowest order QCD processes giving evidence of point-like interactions of the photon. For a description of the apparatus, see the LBL-91 supplement on detectors.

Papers IEEE TNS 30 (1983) 35.

CERN-WA-070 (Aug 1980) Approved Oct 1981.

STUDY OF DIRECT PHOTON EVENTS IN HADRONIC COLLISIONS

GENEVA U – R Bopp, S U Chung, M Donnat, P A Dorsaz, J Fischer, M N Kienzle, M Martin (Spokesperson), L Mathys, L Rosselet, M Werlen
GLASGOW U – S Jack, J G Lynch, A Maxwell, P J Negus, A S Thompson, R M Turnbull, J Wells
LIVERPOOL U – P S L Booth, L J Carroll, A J Cass, D N Edwards, J N Jackson, R Poultney, W H Range, S Snow
MILAN U – M Bonesini, D Cavalli, G Costa, E Galluzzi, F Gianotti, L Mandelli, M Mazzanti, L Perini, G Polesello
NEUCHATEL U – E Bonvin, L Fluri, A Jornod

Accelerator CERN-SPS *Detector* OMEGA

Reactions

$\pi^+\ p \rightarrow \gamma$ X	200, 280 GeV/c
$\pi^-\ p \rightarrow \gamma$ X	"
$p\ p \rightarrow \gamma$ X	"

Comments Uses a fine-grained γ detecting calorimeter together with the Omega spectrometer. For a description of the apparatus, see the LBL-91 supplement on detectors. Taking data (November 86).

CERN-WA-071 (Feb 1981) Approved Oct 1981; Completed Sep 1984.

AN EXPERIMENT TO STUDY BEAUTY PRODUCTION AND LIFETIME IN THE UPGRADED OMEGAPRIME SPECTROMETER

CERN – G Darbo, J Garcia, E Higon, L Rossi, G Vanderhaeghe
GENOA U – M Dameri, B Osculati, M Sannino, G Tomasini, S Vitale
MILAN U & INFN, MILAN – P F Manfredi, D Marioli, C Meroni, S Micheletti, G Vegni
LEBEDEV INST – M I Adamovich, Y A Alexandrov, M M Chernyavsky, S G Gerasimov, V G Larionova, N G Menjelai-Peresadko, G I Orlova, N A Salmanova, L N Shtarkov, M I Tretyakova, M V Vnukova
PARIS, CURIE UNIV VI & PARIS, UNIV VII, LPNHE – M M Cloarec, F Levy, J Lory, D Schune, Tsai-Chu, B Willot
INFN, ROME & ROME U – G Baroni, G Diambrini-Palazzi (Spokesperson), P Ginobbi, E Lamanna, M A Mazzoni, F Meddi, S Petrera
SANTANDER U – R Niembro, A Ruiz, E Villar
VALENCIA U – J M Bolta, J Cabrera, R Llosa, M A Sanchis, F Senent
GENEVA U – S Tentindo

Accelerator CERN-SPS *Detector* OMEGAPRIME

Reactions

π^- nucleus	350 GeV/c

Particles studied bottom, charm

Comments Detects beauty particles produced in emulsion targets using a charm decay detector or a high-p_t electron trigger. For a description of the apparatus, of the apparatus, see the LBL-91 supplement on detectors. A total of 50 liters of emulsion exposed.

Papers NIM 217 (1983) 194, NIM 225 (1984) 661, and NIM 226 (1984) 63.

CERN-WA-072 (Jun 1981) Approved Oct 1981; Completed Mar 1982.

A STUDY OF FAST PROTON PRODUCTION IN $\pi^\pm$ NUCLEUS INTERACTIONS USING THE OMEGA SPECTROMETER

CERN – W Beusch, A Burns, K Knudson, A Palano, E Quercigh, R Zitoun
PARIS, CURIE UNIV VI – T A Armstrong, M Baubillier, N Er Schaidat
NEUCHATEL U – D Perrin
WARSAW U, IEP – A Jacholkowski, S Otwinowski, M Szeptycka (Spokesperson), S Tkaczyk, R Walczak
LISBON, CFMC – M C Abrell, J Gago, M Pimenta

Accelerator CERN-SPS *Detector* OMEGA

Reactions

π^+ nucleus $\rightarrow p$ X	30 GeV/c
π^- nucleus $\rightarrow p$ X	"

Comments Measures the inclusive cross sections of fast (> 11 GeV/c) protons produced by π^+ and π^- on H, C, Al, Cu, Sn, and Pb. For a description of the apparatus, see the LBL-91 supplement on detectors.

Papers ZPHY C25 (1984) 115.

CERN-WA-074 (Dec 1981) Approved Feb 1982; Completed May 1982.

$\bar{p}p$ GLORY SCATTERING

CERN – P Sonderegger, R Zitoun
LISBON, CFMC – J Dias de Deus, J M Gago (✓ Spokesperson), M Pimenta
NEUCHATEL U – D Perrin
PARIS, CURIE UNIV VI – T Armstrong, M Baubillier, J C Brient, M Sene, Z Strachman
COLLEGE DE FRANCE – J Kahane, R Sene
MOSCOW, ITEP – Yu Galaktionov

Accelerator CERN-SPS *Detector* OMEGA

Reactions

$\bar{p}\ p \rightarrow \bar{p}\ p$	8–12 GeV/c
$\pi^-\ p \rightarrow \pi^-\ p$	"
$K^-\ p \rightarrow K^-\ p$	8–16 GeV/c

Comments Studies backward elastic scattering, and Λ polarization in the K^- fragmentation region. For a description of the apparatus, see the LBL-91 supplement on detectors.

Papers NP B262 (1985) 356, and NP B (accepted).

CERN-WA-075 (Sep 1981) Approved Apr 1982; Completed Jun 1984.

AN EXPERIMENT TO OBSERVE DIRECTLY BEAUTY PARTICLES SELECTED BY MUONIC DECAY IN EMULSION AND TO ESTIMATE THEIR LIFETIMES

BARI U – N Armenise, O Erriquez, M T Muciaccia, S Natali, S Nuzzo, F Romano, F Ruggieri
BRUSSELS U, IIHE – M Barth, G Bertrand-Coremans, R Roosen
CERN – E Chesi, P Musset, F Piuz, G Poulard, G Rosa, H Sletten
UNIVERSITY COLL, DUBLIN – A Breslin, A Montwill
JAPAN U GROUP COLLAB – M Hazama, K Hoshino, Y Isogane, Y Maeda, M Miyanishi, M Nakamura, K Niu, K Niwa, M Ohashi, Y Sato, H Shibuya, Y Tsuneoka, N Ushida, O Yamakawa, Y Yanagisawa
UNIVERSITY COLL, LONDON – J H Bartley, D H Davis, B G Duff, M J Esten, F F Heymann, D C Imrie, G J Lush, D N Tovee
ROME U – G Baroni, S Dell'Uomo, A Frenkel, S Di Liberto, A Manfredini, G Marini, G Martellotti, A Nigro, G Penso, E Petrolo, P Pistilli, G Romano (Spokesperson), A Sciubba, G Sgarbi, M De Vincenzi
TURIN U – D Allasia, V Bisi, D Gamba, A Marzari-Chiesa, L Ramello, L Ricatti, A Romero
MARSEILLE U, LUMINY – J P Albanese
STRASBOURG – R Arnold
BIRKBECK COLL – M Coupland, P Trent

Accelerator CERN-SPS *Detector* Emulsion

Reactions

π^- nucleus → bottom X	360 GeV/c

Particles studied bottom, charm

Comments Identification involves direct observation in emulsion of beauty and charm decays. Selection uses high-p_t muons. Sixty liters of emulsion are exposed.

Papers PL 158B (1985) 186.

CERN-WA-076 (Jan 1982) Approved Apr 1982, Nov 1984; Completed Sep 1986.

STUDY OF THE MESONS PRODUCED CENTRALLY IN THE REACTION $pp \rightarrow ppX^0$ AND $\pi^- p \rightarrow \pi^- pX^0$ AT 300 GeV/c

ATHENS U – A Apostolakis, M Stassinaki, G Vassiliadis
BARI U – C Evangelista, B Ghidini, V Lenti, F Navach, A Palano (✓ Spokesperson), G Zito
BIRMINGHAM U – O Baillie-Villalobos, I J Bloodworth, J N Carney, R Childs, J B Kinson, H R Shaylor, M T Trainor, M F Votruba
CERN – W Beusch, B R French, Y Goldschmidt-Clermont, A Jacholkowski, K Knudson, J C Lassalle, E Quercigh, N Redaelli, L Rossi, R Zitoun
COLLEGE DE FRANCE – M Benayoun, J Kahane, P Leruste, A Malamant, J L Narjoux, M Sene, R Sene

Accelerator CERN-SPS *Detector* OMEGA

Reactions

$p\ p \rightarrow p\ p$ X	85, 300 GeV/c
$\pi^+\ p \rightarrow \pi^+\ p$ X	85 GeV/c
$\pi^-\ p \rightarrow \pi^-\ p$ X	300 GeV/c

Particles studied $f_1(1420)$, meson^0, glueball

Comments Many specific exclusive channels are examined. For a description of the Omega spectrometer, see the LBL-91 supplement on detectors.

Papers PL 146B (1984) 273, PL 166B (1986) 245, and PL 167B (1986) 133.

CERN-WA-077 (Sep 1982) Approved Nov 1982.

SEARCH FOR DIRECT PRODUCTION OF GLUONIUM STATES IN HIGH p_t $\pi^- N$ COLLISIONS AT 350 GeV/c

ATHENS U – A Angelopoulos, A Apostolakis, H Rozaki, M Stassinaki, G Vassiliadis
BARI U – C Evangelista, B Ghidini, V Lenti, F Navach, A Palano, G Zito
BIRMINGHAM U – I J Bloodworth, J N Carney, J B Kinson, H R Shaylor, M F Votruba
CERN – W Beusch, A J Burns, B R French, Y Goldschmidt-Clermont, K Knudson, J C Lassalle, R Petronzio, E Quercigh (✓ Spokesperson)
COLLEGE DE FRANCE – M Benayoun, J Kahane, P Leruste, A Malamant, J L Narjoux, R Sene
PARIS, CURIE UNIV VI – M Baubillier, R Parrie, M Sene, Z Strachman, R Zitoun

Accelerator CERN-SPS *Detector* OMEGAPRIME

Reactions

π^- Be → hadrons	150, 300 GeV/c

Particles studied glueball

Comments For a description of the Omega spectrometer, see the LBL-91 supplement on detectors. Took some data in 1984, and scheduled to run again in 1987.

CERN-WA-078 (Feb 1983) Approved Jun 1983; Completed Aug 1985.

SEARCH FOR THE HADROPRODUCTION OF $b\bar{b}$ PAIRS

BARI U – G Catanese, M T Muciaccia, S Natali, S Nuzzo, F Ruggieri
BRUSSELS U, IIHE – M Van Homwegen, R Roosen
CERN – G Carboni, M J Esten, G Fidecaro, M Fidecaro, P Musset, P Pistilli (Spokesperson), F Piuz, G Poulard, H Sletten
UNIVERSITY COLL, LONDON – J H Bartley, M Coupland, D H Davis, B G Duff, F F Heymann, D C Imrie, G J Lush, D N Tovee, P Trent
ROME U & INFN, ROME – A Frenkel, E Lamanna, S Di Liberto, G Marini, G Martellotti, A Nigro, G Penso, S Petrera, E Petrolo, G Romano, G Rosa, A Sciubba, M De Vincenzi
TURIN U & INFN, TURIN – V Bisi, D Gamba, L Riccati
TURIN U – L Ramello
GENOA U & INFN, GENOA – G Crosetti
DESY – C Gerke

Accelerator CERN-SPS *Detector* Spectrometer

Reactions

π^- nucleus → $\mu^+\ \mu^+$ X	350 GeV/c
π^- nucleus → $\mu^-\ \mu^-$ X	"
π^- nucleus → 3muon X	"
π^- nucleus → 4muon X	"

Particles studied bottom, D^0

Comments In addition to the search for the associated production of beauty particles, the experiment also looks for evidence of $D^0\overline{D}^0$ mixing and measures the A dependence of the $D\overline{D}$ cross section.

CERN-WA-079 (Apr 1983) Approved Jun 1983; Started Aug 1986.

STUDY OF NEUTRINO-ELECTRON SCATTERING AT THE SPS

CHARM-II COLLABORATION
BRUSSELS U, IIHE – G Bertrand-Coremans, D Geiregat, P Villian, G Wilquet, C De Winter
CERN – F Bergsma, C Busi, A Capone, T Delbar, A Ereditato, W Flegel, H Grote, C Nieuwenhuis, J Panman, D De Pedis, A Seiden, K Winter (✓ Spokesperson), V Zacek
HAMBURG U – T Bauche, V Blobel, F W Busser, A Eckel, P D Gall, L Gerland, F Niebergall, P Stahelin
LOUVAIN U – D Favart, G Gregoire, T Mouthuy
MOSCOW, ITEP – P Gorbunov, E A Grigoriev, V D Khovansky, M Kubantsev, A Rosanov
MUNICH U, EXP PHYS – D Braun, E Gorini, W Lippich, U Meyer-Berkhout, A Staude, C Zupancic
NAPLES U, IFS & INFN, NAPLES – M Caria, F Grancagnolo, R Iasevali, G Miele, V Palladino, P Strolin
INFN, ROME – E Di Capua, U Dore, P Loverre, G Piredda, A Rambaldi-Frenkel, R Santacesaria, D Zanello

Accelerator CERN-SPS *Detector* CHARM-II

Reactions

$\nu_\mu\ e^-$	5–100 GeV/c
$\overline{\nu}_\mu\ e^-$	"

Comments The main aim is to measure the ratio of cross sections for $\nu_\mu e^-$ and $\overline{\nu}_\mu e^-$ scattering. This gives the electroweak mixing angle. For a description of the apparatus, see the LBL-91 supplement on detectors. Taking data (November 86).

CERN-WA-080 (1982) Approved Feb 1983, Nov 1984.

STUDY OF RELATIVISTIC NUCLEUS-NUCLEUS COLLISIONS AT THE CERNS SPS

DARMSTADT, GSI – R Albrecht, R Bock, G Claesson, H H Gutbrod (√ Spokesperson), B Kolb, I Lund, R Schmidt, R Schulze, T Siemiarczuk
LBL – A Franz, P Kristiansson, A M Poskanzer, H G Ritter
LUND U – S Garpmann, H A Gustafsson, A Oskarsson, I Otterlund, S Persson, K Soderstrom, E Stenlund
MUNSTER U – P Beckmann, F Berger, L Dragon, R Glasow, K H Kampert, H Loehner, T Peitzmann, M Purschke, R Santo, R Weinke
OAK RIDGE – T Awes, C Baktash, J Beene, R Ferguson, E Gross, J Johnson, I Y Lee, F Obenshain, F Plasil, S Sorensen, G Young

Accelerator CERN-SPS *Detector* PLASTIC-BALL, Wire chamber, Calorimeter

Reactions

^{16}O nucleus	200 GeV (T_{lab}/N)
p nucleus	"

Comments Determines the energy flux and transverse energy distribution, the high E_t π^0 and γ spectra near mid-rapidity, the target spectator decay pattern and entropy (from relative yields of p, d, pions, etc.), and the multiplicity distribution and multiplicity fluctuations. Taking data (November 86).

CERN-WA-081 (1983) Approved Nov 1984; Completed Jun 1986.

MEASUREMENTS OF PAIR PRODUCTION UNDER CHANNELLING CONDITIONS BY 70–180 GeV PHOTONS INCIDENT ON SINGLE CRYSTALS

AARHUS U – J Bak, S P Moller, G Oades, K Ostergaard, J B B Petersen, E Uggerhoj (Spokesperson)
CERN – A Sorensen
STRASBOURG – P Siffert, M Suffert

Accelerator CERN-SPS *Detector* OMEGA

Reactions

γ crystal $\rightarrow e^+\ e^-$ X	15–150 GeV/c

Comments Uses the set-up of CERN-WA-069.

CERN-WA-082 (Oct 1985) Approved Feb 1986.

A TEST OF AN IMPACT PARAMETER TRIGGER AIMED A HIGH STATISTICS HEAVY-QUARK STUDY

CERN – W Beusch, J P Dufey, B R French, A Jacholkowski, K Knudson, J C Lassalle, F Muller, N Redaelli, L Rossi (√ Spokesperson)
INFN, GENOA & GENOA U – M Dameri, G Darbo, B Osculati, G Tomasini
INFN, MILAN & MILAN U – D Marioli, C Meroni, G Vegni
MONS U – J F Balland, F Grard, P Legros
SANTANDER U – J J Garcia

Accelerator CERN-SPS *Detector* OMEGA

Reactions

π^+ nucleus $\rightarrow$ charm X	360 GeV/c

Particles studied charm, D^+, D^0, D_s^+, Λ_c^+

Comments Triggers on charm decays by measuring the impact parameter silicon-strip counters as a microvertex detector. Test run data taking completed August 86.

CERN-WA-083 (Oct 1985) Approved Feb 1986.

INVESTIGATION OF SOFT PHOTON PRODUCTION IN HADRONIC COLLISIONS USING THE OMEGA SPECTROMETER

ATHENS U – M Spyropoulou-Stassinaki, G Vassiliadis, I Vichou
TATA INST – S Bannersee, A Subramanian
CERN – W Beusch, Y Goldschmidt-Clermont (√ Spokesperson), K Knudson, E Quercigh, P Sonderegger

Accelerator CERN-SPS *Detector* OMEGA

Reactions

$\pi^+\ p \rightarrow \gamma$(s) X	280 GeV/c
$p\ p \rightarrow \gamma$(s) X	"
$\pi^-\ p \rightarrow \gamma$(s) X	"

Comments Investigates an observation made in BEBC that the yield of soft γ's exceeds the QED prediction of hadronic bremsstrahlung. Taking data (November 86).

CESR-CLEO Started Oct 1979.

THE CLEO EXPERIMENT AT CESR

CORNELL U – C Bebek, K Berkelman, E Blucher, D G Cassel, T Copie, R DeSalvo, J W DeWire, R Ehrlich, R Galik, M G D Gilchriese, B Gittelman, S W Gray, M Halling, D L Hartill, B K Heltsley, S Holzner, M Ito, J Kandaswamy, R Kowalewski, D L Kreinick, Y Kubota, N B Mistry, J Mueller, R Namjoshi, E Nordberg, M Ogg, D Perticone, D Peterson, M Pisharody, K Read, D Riley, A Silverman, P C Stein, S Stone, Xia Yi
HARVARD U – T Bowcock, R Giles, J Hassard, K Kinoshita, F Morrow, F M Pipkin, R Wilson
ROCHESTER U – S Behrends, J A Guida, J M Guida, F Morrow, R Poling, C Rosenfeld, E H Thorndike, P Tipton
RUTGERS U – J Green, F Sannes, R Stone
SYRACUSE U – D Bortoletto, A Chen, L Garren, M Goldberg, N Horwitz, A Jawahery, P Lubrano, G Moneti (√ Spokesperson)
VANDERBILT U – S Csorna, M Mestayer, R S Panvini, G B Word
OHIO STATE U – T Gentile, P Haas, M Hempstead, T Jensen, H Kagan, R Kass
ITHACA COLL – A J Sadoff
SUNY, ALBANY – M S Alam, N Katayama, I J Kim, C R Sun, V Tanikella
CARNEGIE MELLON U – A Bean, G J Bobbink, I Brock, A Engler, T Ferguson, R Kraemer, C Rippich, R Sutton, H Vogel
FLORIDA U – P Avery, D Besson

Accelerator CESR *Detector* CLEO

Reactions

$e^+\ e^- \rightarrow$ hadrons	9.0–12.0 GeV (Ecm)
$e^+\ e^- \rightarrow e^+\ e^-$	"
$e^+\ e^- \rightarrow \mu^+\ \mu^-$	"

Particles studied Υ(9460), Υ(10023), Υ(10355), Υ(10575), B(5270), τ, D^+, D^0, D_s^+

Comments Studies e^+e^- interactions in the energy range of the Υ resonances. Topics include $b\bar{b}$ spectroscopy, b-quark decays, and decays of the Υ's. For a description of the apparatus, see the LBL-91 supplement on detectors.

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, PR D27 (1983) 475, PR D27 (1983) 1665, NIM 211 (1983) 47, PL 122B (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 D29 (1984) 1285, PRL 52 (1984) 799, PL 137B (1984) 277, PRL 52 (1984) 1084, PRL 53 (1984) 24, PRL 53 (1984) 1309, 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, PR D33 (1986) 300, PR D34 (1986) 905, PRL 56 (1986) 2781, PR D34 (1986) 3279, PRL 58 (1987) 183, PR D35 (1987) 19, PRL 58 (1987) 307, and PR D35 (1987) 1081.

CESR-CUSB (1978) Approved Feb 1978, Nov 1979.

CUSB — HIGH RESOLUTION CALORIMETER TO STUDY THE Υ SPECTROSCOPY AND B PHYSICS

SUNY, STONY BROOK - J E Horstkotte, C Klopfenstein, J Lee-Franzini, R D Schamberger, Jr , M Sivertz, L J Spencer
COLUMBIA U - P Franzini (√ Spokesperson), D Son, P M Tuts, S Youssef, T Zhao
CORNELL U - S W Herb
LOUISIANA STATE U - K Han, R Imlay, G Levman, W Metcalf, V Sreedhar
MUNICH, MAX PLANCK INST - H Dietl, G Eigen, E Lorenz, G Mageras, F Pauss, H Vogel

Accelerator CESR *Detector* CUSB

Reactions

$e^+ e^- \rightarrow$ hadrons	9.4-11.6 GeV (Ecm)
$e^+ e^- \rightarrow e^+ e^-$	"
$e^+ e^- \rightarrow \mu^+ \mu^-$	"
$e^+ e^- \rightarrow \gamma$ X	"

Particles studied Υ(9460), Υ(10023), Υ(10355), Υ(10575), Υ(10860), Υ(11020), $\chi_{b0}(9860)$, $\chi_{b1}(9895)$, $\chi_{b2}(9915)$, $\chi_{b0}(10235)$, $\chi_{b1}(10255)$, $\chi_{b2}(10270)$, $B(5270)$, $B^*(5325)$, higgs, axion, ς(8300), $X(2220)$

Comments See also CESR-CUSB-II. For a description of the apparatus, see the first edition of the LBL-91 supplement on detectors.

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 114B (1982) 277, NP B206 (1982) 1, PRL 49 (1982) 1612, PRL 49 (1982) 1616, PL 118B (1982) 453, PRL 51 (1983) 160, PL 130B (1983) 439, PL 130B (1983) 444, PR D29 (1984) 2483, NP B242 (1984) 31, PL 138B (1984) 225, PL 139B (1984) 332, PL 141B (1984) 271, PR D30 (1984) 1985, PRL 54 (1985) 377, PRL 55 (1985) 36, and PRL 56 (1986) 2672.

CESR-CUSB-II (1978) Approved Jun 1984.

CUSB-II — HIGH RESOLUTION BGO CALORIMETER TO STUDY THE Υ SPECTROSCOPY AND B PHYSICS

COLUMBIA U - M Artuso, P Franzini (√ Spokesperson), P M Tuts
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 (Ecm)
$e^+ e^- \rightarrow e^+ e^-$	"
$e^+ e^- \rightarrow \mu^+ \mu^-$	"
$e^+ e^- \rightarrow \gamma$ X	"

Particles studied Υ(9460), Υ(10023), Υ(10355), Υ(10575), Υ(10860), Υ(11020), $\chi_{b0}(9860)$, $\chi_{b1}(9895)$, $\chi_{b2}(9915)$, $\chi_{b0}(10235)$, $\chi_{b1}(10255)$, $\chi_{b2}(10270)$, $B(5270)$, $B^*(5325)$, higgs, axion, ς(8300), η_b, s-quark

Comments An upgraded detector. For a description of the apparatus, see the LBL-91 supplement on detectors.

Papers See also CESR-CUSB. NIM (to be published), PR D37 (to be published), PL 184B (to be published).

DESY-DORIS-ARGUS Approved 1979; Started Sep 1982.

ARGUS — A NEW DETECTOR FOR DORIS

DESY - H Albrecht, U Binder, P Boeckmann, R Glaeser, G Harder, I Lembke-Koppitz, W Schmidt-Parzefall (√ Spokesperson), H Schroeder, H D Schulz, R Wurth, A Yagil
DORTMUND U - J P Donker, A Drescher, D Kamp, U Matthiesen, H Scheck, B Spaan, J Spengler, D Wegener
HEIDELBERG U, IHEP - J C Gabriel, K R Schubert, J Stiewe, K Strahl, R Waldi, S Weseler
IPP, CANADA - K W Edward, W R Frisken, D J Gilkinson, D M Gingrich, H Kapitza, P Kim, R Kutschke, D B MacFarlane, J A McKenna, K W McLean, A W Nilsson, R S Orr, P Padley, J A Parsons, P M Patel, J D Prentice, H Seywerd, J D Swain, G Tsipolitis, T S Yoon, J C Yun
KANSAS U - R Ammar, D Coppage, R Davis, S Kanekal, N Kwak
LUND U - L Joensson
MOSCOW, ITEP - A Babaev, M Danilov, A Golutvin, I Gorelov, V Lubimov, V Matveev, V Nagovitsin, V Ryltsov, A Semenov, V Shevchenco, V Soloshenko, V Tchistilin, I Tichomirov, Y Zaitsev
SOUTH CAROLINA U - R L Childers, C W Darden, Y Oku
LJUBLJANA U - B Bostjancic, G Kernel, M Plesko
STOCKHOLM U - H Gennow

Accelerator DESY-DORIS *Detector* ARGUS

Reactions

$e^+ e^-$	9-11.5 GeV (Ecm)
$e^+ e^- \rightarrow$ charm X	"
$e^+ e^- \rightarrow$ bottom X	"
$e^+ e^- \rightarrow$ Υ(unspec)	"
$e^+ e^- \rightarrow$ hvy-lepton X	"

Particles studied charm, bottom, Υ(unspec), hvy-lepton

Comments For a description of the apparatus, see the LBL-91 supplement on detectors.

Papers NIM 163 (1979) 77, NIM 195 (1982) 475, NIM 205 (1983) 125, NIM 216 (1983) 35, NIM 217 (1983) 153, PL 134B (1984) 137, PL 135B (1984) 498, PL 146B (1984) 111, NIM A235 (1985) 26, NIM A237 (1985) 464, PL 150B (1985) 235, PL 153B (1985) 343, PL 154B (1985) 452, PL 156B (1985) 134, ZPHY C28 (1985) 45, PL 157B (1985) 326, PL 158B (1985) 525, PL 160B (1985) 331, PL 162B (1985) 395, PL 163B (1985) 404, ZPHY C29 (1985) 167, NIM A249 (1986) 277, PRL 56 (1986) 549, PL 167B (1986) 360, ZPHY C31 (1986) 181, PL 179B (1986) 398, PL 179B (1986) 403, PL 182B (1986) 95, ZPHY C33 (1986) 7, and ZPHY C33 (1987) 359.

DESY-DORIS-CRYSTAL-BALL (Jun 1981) Started Jul 1982; Completed 1986.

A LARGE SOLID ANGLE NEUTRAL DETECTOR (THE CRYSTAL BALL)

CAL TECH - C Peck, F C Porter, P Ratoff
CARNEGIE MELLON U - I Brock, A Engler, R W Kraemer, D Marlow, F Messing, D Prindle, B Renger, C Rippich, H Vogel
CRACOW - Z Jakubowski, G Nowak
DESY - J K Bienlein (√ Spokesperson), T Kloiber, W Koch, T Skwarnicki, H-J Trost, P Zschorsch
HARVARD U - D Antreasyan, J Irion, K Strauch, D Williams
PRINCETON U - D Besset, R Carbenda, M Cavalli-Sforza, R Cowan, D Coyne
SLAC - E D Bloom (√ Spokesperson), R Clare, S Cooper, J Gaiser, G Godfrey, W Lockman, S Lowe, B Niczyporuk, A Schwarz, K Wacker
STANFORD U - D Gelphman, R Hofstadter, I Kirkbride, R Lee, A Litke, B Pollock, J Tompkins
ERLANGEN U - G Folger, B Lurz, U Volland, H Wegener
FLORENCE U & INFN, FLORENCE - A Cartacci, G Conforto, B Monteleoni, P Pelfer
HAMBURG U - A Fridman, F H Heimlich, R Lekebusch, W Maschmann, R Nernst, D Sievers, U Strohbusch
NIJMEGEN U & NIKHEF, NIJMEGEN - A C Koenig, W Metzger, D J Schotanus, W Walk, R T Van de Walle
WURZBURG U - S Keh, H Kilian, K Koenigsmann, M Scheer, P Schmitt

Accelerator DESY-DORIS-II *Detector* CRYS-BALL

Reactions

$e^+ e^- \rightarrow \gamma$ X	4.4–11.2 GeV (E_{cm})
$e^+ e^- \rightarrow \pi^0$ X	"
$e^+ e^- \rightarrow \eta$ X	"
$e^+ e^- \rightarrow e^\pm$ X	"

Particles studied $\Upsilon(9460)$, $\Upsilon(10023)$, χ_b(unspec)

Comments An extension of studies of quarkonium and gluonium (see SLAC-SP-024 and -030) to the Υ system, with special emphasis on γ transitions. For a description of the apparatus, see the LBL-91 supplement on detectors.

Papers PL 135B (1984) 498, PRL 54 (1985) 2195, PR D32 (1985) 2893, PR D33 (1986) 1847, and PR D34 (1986) 2611.

DESY-DORIS-LENA Approved 1979; Started 1979; Completed 1980.

MEASUREMENTS IN CONTINUATION OF DESY-147

CRACOW-DESY-ERLANGEN-HAMBURG-MICHIGAN STATE-CARNEGIE MELLON-SACLAY-TEL AVIV-WURZBURG COLLABORATION

CRACOW – B Niczyporuk, T Zeludziewicz
DESY – J K Bienlein (√ Spokesperson), R Graumann, J Krueger, M Leissner, M Schmitz, H-J Trost
ERLANGEN U – G Folger, B Lurz, H Vogel, U Volland, H Wegener
HAMBURG U – F H Heimlich, R Nernst, A Schwarz, U Strohbusch, P Zschorsch
MICHIGAN STATE U – K W Chen, R Hartung
CARNEGIE MELLON U – M Coles, R W Kraemer, D Marlow, F Messing, T Ridge, C Rippich, B Stacey, S Youssef
SACLAY – A Fridman
TEL AVIV U – G Alexander, A Av-Shalom, G Bella, Y Gnat, J Grunhaus
WURZBURG U – E Hoerber, W Langguth, M Scheer

Accelerator DESY-DORIS *Detector* LENA

Reactions

$e^+ e^-$	7.4–11.5 GeV (E_{cm})

Particles studied $\Upsilon(9460)$, $\Upsilon(10023)$

Comments Nonmagnetic lead glass-NaI γ and $e^\pm$ detector and inner drift chambers.

Papers PRL 46 (1981) 92, PL 99B (1981) 169, PL 100B (1981) 95, ZPHY C9 (1981) 1, ZPHY C15 (1982) 299, and ZPHY C17 (1983) 197.

DESY-PETRA-CELLO (Jul 1976) Approved Oct 1976; Started Mar 1980; Completed Nov 1986.

A 4π MAGNETIC DETECTOR FOR PETRA — CELLO

DESY-KARLSRUHE-MUNCHEN-ORSAY-PARIS-SACLAY COLLABORATION

DESY – H J Behrend, J H Field, V Schroeder, H Sindt
KERNFORSCHUNGSZENTRUM, KARLSRUHE & KARLSRUHE U – D Apel, J Bodenkamp, D Crobaczek, J Engler, G Fluegge, D Fries, F Moennig, H Mueller, H Randoll, G Schmidt, H Schneider
MUNICH, MAX PLANCK INST – W de Boer, G Buschhorn, G Grindhammer, P Grosse-Wiesmann, B Gunderson, C Kiesling, R Kotthaus, H Lierl, D Luers, T Meyer, L Moss, H Oberlack (Spokesperson), P Schacht, M J Schachter, A Snyder, H Steiner
ORSAY, LAL – G Carnesecchi, A Cordier, M Davier, F Le Diberder, D Fournier, J F Grivaz, J Haissinski, V Journe, F Laplanche, J J Veillet, A Weitsch
PARIS, CURIE UNIV VI – R George, M Goldberg, B Grossetete, F Kapusta, F Kovacs, G London, L Poggioli, M Rivoal
SACLAY – R Aleksan, J Bouchez, G Cozzika, Y Ducros, A Gaidot, J Pamela, J P Pansart, F Pierre

Accelerator DESY-PETRA *Detector* CELLO

Reactions

$e^+ e^-$	14–47.3 GeV (E_{cm})

Comments The first experiment surveys cross sections, etc. CELLO is optimized for $e^\pm$ and γ detection, at the expense of extensive particle identification. For a description of the apparatus, see the LBL-91 supplement on detectors.

Papers PS 23 (1981) 610, PL 103B (1981) 148, PL 110B (1982) 329, PL 113B (1982) 427, PL 114B (1982) 282, PL 114B (1982) 287, PL 114B (1982) 378, ZPHY C14 (1982) 95, ZPHY C14 (1982) 189, ZPHY C14 (1982) 283, PL 118B (1982) 211, NP B211 (1983) 369, NP B218 (1983) 269, ZPHY C16 (1983) 301, PL 123B (1983) 127, PL 126B (1983) 384, PL 126B (1983) 391, PL 127B (1983) 270, ZPHY C19 (1983) 291, ZPHY C20 (1983) 207, ZPHY C21 (1984) 205, PL 138B (1984) 311, ZPHY C23 (1984) 103, ZPHY C23 (1984) 223, PL 140B (1984) 130, PL 141B (1984) 145, PL 144B (1984) 297, PL 158B (1985) 536, PL 161B (1985) 182, PL 168B (1986) 420, PL 176B (1986) 274, PL 178B (1986) 452, and PL 181B (1986) 178.

DESY-PETRA-JADE Approved Oct 1976; Started Sep 1978; Completed Nov 1986.

A COMPACT MAGNETIC DETECTOR AT PETRA — JADE

DESY – W Bartel, L Becker, C Bowdery, D Cords, R Felst (√ Spokesperson), D Haidt, H Junge, G Knies, H Krehbiel, P Laurikainen, R Meinke, B Naroska, J Olsson, E Pietarinen, D Schmidt, P Steffen
HAMBURG U – G Dietrich, J Hagemann, G Heinzelmann, H Kado, C Kleinwort, M Kuhlen, T Mashimo, K Meier, A Petersen, R Ramcke, U Schneekloth, G Weber
HEIDELBERG U, IHEP – K Ambrus, S Bethke, A Dieckmann, J Heintze, K H Hellenbrand, R D Heuer, S Komamiya, J von Krogh, P Lennert, H Matsumura, H Rieseberg, J Spitzer, A Wagner
LANCASTER U – A Finch, F Foster, G Hughes, T Nozaki, J Nye
MANCHESTER U – J Allison, J Baines, A H Ball, R Barlow, J Chrin, I P Duerdoth, T Greenshaw, P Hill, F K Loebinger, A A Macbeth, H McCann, H E Mills, P G Murphy, K Stephens, P Warming
MARYLAND U – R G Glasser, B Sechi-Zorn, J A J Skard, S Wagner, G T Zorn
RUTHERFORD – S L Cartwright, D Clarke, R Marshall, R P Middleton, J B Whittaker
TOKYO U – T Kawamoto, T Kobayashi, M Minowa, M Nozaki, H Takeda, T Takeshita, S Yamada

Accelerator DESY-PETRA *Detector* JADE

Reactions

$e^+ e^- \rightarrow$ hadrons	10–44 GeV (E_{cm})
$e^+ e^- \rightarrow e^+ e^-$	"
$e^+ e^- \rightarrow \mu^+ \mu^-$	"
$e^+ e^- \rightarrow \tau^+ \tau^-$	"
$e^+ e^- \rightarrow \gamma \gamma$	"
$e^+ e^- \rightarrow e^+ e^-$ hadrons	"
$e^+ e^- \rightarrow e^+$ X	"
$e^+ e^- \rightarrow e^-$ X	"
$e^+ e^- \rightarrow \mu^+$ X	"
$e^+ e^- \rightarrow \mu^-$ X	"
$e^+ e^- \rightarrow e^+ \mu^-$ X	"
$e^+ e^- \rightarrow e^- \mu^+$ X	"

Particles studied τ, quark, hvy-lepton, $D^*(2010)$, s-particle

Comments For a description of the apparatus, see the LBL-91 supplement on detectors.

Papers PL 88B (1979) 171, PL 89B (1979) 136, PL 91B (1980) 142, PL 91B (1980) 152, PL 92B (1980) 206, ZPHY C6 (1980) 295, PL 99B (1981) 277, PL 99B (1981) 281, PL 100B (1981) 364, PL 101B (1981) 129, PL 101B (1981) 361, ZPHY C9 (1981) 315, PL 104B (1981) 325, PL 107B (1981) 163, PL 108B (1982) 140, PL 113B (1982) 190, PL 114B (1982) 71, PL 114B (1982) 211, PL 115B (1982) 338, PL 119B (1982) 239, PL 121B (1983) 203, PL 123B (1983) 353, PL 123B (1983) 460, ZPHY C19 (1983) 197, ZPHY C20 (1983) 187, PL 129B (1983) 145, PL 130B (1983) 454,

PL 132B (1983) 241, ZPHY C21 (1983) 37, PL 134B (1984) 275, PL 139B (1984) 327, ZPHY C24 (1984) 223, ZPHY C24 (1984) 231, ZPHY C25 (1984) 231, PL 145B (1984) 441, PL 146B (1984) 121, PL 146B (1984) 126, PL 146B (1984) 437, ZPHY C26 (1985) 507, PL 152B (1985) 385, PL 152B (1985) 392, PL 155B (1985) 288, ZPHY C28 (1985) 343, PL 157B (1985) 340, PL 158B (1985) 511, PL 160B (1985) 337, PL 160B (1985) 421, ZPHY C29 (1985) 505, PL 161B (1985) 188, PL 161B (1985) 197, PL 163B (1985) 277, ZPHY C30 (1986) 371, ZPHY C30 (1986) 545, ZPHY C31 (1986) 349, ZPHY C31 (1986) 359, PL 174B (1986) 350, PL 182B (1986) 216, ZPHY C33 (1986) 23, and ZPHY C33 (1987) 339.

DESY-PETRA-MARK-J (Jul 1976) Approved Oct 1976; Completed Nov 1986.

A SIMPLE DETECTOR TO MEASURE e^+e^- REACTIONS AT HIGH ENERGIES — MARK J

AACHEN, TECH HOCHSCH, III PHYS INST – R Becker-Szendy, A Boehm, E Deffur, H S Fesefeldt, D Hueser, W Krenz, D Linnhoefer, J Mnich, F P Poschmann, U Schroeder, J Schug, D Teuchert, S X Wu
BROOKHAVEN – R R Rau
CAL TECH – H Ma, H Newman, H Stone, R Y Zhu
DESY – S Ansari, M Hussain, K Nadeem, M Rohde, M F Wyne
MIT – U Becker, J G Branson, J D Burger, M Capell, M Chen, M Dhina, D Fong, M Fukushima, G Herten, M M Ilyas, D Luckey, H Rykaczewski, S C C Ting (√ Spokesperson), M White, B Wyslouch, B Zhou
MADRID, JEN – B Adeva, J Berdugo, M Cerrada, L Garrido, C Mana, M A Marquina, M Martinez, S Rodriguez, J A Rubio, J Salicio
NIKHEF, AMSTERDAM – M Demarteau, P Duinker, D Harting, P Kuijer, E J Luit, G G G Massaro, G M Swider
GENEVA U – M Nusbaumer
BEIJING, IHEP – C C Chang, Y H Chang, H S Chen, M L Chen, M Y Chen, Y K Chi, B Z Dong, R D Han, M C Ho, D Z Jiang, H W Tang, K L Tung, M Q Wang, H G Wu, B X Yang, X Yu, L S Zhang, Z H Zhang
BERLIN, DAW – K Deiters, M Klein, R Leiste, W D Nowak, M Sachwitz, H J Schreiber, H Vogt
ZURICH, ETH – Q Z Li, M Pohl

Accelerator DESY-PETRA *Detector* MARK-J

Reactions

$e^+ e^- \rightarrow \mu^+ \mu^-$	12–47 GeV (E_{cm})
$e^+ e^- \rightarrow e^+ e^-$	"
$e^+ e^- \rightarrow \tau^+ \tau^-$	"
$e^+ e^- \rightarrow$ muon X	"
$e^+ e^- \rightarrow$ hadrons	"

Particles studied τ, $B(5270)$, gluon

Comments Measures asymmetries, looks for structures in the total hadronic cross section, determines properties of B mesons and gluons, searches for a wide variety of new particles up to E_{cm} =46.78 GeV, etc. For a description of the apparatus, see the LBL-91 supplement on detectors.

Papers PRL 42 (1979) 1110, PRL 42 (1979) 1113, PRL 43 (1979) 830, PL 85B (1979) 463, PRL 43 (1979) 901, PRL 43 (1979) 1915, PRPL 63 (1980) 337, PL 89B (1979) 139, PRL 44 (1980) 1722, PL 95B (1980) 149, PRL 45 (1980) 1904, PRL 46 (1981) 1663, PL 108B (1982) 63, PRL 48 (1982) 721, PRL 48 (1982) 967, PRL 48 (1982) 1701, PL 115B (1982) 345, PRL 50 (1983) 799, PRL 50 (1983) 2051, PRL 51 (1983) 443, PRPL 109 (1984) 131, PRL 53 (1984) 134, PRL 53 (1984) 1806, PL 152B (1985) 439, PRL 54 (1985) 1750, PRL 55 (1985) 665, PL 179B (1986) 177, PL 180B (1986) 181, and PR D34 (1986) 681.

DESY-PETRA-PLUTO-2 (Jul 1979) Started Aug 1981; Completed Aug 1982.

STUDY OF $\gamma\gamma$ INTERACTIONS WITH THE DETECTOR PLUTO AT PETRA

AACHEN, TECH HOCHSCH, I PHYS INST – Chr Berger, A Deuter, H Genzel, R Grigull, W Lackas, F Pielorz, F Raupach
BERGEN U – A Klovning, E Lillestol, J M Olsen
GLASGOW U – P J Bussey, S Cartwright, J B Dainton, B King, C Raine, J M Scarr, I O Skillicorn, K Smith
MARYLAND U – C Y Chang, R Glasser, R G Kellogg, K H Lau, S Maxfield, R O Polvado, B Sechi-Zorn, J A Skard, A Skuja, A Tylka, G Welch, G Zorn
SIEGEN U – M Almeida, A Baecker, F Barreiro, S Brand, K Derikum, C Grupen, H J Meyer, B Neumann, M Rost, K H Stupperich, G Zech
TEL AVIV U – G Alexander, G Bella, Y Gnat, J Grunhaus
WUPPERTAL U – H J Daum, H Meyer, O Meyer, D Schmidt
DESY – H Ackermann, U Bartnik, J Buerger, L Criegee, H C Dehne, G Franke, H Funge, M Gaspero, Chr Gerke, U Jacobs, G Knies, K Kraski, E Lehmann, C Maxeiner, H Maxeiner, U Michelsen, H Nakata, K H Pape, F Ritter, B Stella, U Timm (√ Spokesperson), W Wagner, P Waloschek, G G Winter, M Zachara, W Zimmermann
HAMBURG U – O Achterberg, Ch Bieler, V Blobel, L Boesten, D Burkart, K Diehlmann, V Hepp, H Kapitza, B Koppitz, B Lewendel, W Luehrsen, F Meyer, M Poppe, H Spitzer, R V Staa

Accelerator DESY-PETRA *Detector* PLUTO

Reactions

$e^+ e^- \rightarrow e^+ e^-$ hadrons	35 GeV (E_{cm})
$e^+ e^- \rightarrow e^+ e^-$ jets	"
$e^+ e^- \rightarrow e^+ e^-$ meson	"
$e^+ e^- \rightarrow e^+ e^-$ leptons	"
$e^+ e^- \rightarrow \mu^+ \mu^-$	"
$e^+ e^- \rightarrow$ hadrons	"
$e^+ e^- \rightarrow \gamma\gamma$	"

Comments Magnetic forward spectrometers are added to the earlier PLUTO apparatus. Although the emphasis is on $\gamma\gamma$ physics, single-γ events are registered too. For a description of the apparatus, see the LBL-91 supplement on detectors.

Papers This is all the papers from all the PLUTO experiments. Most results to 1982 from PLUTO are summarized in PREP 83 (1982) 153. PL 53B (1975) 489, PL 64B (1976) 369, PL 66B (1977) 395, PL 67B (1977) 367, PL 68B (1977) 283, PL 68B (1977) 297, PL 68B (1977) 301, PL 72B (1977) 135, PL 72B (1978) 493, PL 73B (1978) 99, PL 76B (1978) 243, PL 76B (1978) 652, PL 78B (1978) 162, PL 78B (1978) 176, PL 81B (1979) 84, PL 81B (1979) 410, PL 82B (1979) 449, ZPHY C1 (1979) 343, PL 86B (1979) 413, PL 86B (1979) 418, PL 89B (1979) 120, ZPHY C3 (1980) 193, PL 90B (1980) 312, ZPHY C4 (1980) 269, PL 91B (1980) 148, PL 93B (1980) 497, PL 94B (1980) 87, PL 94B (1980) 254, PRL 45 (1980) 1533, PL 95B (1980) 313, PL 97B (1980) 459, PL 99B (1981) 287, PL 99B (1981) 292, PL 99B (1981) 489, PL 100B (1981) 351, ZPHY C7 (1981) 289, ZPHY C8 (1981) 101, ZPHY C8 (1981) 167, PL 104B (1981) 79, PL 107B (1981) 168, ZPHY C12 (1982) 297, NP B202 (1982) 189, NP B214 (1983) 189, ZPHY C19 (1983) 205, ZPHY C21 (1983) 53, ZPHY C22 (1984) 103, PL 137B (1984) 267, PL 142B (1984) 111, PL 142B (1984) 119, PL 142B (1984) 125, ZPHY C26 (1984) 191, ZPHY C26 (1984) 199, PL 149B (1984) 421, PL 149B (1984) 427, ZPHY C26 (1984) 353, ZPHY C27 (1985) 167, ZPHY C27 (1985) 249, ZPHY C27 (1985) 341, ZPHY C28 (1985) 1, ZPHY C28 (1985) 365, ZPHY C29 (1985) 183, ZPHY C29 (1985) 499, PL 167B (1986) 120, NP B281 (1987) 365, and ZPHY C33 (1987) 351.

DESY-PETRA-TASSO (Jul 1976) Approved Oct 1976; Completed Nov 1986.

A LARGE 4π MAGNETIC DETECTOR FOR PETRA — TASSO

AACHEN, TECH HOCHSCH, I PHYS INST – W Braunschweig, R Gerhards, F J Kirschfink, H-U Martyn, P Rosskamp, E Vogel, W Wallraff
BONN U – B Bock, J Eisenmann, H M Fischer, H Hartmann, E Hilger, A Jocksch, H Kolanoski, H Kueck, V Mertens, R Wedemeyer
BRISTOL U – B Foster, A J Martin
DESY – E Bernardi, Y Eisenberg, A Eskreys, K Gather, H Hultschig, P Joos, B Klima, H Kowalski, A Ladage, B Loehr (√ Spokesperson), D Lueke, P Maettig, A Montag,

D Notz, A Shapira, D Trines, T Tymieniecka, G Tysarczyk, R Walczak, G Wolf, G Yekutieli, W Zeuner
HAMBURG U – T Kracht, H L Krasemann, J Krueger, E Lohrmann, G Poelz, K U Poesnecker
IMPERIAL COLL – D M Binnie, P Dornan, D A Garbutt, C Jenkins, W G Jones, J Sedgbeer, J Shulman, D Su, A P Watson
MADRID, AUTONOMA U – F Barreiro, E Ros
OXFORD U – C Balkwill, M G Bowler, P N Burrows, R J Cashmore, P Dauncey, R Devenish, G Heath, D Mellor, P Ratoff, I Tomalin, J M Yelton
QUEEN MARY COLL – S L Lloyd
RUTHERFORD – G E Forden, J C Hart, D K Hasell, D H Saxon
SIEGEN U – S Brandt, M Holder, L Labarga, B Neumann
WEIZMANN INST – U Karshon, G Mikenberg, R Mir, D Revel, E Ronat, N Wainer
WISCONSIN U – G Baranko, A Caldwell, M Cherney, J M Izen, S Ritz, D Strom, M Takashima, E Wicklund, S L Wu, G Zobernig

Accelerator DESY-PETRA *Detector* TASSO

Reactions

$e^+ e^- \rightarrow$ hadrons	12–47 GeV (E_{cm})
$e^+ e^- \rightarrow$ lepton$^+$ lepton$^-$	"
$e^+ e^- \rightarrow \gamma\gamma$	"
$e^+ e^- \rightarrow e^+ e^-$ hadrons	"

Particles studied hvy-lepton, unspec

Comments Studies formation of jets, gluon blemsstrahlung, inclusive particle production, QCD tests, lifetimes of the tau, charmed, and bottom particles, QED tests, electroweak asymmetries in muon pair production, new particle searches, and inclusive and exclusive two-photon reactions. For a description of the apparatus, see the LBL-91 supplement on detectors.

Papers PL 83B (1979) 261, PL 86B (1979) 243, PL 88B (1979) 199, PL 89B (1980) 418, ZPHY C4 (1980) 87, PL 92B (1980) 199, PL 94B (1980) 91, PL 94B (1980) 259, PL 94B (1980) 437, PL 94B (1980) 444, PL 97B (1980) 448, PL 97B (1980) 453, PL 99B (1981) 163, PL 100B (1981) 357, ZPHY C10 (1981) 117, PL 105B (1981) 75, PL 107B (1981) 290, PL 108B (1982) 67, PL 108B (1982) 71, PL 110B (1982) 173, PL 113B (1982) 98, PL 113B (1982) 499, PL 114B (1982) 65, PL 117B (1982) 135, PL 117B (1982) 365, ZPHY C16 (1982) 13, PL 121B (1983) 216, PL 122B (1983) 95, ZPHY C17 (1983) 5, PL 126B (1983) 493, PL 130B (1983) 340, PL 130B (1983) 449, ZPHY C22 (1984) 13, PL 135B (1984) 243, PL 136B (1984) 130, PL 138B (1984) 219, PL 138B (1984) 317, PL 138B (1984) 441, PL 139B (1984) 126, ZPHY C22 (1984) 219, ZPHY C22 (1984) 307, PL 141B (1984) 264, PL 142B (1984) 135, PL 146B (1984) 443, PL 147B (1984) 487, ZPHY C26 (1984) 157, ZPHY C26 (1984) 181, ZPHY C26 (1984) 337, PL 149B (1984) 524, ZPHY C26 (1985) 521, ZPHY C27 (1985) 27, PL 154B (1985) 236, ZPHY C29 (1985) 29, ZPHY C29 (1985) 189, ZPHY C29 (1985) 347, ZPHY C30 (1986) 355, ZPHY C31 (1986) 527, ZPHY C31 (1986) 537, ZPHY C32 (1986) 11, ZPHY C32 (1986) 343, and ZPHY C33 (1986) 13.

FNAL-053A (Jun 1970, Jul 1971, Jun 1976, Jan 1978, Jun 1978) Approved Dec 1971, Jun 1976, Jun 1978; Completed Mar 1981.

SEARCH FOR THE INTERMEDIATE BOSON, LEPTON PAIR PRODUCTION, AND A STUDY OF DEEPLY INELASTIC REACTIONS UTILIZING HIGH ENERGY NEUTRINO INTERACTIONS IN LIQUID NEON

COLUMBIA U – C Baltay (√ Spokesperson), M Bregman, H French, M Hibbs, M Kalelkar, R D Schaffer, J Schmidt
BROOKHAVEN – N Baker, S Kahn, M Murtagh, R B Palmer, N P Samios

Accelerator FNAL *Detector* HLBC-15FT

Reactions

ν_μ Ne $\rightarrow$ Ne $\mu^- \mu^+ \nu_\mu$	0–200 GeV/c
ν_μ Ne $\rightarrow$ Ne $\mu^- e^+ \nu_e$	"
ν_μ Ne $\rightarrow \mu^-$ hadrons	"
$\nu_\mu p \rightarrow \mu^- \Delta(1232\,P_{33})^{++}$	"
$\nu_\mu p \rightarrow \mu^-$ hadrons	"
$\nu_\mu e^- \rightarrow \nu_\mu e^-$	"

Particles studied W^+, S^+, D^0, $D^*(2010)$, Λ_c^+, $\Sigma_c(2450)^{++}$

Comments Studies also include charmed particle production, neutral current interactions, and a search for neutrino oscillations. Took 440 KPX.

Papers PRL 39 (1977) 862, PRL 40 (1978) 144, PRL 41 (1978) 73, PRL 41 (1978) 213, PRL 41 (1978) 357, PRL 42 (1979) 1721, PRL 47 (1981) 1576, PRL 51 (1983) 735, PR D32 (1985) 531, PRL 55 (1985) 2543, PR D34 (1986) 1251, and PR D34 (1986) 2183.

FNAL-180 (Jun 1972) Approved Jul 1972, Jun 1976; Started 1975.

A STUDY OF $\bar{\nu}$ INTERACTIONS IN THE FERMILAB 15-FT BUBBLE CHAMBER, FILLED WITH HYDROGEN AND NEON

SERPUKHOV – V V Ammosov, A G Denisov, P F Ermolov (√ Spokesperson), V A Gapienko, V I Klukhin, V I Koreshev, A I Mukhin, P V Pitukhin, V I Sirotenko, E A Slobodyuk
MOSCOW, ITEP – V I Efremenko, A V Fedotov, P A Goritchev, V S Kaftanov, G K Kliger, V Z Kolganov, S P Krutchinen, M A Kubantsev, V I Shekelyan, V G Shevenko
FERMILAB – F R Huson, F A Nezrick
MICHIGAN U – J W Chapman, C T Coffin, B P Roe, D Sinclair, J Vander Velde

Accelerator FNAL *Detector* HLBC-15FT

Reactions

$\bar{\nu}_\mu p \rightarrow \mu^+ n$	0–200 GeV/c
$\bar{\nu}_\mu p \rightarrow \mu^+$ X	"
$\bar{\nu}_\mu p \rightarrow \bar{\nu}_\mu$ X	"
$\bar{\nu}_\mu$ nucleon $\rightarrow \mu^+$ X	"
$\bar{\nu}_\mu$ nucleon $\rightarrow \mu^+$ vee X	"
$\bar{\nu}_\mu$ nucleon $\rightarrow \mu^+$ hadron X	"
$\bar{\nu}_\mu$ nucleon $\rightarrow \mu^+ e^\pm$ X	"
$\bar{\nu}_\mu$ nucleon $\rightarrow \bar{\nu}_\mu$ X	"
$\bar{\nu}_\mu$ nucleon $\rightarrow \bar{\nu}_\mu$ vee X	"
$\bar{\nu}_\mu e^- \rightarrow \bar{\nu}_\mu e^-$	"
$\bar{\nu}_\mu \rightarrow \bar{\nu}_\tau$	—

Comments Approved for 500 KPX, of which 273 were taken by July 77. No running since. Analysis combined with the ν exposure of FNAL-053.

Papers NIM 129 (1975) 59, PRL 38 (1977) 266, PRL 39 (1977) 382, PR D18 (1978) 3905, PR D18 (1978) 1367, PL 81B (1979) 89, PL 84B (1979) 511, NC 51A (1979) 539, PL 84B (1979) 357, PL 88B (1979) 181, NP B162 (1980) 205, PL 91B (1980) 311, PR D22 (1980) 2581, PL 93B (1980) 210, NP B177 (1981) 365, NP B184 (1981) 13, PL 102B (1981) 213, PL 105B (1981) 301, PL 106B (1981) 151, PR D24 (1981) 1424, PS 25 (1982) 159, NP B199 (1982) 399, NP B203 (1982) 1, PL 132B (1983) 246, NP B203 (1983) 16, ZETFP 36 (1982) 300 = JETPL (1982) 367, ZETFP 38 (1983) 210 = JETPL 38 (1983) 248, YF 39 (1984) 619, YF 39 (1984) 626 = SJNP 39 (1984) 392, ZETFP 39 (1984) 99 = JETPL 39 (1984) 119, ZETFP 39 (1984) 176 = JETPL 39 (1984) 209, ZETFP 39 (1984) 327 = JETPL 39 (1984) 393, ZETFP 39 (1984) 443 = JETPL 39 (1984) 537, PL 137B (1984) 122, PL 140B (1984) 127, ZETFP 40 (1984) 262 = JETPL 40 (1984) 1041, PL 156B (1985) 441, YF 41 (1985) 1193 = SJNP 41 (1985) 763, YF 42 (1985) 374 = SJNP 42 (1985) 236, YF 42 (1985) 664 = SJNP 42 (1985) 421, YF 43 (1986) 598 = SJNP 43 (1986) 380, ZETFP 43 (1986) 502 = JETPL 43 (1986) 649, and ZETFP 43 (1986) 554 = JETPL 43 (1986) 716.

FNAL-326 (May 1974, Jul 1975, Feb 1977) Approved Mar 1977; Completed Apr 1982.

A PROPOSAL TO MEASURE MUON PAIRS PRODUCED AT HIGH INVARIANT MASS BY PIONS

CHICAGO U – H J Frisch, H B Greenlee, C Grosso-Pilcher, K F Johnson, M D Mestayer, L Schachinger, M J Shochet (√ Spokesperson), M L Swartz
PRINCETON U – P A Piroue, B G Pope, D P Stickland, R L Sumner

Accelerator FNAL *Detector* Double-arm spectrometer

Reactions

π^- Be → $\mu^+ \mu^-$ X	225 GeV/c
π^- Cu → $\mu^+ \mu^-$ X	"
π^- Sn → $\mu^+ \mu^-$ X	"
π^- Wt → $\mu^+ \mu^-$ X	"

Comments Ran for 2000 hours.

Papers PR D25 (1982) 2000, PRL 53 (1984) 32, and PRL 55 (1985) 1555.

FNAL-400 (May 1975) Approved Jul 1975, Jul 1976, Mar 1977, Apr 1978, Jul 1980; Completed Jul 1984.

CHARMED PARTICLE PRODUCTION BY NEUTRONS

FERMILAB – M Binkley, J Butler, I Gaines, P Garbincius, M Gormley, J Haggerty, D Harding, P Lebrun, J Peoples
ILLINOIS U, URBANA – M Diesburg, J Filaseta, T Kroc, T O'Halloran, C Shipbough, J Wiss (Spokesperson)
COLORADO U – P Coteus, J Cumalat, J Enagonio, R Ladbury
INFN, MILAN – A Grabar, S Sala
BOLOGNA U – F Frabetti
MILAN U – M Dicorato
PAVIA U – F Bossi, P Manfredi

Accelerator FNAL *Detector* Spectrometer

Reactions

n Si → charm X	280, 560 GeV/c

Particles studied charm

Comments A charm search using incident neutrons, an active target, and a PWC decay vertex detector. Ran for 2000 hours.

Papers NIM 222 (1984) 474.

FNAL-458 (Oct 1975, May 1976) Approved Jul 1976, Mar 1977, Apr 1978.

PHOTOPRODUCTION EXPERIMENT AT FERMILAB

COLUMBIA U – B Knapp, W Lee (Spokesperson), P Leung, S D Smith, A Wijangco
ILLINOIS U, URBANA – J Bronstein, R Coleman, G Gladding, M Goodman, R Messner, T O'Halloran, J Sorracino, A Wattenberg
FERMILAB – M Binkley, I Gaines, J Peoples
HAWAII U – J Knauer

Accelerator FNAL *Detector* Combination

Reactions

γ nucleus → $\mu^+ \mu^-$ X	0–300 GeV/c
γ nucleus → $\mu^+ e^-$ X	"
γ nucleus → $\mu^- e^+$ X	"
γ nucleus → $e^+ e^-$ X	"
γ nucleus → μ^+ charged(s) X	"
γ nucleus → μ^- charged(s) X	"
γ nucleus → e^+ charged(s) X	"
γ nucleus → e^- charged(s) X	"
γ nucleus → > 3 charged	"
γ nucleus → $2\pi^+ 2\pi^-$	"
γ nucleus → $2\pi^+ 2\pi^- \pi^0$	"
γ nucleus → $K^+ K^- \pi^+ \pi^-$	"
γ nucleus → $K^+ K^- \pi^+ \pi^- \pi^0$	"
γ nucleus → $\bar{p} p \pi^+ \pi^-$	"
γ nucleus → $\bar{p} p \pi^+ \pi^- \pi^0$	"

Particles studied J/ψ, $\psi(3685)$, $\eta_c(2980)$, charm, vmeson, hvy-lepton

Comments Continues work of FNAL-087A and 401. Previously was approved for 1000 hours, with a total of 2000 hours for FNAL experiments 400, 401 and 458. This time has now, however, been used by experiment 87A. Inactive as of October 81.

Papers This includes papers from FNAL-087A + FNAL-401. PRL 34 (1975) 1040, PRL 34 (1975) 1044, PRL 37 (1976) 571, PRL 37 (1976) 574, PRL 37 (1976) 578, PRL 37 (1976) 882, PRL 43 (1979) 414, PRL 43 (1979) 1691, PRL 44 (1980) 1309, PR D22 (1980) 537, PRL 46 (1981) 799, PRL 48 (1982) 73, PRL 50 (1983) 302, and PRL 54 (1985) 628.

FNAL-466 (Dec 1975) Approved Mar 1976.

STUDY OF HIGH-ENERGY REACTION MECHANISMS BY THE MEASUREMENT OF THE ANGULAR AND ENERGY DISTRIBUTIONS OF NUCLEI RECOILING FROM TARGETS BOMBARDED WITH 200–300 GeV PROTONS

ARGONNE – D Henderson, S B Kaufman, E P Steinberg, B D Wilkins
PURDUE U – D Fortney, D Klingensmith, N T Porile (√ Spokesperson), C F Wang
CHICAGO U – S K Chang, R A Johns, J LaRosa, N Sugarman, A Turkevich

Accelerator FNAL *Detector* Counter

Reactions

p nucleus → nucleus X	200–400 GeV/c

Comments An ongoing study, with 102 targets exposed as of September 85.

Papers PRL 43 (1979) 918, PR C21 (1980) 664, PR D21 (1980) 2511, PR C22 (1980) 670, PR C25 (1982) 244, PR C25 (1982) 478, PR C29 (1984) 569, and PR C33 (1986) 2183.

FNAL-490 (May 1976) Approved Jun 1976; Completed Jun 1980.

A SEARCH FOR SHORT-LIVED PARTICLES USING A HIGH-RESOLUTION STREAMER CHAMBER

YALE U – T Cardello, M Dine, D Ljung, T Ludlam, R Majka, P Nemethy, J Sandweiss (√ Spokesperson), A Schiz, J Slaughter, H Taft, L Tzeng
FERMILAB – M Atac, S Ecklund
LBL – et al.

Accelerator FNAL *Detector* Streamer chamber

Reactions

π^- nucleus → muon X	200 GeV/c

Particles studied charm

Comments A search for particles with lifetimes as short as 2.5×10^{-14} s in muon-triggered events. Ran for 850 hours.

Papers PRL 44 (1980) 1104.

FNAL-497 (May 1976) Approved Jun 1976; Completed Mar 1981.

HYPERON FLUXES AND POLARIZATIONS

FERMILAB – J Lach (Spokesperson)
FERMILAB & IOWA U & IOWA STATE U & YALE U – E W Anderson, C Ankenbrandt, J P Berge, A Breakstone, A E Brenner, J Butler, T R Cardello, P S Cooper, K Doroba, J Elias, P Lauriakainen, J MacLachlan, J P Marriner, E McCliment, E I Rosenberg, L J Teig, J L Thron, Y W Wah

Accelerator FNAL *Detector* Wire chamber

Reactions

p nucleus → Σ^+ X	400 GeV/c
p nucleus → Σ^- X	"
p nucleus → Ξ^- X	"
p nucleus → Ω^- X	"

Particles studied Σ^+, Σ^-

Comments Replaces FNAL-097. Surveys hyperon fluxes and polarizations as functions of x and p_t. Also searches for particles with lifetimes around 10^{-11} s. Ran for 2500 hours. See also FNAL-697.

Papers PRL 51 (1983) 863, PR D31 (1985) 451, PR D32 (1985) 1, and PRL 55 (1985) 2551.

FNAL-502 (Jul 1976) Approved Sep 1976; Completed Jun 1980.

SEARCH FOR MONOPOLES ABOVE THE 15-FOOT BUBBLE CHAMBER

COLORADO U – D F Bartlett (√ Spokesperson), D Soo
GENERAL ELECTRIC, SCHENECTADY – R L Fleischer, H R Hart, Jr , A Mogro-Campero

Accelerator COSM *Detector* Plastic

Particles studied monopole

Comments Uses the fringe field of the 15-ft bubble chamber as a collector, and lexan as detector.

Papers PR D24 (1981) 612. No other papers expected.

FNAL-508 (Sep 1976) Approved Sep 1976; Completed Apr 1985.

STUDY OF MECHANISM FOR MULTIPLE PRODUCTION OF PARTICLES AT HIGH ENERGIES: EMULSION EXPOSURE TO ABOUT 750 GeV PROTONS

CRACOW – W Wolter (√ Spokesperson), et al.

Accelerator FNAL *Detector* Emulsion

Reactions

p nucleus	800 GeV/c

Comments Follows on work of FNAL-90, -249, and -339. Exposed 7 emulsion stacks.

Papers APP B (accepted).

FNAL-515 (Oct 1976) Approved Mar 1977; Completed Mar 1982.

STUDY OF CHARM PARTICLES PRODUCED IN HADRONIC INTERACTIONS

NORTHWESTERN U – D Buchholz, L M Cremaldi, S Delchamps, H S Mao, J Rosen (Spokesperson), W K Sakumoto, R Schluter, S B Sontz, C Winter
FERMILAB – D Johnson
CARNEGIE MELLON U – R Edelstein, G Ginther, R Lipton, J M McQuade, J Russ, L Spiegel
NOTRE DAME U – J Bishop, N Biswas, N Cason, L Dauwe, V Kenney, A Kreymer, P Mooney, R Pemper, R Ruchti, W Shephard

Accelerator FNAL *Detector* Spectrometer

Reactions

π^- nucleus → μ^+ charged X	200 GeV/c
π^- nucleus → μ^- charged X	"
π^- nucleus → μ^+ charm X	"
π^- nucleus → μ^- charm X	"

Particles studied charm

Comments Triggers on prompt muons. An outgrowth of FNAL-397. Ran for 2650 hours.

Papers PRL 53 (1984) 1411.

FNAL-516 (Oct 1976, Oct 1977) Approved Nov 1977; Completed Jun 1981.

PHOTOPRODUCTION OF FINAL STATES OF MASS ABOVE 2.5 GeV WITH A MAGNETIC SPECTROMETER IN THE TAGGED PHOTON LAB

THE FERMILAB TAGGED PHOTON SPECTROMETER COLLABORATION
UC, SANTA BARBARA – V Bharadwaj, B Denby, A Eisner, R Kennett, A Lu, R Morrison, D Summers, M Witherell
COLORADO U – D Bartlett, S Bhadra, A Duncan, J Elliott, U Nauenberg
CARLETON U & NATIONAL RESEARCH COUNCIL, OTTAWA – P Estabrooks, M Losty, J Pinfold
FERMILAB – J Appel, J Biel, D Bintinger, J Bronstein, P Mantsch, T Nash (√ Spokesperson), W Schmidke, C Sliwa, M Sokoloff, K Stanfield, M Streetman, S Willis
OKLAHOMA U – G Kalbfleisch, M Robertson
TORONTO U – D Blodgett, S Bracker, G Hartner, R Kumar, G Luste, J Martin, K Shahbazian, W J Spalding, C Zorn

Accelerator FNAL *Detector* TPS

Reactions

$\gamma\, p \rightarrow \omega\, p$	70–140 GeV/c
$\gamma\, p \rightarrow J/\psi\, p$	"
$\gamma\, p \rightarrow \psi(3685)\, p$	"
$\gamma\, p \rightarrow$ charm X	"

Particles studied charm

Comments Recoils as well as forward-going particles are detected. See also FNAL-691, which is essentially a second run of this. For a description of the apparatus, see the LBL-91 supplement on detectors. Ran for 4500 hours.

Papers IEEE TNS 26 (1979) 686, NIM 216 (1983) 113, PRL 52 (1984) 410, PRL 52 (1984) 795, PRL 55 (1985) 2749, NIM 228 (1985) 283, and PR D32 (1985) 1053.

FNAL-524 (Jan 1977) Approved Mar 1977; Completed Apr 1985.

PROTON-NUCLEUS INTERACTIONS IN EMULSION PLATES WITH EMBEDDED METAL POWDER GRANULES AT HIGHEST AVAILABLE ENERGY (> 400 GeV)

WASHINGTON U, SEATTLE – J R Florian, J J Lord, R J Wilkes (√ Spokesperson)

Accelerator FNAL *Detector* Emulsion

Reactions

p Cr	500 GeV/c
p Ag	"
p Wt	"

Particles studied charm, hvy-lepton

Comments Exposed 6 emulsion stacks. Analysis is in progress.

FNAL-531 (Jan 1977) Approved Mar 1977, Jul 1979; Completed Jun 1981.

WEAK DECAY LIFETIMES OF ν-PRODUCED PARTICLES IN A TAGGED EMULSION SPECTROMETER

OHIO STATE U – S M Errede, N W Reay (Spokesperson), K Reibel, T A Romanowski, N R Stanton
OTTAWA U – V Areti, G Fortier, J Hebert, J D Hebert
TORONTO U – P J Davis, M Donnelly, J F Martin, J D Prentice, T S Yoon
NAGOYA U – H Fuchi, K Hoshino, S Kuramata, K Niu, K Niwa, S Tasaka, Y Yanagisawa
YOKOHAMA NATIONAL U – H Kimura, Y Maeda
AICHI U – N Ushida
OSAKA CITY U – T Hara, O Kusumoto, M Teranaka
OSAKA PREFECTURE U, SCI EDUC INST – H Okabe, J Yokota
KOBE U – G Fujioka, H Fukushima, T Hayashino, Y Homma, M Igarashi, Y Tsuzuki, H Yamazaki
FERMILAB & SEOUL NATIONAL U & MCGILL U & OKAYAMA U & TOKYO U & VIRGINIA TECH – et al.

Accelerator FNAL *Detector* Combination

Reactions

ν_μ nucleus → charm chargeds X	10–100 GeV/c
$\overline{\nu}_\mu$ nucleus → charm chargeds X	"

Particles studied charm, unspec

Comments Search for particles with lifetimes in the range 2×10^{-15} to 3×10^{-12} s. Ran for 3800 hours.

Papers PRL 45 (1980) 1053, JPSJ 47 (1979) 687, PRL 47 (1981) 1694, PRPL 83 (1982) 85, PRL 48 (1982) 844, PL 121B (1983) 287, PL 121B (1983) 292, PRL 51 (1983) 2362, PRL 56 (1986) 1767, PRL 56 (1986) 1771, and PRL 57 (1986) 2897.

FNAL-537 (Feb 1977, Oct 1977) Approved Mar 1978; Completed Feb 1982.

STUDY OF $\bar{p}N$ INTERACTIONS IN THE P-WEST HIGH INTENSITY LABORATORY

FERMILAB - M Binkley, B Cox (√ Spokesperson), J Enagonio, C Hojvat, D Judd, R D Kephart, P K Malhotra, P O Mazur, C T Murphy, F Turkot, R L Wagner, D Wagoner, W Yang
ATHENS U, NUCL PHYS LAB - E Anassontzis, S Katsanevas, P Kostarakis, C Kourkoumelis, A Markou, L K Resvanis, G Voulgaris
MCGILL U - H Areti, S Conetti, P Lebrun, D Ryan, T Ryan, W Schappert, D Stairs
MICHIGAN U - C Akerlof, D Kraushaar, D Nitz, R Thun
SHANDONG U - He Mao, Z Nai-jian

Accelerator FNAL *Detector* Spectrometer

Reactions

$\bar{p}$ nucleus → $\mu^+ \mu^-$ X	125 GeV/c
π^- nucleus → $\mu^+ \mu^-$ X	"

Particles studied J/ψ

Comments Studies J/ψ and high-mass muon pair production. The main result so far is the agreement, except for absolute normalization, of the x_F, τ, and p_t spectra with the simple Drell-Yan formalism. Ran for 2700 hours.

Papers NIM 212 (1983) 135, PR D29 (1984) 63, and PRL 54 (1985) 2572.

FNAL-549 (Apr 1977) Approved May 1977.

A SEARCH FOR FRACTIONAL CHARGES USING ACCELERATOR AND LOW TEMPERATURE TECHNIQUES

STANFORD U - W M Fairbank, G S LaRue
MICHIGAN U - M J Longo (√ Spokesperson)

Accelerator FNAL *Detector* Other

Reactions

p nucleus → quark X	400 GeV/c

Particles studied quark

Comments Attempts to collect fractional charges on niobium spheres. Approved for parasitic running. Inactive, and very unlikely to be revived.

FNAL-555 (May 1977) Approved Nov 1978; Completed Feb 1982.

STUDY OF CROSS SECTIONS AND POLARIZATIONS IN NEUTRAL STRANGE PARTICLE PRODUCTION AT HIGH TRANSVERSE MOMENTUM

RUTGERS U - A Beretvas, L Deck, T Devlin (√ Spokesperson), K B Luk, P C Petersen, G B Thomson, R Whitman
WISCONSIN U - R Handler, B Lundberg, L Pondrom, M Sheaff, C Wilkinson
MICHIGAN U - P Border, J Dworkin, O E Overseth, R Rameika, G Valenti
MINNESOTA U - K Heller, C James

Accelerator FNAL *Detector* Spectrometer

Reactions

p Be → Λ X	400 GeV/c
p Be → $\bar{\Lambda}$ X	"
p Be → K_S X	"

Comments Extends measurements and uses apparatus of FNAL-8. Ran for 650 hours. Analysis is in progress. See also FNAL-619.

Papers PRL 46 (1981) 877, PR D25 (1982) 639, PRL 51 (1983) 2025, and PR D34 (1986) 53.

FNAL-557 (May 1977) Approved Jun 1977; Completed Jul 1984.

STUDY OF HADRON JETS WITH THE CALORIMETER TRIGGERED MULTIPARTICLE SPECTROMETER

CAL TECH - R Gomez
FERMILAB - B Brown, L Dauwe, P Devensky, H Haggerty, E Malamud (√ Spokesperson), M Nikolic
ILLINOIS U, CHICAGO - R Abrams, J Ares, H Goldberg, C Halliwell, F Lopez, S Margulies, D McLeod, A Salminen, J Solomon, Gwan Wu
INDIANA U - S Blessing, R Crittenden, P Draper, A Dzierba, J Florian, R Heinz, J Krider, T Marshall, J Martin, D Petersen, A Sambamurti, P Smith, A Snyder, C Stewart, T Sulanke, S Teige, A Zieminski
MARYLAND U - R G Glasser, J Goodman, S Gupta, R Holmes, L Myrianthopoulos, P Rapp, H Strobele, G Yodh
RUTGERS U - S Ahn, T Watts
GEORGE MASON U - R Ellsworth
FLORIDA STATE U - S Hagopian, J E Lannutti, A Pfifer
SERPUKHOV - A Abramov, Yu Antipov, B Baldin, S Denisov, V Glebov, Y Gorin, V Kryshkin, S Petrukhin, S Polovnikov, V Sulyaev

Accelerator FNAL *Detector* FMPS

Reactions

$p\,p$ → jet(s) X	400, 800 GeV/c
$p\,p$ → $\mu^+ \mu^-$ X	"
p nucleus → jet(s) X	"
p nucleus → $\mu^+ \mu^-$ X	"

Comments An extension and improvement of FNAL-260. Triggers on jets with high p_t. Ran 600 hours at 400 GeV/c ending in June 81. Then ran 350 hours at 800 GeV/c on H, Al, Be, Cu, and Pb targets ending in July 84. This run was combined with the start of FNAL-672. For a description of the apparatus, see the LBL-91 supplement on detectors.

Papers IEEE TNS 28 (1981) 666, NIM 188 (1981) 285, PRL 49 (1982) 711, PRL 50 (1983) 11, PR D29 (1984) 1895, PR D29 (1984) 2469, NP B232 (1984) 189, PL 177B (1986) 233, PL 183B (1987) 115, and PR D (submitted).

FNAL-564 (May 1977) Approved Jun 1977, Jul 1979; Completed Mar 1981.

DIRECT DETECTION OF SHORT-LIVED PARTICLES FROM NEUTRINO INTERACTIONS IN NUCLEAR EMULSIONS INSIDE THE 15-FOOT BUBBLE CHAMBER

FERMILAB - W M Smart, S Velen, L Voyvodic (Spokesperson)
SERPUKHOV - V V Ammosov, V I Baranov, P F Ermolov, V I Sirotenko, E A Slobodyuk, V A Yarba
MOSCOW, ITEP - V I Efremenko, P A Gorichev, V S Kaftanov, G K Kliger, V Z Kolganov, N Kolganova, S P Krutchinin, M A Kubantsev, E Poszarova, V G Schevchenko, V A Smirnitskiy, A Weissenberg
CRACOW - J Babecki, B Furmanska, R Holynski, S Kryzwdzinski, W Wolter, B Wosiek
DUBNA - S A Bunyatov, V M Sidorov
KANSAS U - R Ammar, R Davis, C Eklund, N Kwak, R Stump, D Zacrep
WASHINGTON U, SEATTLE - T H Burnett, J R Florian, J J Lord, R J Wilkes
ILLINOIS TECH & SYDNEY U & SOFIYA, INST PHYS - et al.

Accelerator FNAL *Detector* DBC-15FT-HYB

Reactions

ν_μ nucleus → charm charged(s)	10–100 GeV/c

$\bar{\nu}_\mu$ nucleus → charm charged(s)	"

Particles studied charm, unspec

Comments Search for particles with lifetimes in the range 10^{-15} to 10^{-11} s. Took 277 KPX.

Papers PL 94B (1980) 118, and PR D29 (1984) 1300.

FNAL-565 (Jun 1977) Approved Mar 1978; Completed Jun 1982.

A STUDY OF THE DETAILED CHARACTERISTICS OF HADRON-NUCLEUS COLLISIONS USING THE FERMILAB HYBRID SPECTROMETER

BROWN U – D Brick, M Heller, A M Shapiro, M Widgoff
ILLINOIS TECH – R Burnstein, C Fu, M Nazaretz, H Rubin
INDIANA U – E D Alyea, Jr
JOHNS HOPKINS U – B Barnett, C-Y Chien, P Lucas, A Pevsner, R Zdanis
MIT – F Barreiro, O Benary, G W Brandenburg, J Brau, W Busza, E S Hafen, R I Hulsizer, V Kistiakowsky, I A Pless (Spokesperson), R K Yamamoto
OAK RIDGE – H O Cohn
RUTGERS U – B Denby, P Jacques, T C Ou, R J Plano, T L Watts
STEVENS TECH – E B Brucker, E Koller, P Stamer, S Taylor
TENNESSEE U – W M Bugg, G Condo, T Handler, E Hart
YALE U – H Kraybill, D Ljung, T Ludlam, H D Taft
CERN & TECHNION & NIJMEGEN U & PADUA U & PAVIA U & ROME U & TEL AVIV U & TOHOKU U & TRIESTE U & MONS U & WEIZMANN INST – et al.

Accelerator FNAL *Detector* HBC-30IN-HYB

Reactions

p nucleus	200, 400 GeV/c
π^+ nucleus	200 GeV/c
π^- nucleus	"
K^+ nucleus	"
K^- nucleus	"
p nucleus	"

Comments The targets are magnesium, silver, and gold thin foils in the chamber. Downstream detectors for the hybrid spectrometer include ISIS and a segmented Cerenkov counter. This and FNAL-570 took a total of 1068 KPX.

Papers NP B201 (1982) 189, and RSI 53 (1982) 303. See also FNAL-570.

FNAL-570 (Sep 1977) Approved Mar 1978; Completed Jun 1982.

A STUDY OF PARTICLE PRODUCTION AND DYNAMICS FROM $x = 0$ TO $x = 1$ AND THE DEPENDENCE ON INCIDENT QUANTUM NUMBERS

BROWN U – D Brick, A M Shapiro, M Widgoff
CERN – F Bruyant, L Montanet
ILLINOIS TECH – R A Burnstein, H A Rubin
INDIANA U – E D Alyea, Jr
JOHNS HOPKINS U – L Bachman, A Pevsner
MIT – F Barreiro, O Benary, E S Hafen, R I Hulsizer, V Kistiakowsky, I A Pless (Spokesperson), P Trepagnier, R K Yamamoto
MONS U – P Gillis, F Grard, V Henri, P Herquet, J Skura, R Windmolders
NIJMEGEN U – F Crijns, W Kittel, W Metzger, C Pols, J Schotanus, R Van de Walle
OAK RIDGE – H O Cohn, R D McCulloch
PADUA U – A Bettini, M Cresti, M Mazzucato, L Peruzzo, P Rossi, G Sartori, S Sartori, L Ventura, A Zudori, G Zumerle
PAVIA U – S Alborghetti, R Attendoli, E Calligarich, G Cecchet, R Dolfini, L Mapelli, S Ratti
ROME U – L Barone, R Bizzarri, G Bressi, G Ciapetti, D Dionisi, P F Loverre, D Zanello, L Zanello
RUTGERS U – P F Jacques, R J Plano, T L Watts
STEVENS TECH – E B Brucker, E L Koller, P E Stamer, S Taylor
TECHNION – S Dado, J Goldberg, S Toaff
TEL AVIV U – G Alexander, S Dagan, J Grunhaus, A Levy, D Lissauer, Y Oren
TENNESSEE U – W M Bugg, G T Condo, T Handler, E L Hart
TRIESTE U – E Castelli, C Omero, P Poropat, M Sessa
WEIZMANN INST – Y Eisenberg, B Haber, D Hochman, U Karshon, E E Ronat, A Shapira, R Yaari, G Yekutieli
YALE U – H Kraybill, D Ljung, T Ludlam, H D Taft
TOHOKU GAKUIN U & TOHOKU U – et al.

Accelerator FNAL *Detector* HBC-30IN-HYB

Reactions

$p\,p$	147 GeV/c
$\pi^+\,p$	"
$K^+\,p$	"
$\bar{p}\,p$	"
$\pi^-\,p$	"

Comments Downstream detectors for the hybrid spectrometer system include ISIS and a forward γ detector. The system is to identify and measure γ's, pions, kaons, protons, antiprotons, and Λ's, and 4-constraint fits will be possible with perhaps as many as three π^0's. Physics topics emphasize multiparticle production in the central region. This experiment and FNAL-565 took a total of 1068 KPX.

Papers ZPHY C15 (1982) 1. See also FNAL-565.

FNAL-576 (Dec 1977) Approved Feb 1978; Completed Jul 1985.

500 GeV PROTON INTERACTIONS IN NUCLEAR EMULSION

OTTAWA U – H Areti, C J B Hebert, J Hebert (Spokesperson)
LUND U – B Andersson, I Otterlund (Spokesperson)
NANCY U – G Baumann, R Devienne
PARIS, CURIE UNIV VI – Tsai-Chu
STRASBOURG – C J Jacquot
LYON, IPN – R Schmitt
FERMILAB – A van Ginneken
BELGRADE U – O Adamovic, M Juric
VALENCIA U – J M Bolta, E Higon
SANTANDER U – A Amoroz, E de Felipe, R Niembro, A Ruiz, E Villar

Accelerator FNAL *Detector* Emulsion

Reactions

p nucleus	500 GeV/c

Comments Exposed 1 emulsion stack.

FNAL-577 (Jan 1978) Approved Jun 1978; Completed Mar 1981.

πp ELASTIC SCATTERING AT LARGE ANGLES

ARIZONA U – R M Kalbach, K W Krueger, A E Pifer
CORNELL U – D H Kaplan, P Karchin, J Orear
FERMILAB – W F Baker, D P Eartly, J S Klinger, A J Lennox, R Rubinstein (√ Spokesperson)
UC, SAN DIEGO – H G E Kobrak, S F McHugh

Accelerator FNAL *Detector* Double-arm spectrometer

Reactions

$\pi^+\,p \rightarrow \pi^+\,p$	100, 200 GeV/c
$\pi^-\,p \rightarrow \pi^-\,p$	"
$K^+\,p \rightarrow K^+\,p$	"
$K^-\,p \rightarrow K^-\,p$	"
$\bar{p}\,p \rightarrow \bar{p}\,p$	"
$p\,p \rightarrow p\,p$	"

Comments Ran for 1550 hours.

Papers PRL 47 (1981) 1683, PR D26 (1982) 723, PR D27 (1983) 2752, and PR D30 (1984) 1413. No other papers expected.

FNAL-580 (Jan 1978) Approved Jun 1978; Completed Jun 1981.

A SEARCH FOR NARROW AND BROAD RESONANCES DECAYING INTO $\Lambda\bar{\Lambda}$, $\Lambda\bar{\Lambda}\pi$, K_SK_S AND $K_SK_S\pi$ FROM π^-p INTERACTIONS AT 200 GeV/c USING THE FERMILAB MPS

ARIZONA U – E Jenkins, K J Johnson, K W Lai, J LeBritton, Y C Lin, A Pifer
FERMILAB – D Green (√ Spokesperson)
FLORIDA STATE U – J Albright, R N Diamond, H Fenker, H Goldman, S Hagopian, J Lannutti, J E Piper
NOTRE DAME U – T Davis, J Poirier
TUFTS U – A Napier, J Schneps
VANDERBILT U – J Marraffino, C Roos, J Waters, M S Webster, E Williams
VIRGINIA TECH – G Collins, J Ficenec, P Trower

Accelerator FNAL *Detector* FMPS

Reactions

$\pi^- p \to \Lambda \bar{\Lambda} X$	200 GeV/c
$\pi^- p \to \Lambda \bar{\Lambda} \pi^+ X$	"
$\pi^- p \to \Lambda \bar{\Lambda} \pi^- X$	"
$\pi^- p \to K_S K_S X$	"
$\pi^- p \to K_S K_S \pi^+ X$	"
$\pi^- p \to K_S K_S \pi^- X$	"

Particles studied meson

Comments For a description of the apparatus, see the LBL-91 supplement on detectors. Ran for 800 hours.

Papers PR D28 (1983) 2304, PR D29 (1984) 1888, PR D30 (1984) 872, PR D30 (1984) 877, PL 149B (1985) 514, PR D34 (1986) 42, and PR D34 (1986) 707.

FNAL-581-704 (Sep 1981) Approved Dec 1981, Dec 1983, Jul 1984.

EXPERIMENTS WITH THE POLARIZED BEAM FACILITY

ARGONNE – D Grosnick, D Hill, D Lopiano, Y Ohashi, T Shima, H Spinka, R Stanek, D Underwood, A Yokosawa (√ Spokesperson)
FERMILAB – D Carey, D Cossairt, A L Read
KYOTO U – K Imai, R Kikuchi, A Masaike, K Miyake, T Nagamine, T Nakamura, N Sasao, N Tamura
KYOTO SANGYO U – F Takeuchi
KYOTO U OF EDUCATION – A Okihana, R Takashima
LOS ALAMOS – N Tanaka
ANNECY – K Kuroda, A Michalowicz
NORTHWESTERN U – F Luehring, D H Miller
RICE U – B Bonner, M Corcoran, B Mayes, H E Miettinen, G S Mutchler, M Nessi, G C Phillips, J B Roberts, F Tedaldi-Nessi
SACLAY – J Bystricky, J P Debrion, F Lehar, A De Lesquen, J Movchet, L Van Rossum
SERPUKHOV – V Apokin, A Dereveschikov, Y Matulenko, A Meschanin, S Nurushev, V Solovyanov, L Solovyev, A Vasilyev
INFN, TRIESTE – R Birsa, F Bradamante, M Giorgi, L Lanceri, A Martin, A Penzo, P Schiavon, S Dalla Torre-Colautti, A Villari, A Zanetti
KEK – S Ishimoto, A Masahito
TEXAS U – Y Onel, G Pauletta

Accelerator FNAL-TEV *Detector* Spectrometer, Counter

Reactions Polarized beam and target

$p\,p \to X$	200 GeV/c
$p\,p \to \pi^0 X$	"
$p\,p \to \pi^+ X$	"
$p\,p \to \pi^- X$	"
$p\,p \to \Lambda X$	"
$p\,p \to \Sigma^0 X$	"
$\bar{p}\,p \to X$	"

Comments The experiments measure (1) the helicity asymmetry in total pp and $\bar{p}p$ 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 and Σ^0's at large x. FNAL-581 is approved for 400 hours, and FNAL-704 is approved for 1200 hours. Scheduled for April 87.

FNAL-584 (Jan 1978) Approved Jun 1978; Completed Jan 1980.

A SEARCH FOR THE DECAY OF NEW LONG-LIVED NEUTRAL PARTICLES WITH A MASS AND LIFETIME EXCEEDING THAT OF THE K_L

CHICAGO U – R Bernstein, B Winstein
STANFORD U – R Cousins, J F Greenhalgh, M Schwartz
WISCONSIN U – G Bock, D Hedin, G Thomson (Spokesperson)

Accelerator FNAL *Detector* Spectrometer

Reactions

neutral	—

Particles studied longlived

Comments Uses the spectrometer of FNAL-533. A search for high transverse momentum particles coming from along a neutral beam line. Ran for 400 hours.

FNAL-585 (Jan 1978) Approved Mar 1978, Dec 1978; Completed Mar 1981.

EXCLUSIVE KN CHARGE EXCHANGE

CARLETON U – K W Edwards
UC, DAVIS – P Yager
UC, SAN DIEGO – H Kobrak, R Pitt, R Swanson
MICHIGAN STATE U – M Abolins, W Francis (Spokesperson), D Owen

Accelerator FNAL *Detector* Spectrometer

Reactions

$K^- p \to \overline{K}^0 n$	75, 100, 150 GeV/c
$K^+ n \to K^0 p$	"

Comments Uses equipment of FNAL-383. Ran for 3150 hours.

FNAL-591 (Jan 1978) Approved Apr 1978; Completed Feb 1981.

BROAD SEARCH FOR NEW HADRONIC STATES VIA HIGH RESOLUTION CHARGE AND MASS DETERMINATION OF NUCLEAR FRAGMENTS FROM p-NUCLEUS COLLISIONS

FERMILAB – F Turkot
PURDUE U – A Bujak, L J Gutay (Spokesperson), A Hirsch, N T Porile, R P Scharenberg, B C Stringfellow

Accelerator FNAL *Detector* Spectrometer

Reactions

p nucleus $\to$ frag X	20–400 GeV/c

Particles studied longlived

Comments Found evidence for a liquid-gas phase transition and searches for abnormal Z/M ratios in nuclear fragments as evidence for abnormal nuclear matter, new longlived hadrons bound to fragments, or new neutron-rich isotopes. The fragments studied have Z from 2 through 13. Uses the gas jet target. Ran for 1950 hours.

Papers PRL 49 (1982) 1321, PL 118B (1982) 458, PR C29 (1984) 508, and PL 156B (1985) 177.

FNAL-594 (Feb 1978) Approved Mar 1978; Completed Jun 1982.

A NEW NEUTRINO DETECTOR AT FERMILAB

FERMILAB – F E Taylor, J K Walker (Spokesperson)
FERMILAB & MIT & MICHIGAN STATE U & NORTHERN ILLINOIS U – et al

Accelerator FNAL *Detector* Calorimeter

Reactions

ν_μ nucleus → ν_μ hadrons	0–230 GeV/c
ν_μ nucleus → μ^- X	"
ν_μ nucleus → muons X	"
ν_μ nucleus → muons e^- X	"
ν_μ nucleus → muons e^+ e^- X	"
ν_μ n → μ^- p	"
ν_μ e^- → ν_μ e^-	"
ν_μ e^- → μ^- ν_e	"
$\overline{\nu}_\mu$ p → μ^+ n	"
$\overline{\nu}_\mu$ nucleus → $\overline{\nu}_\mu$ hadrons	"
$\overline{\nu}_\mu$ nucleus → μ^+ X	"
$\overline{\nu}_\mu$ nucleus → muons X	"
$\overline{\nu}_\mu$ e^- → $\overline{\nu}_\mu$ e^-	"
$\overline{\nu}_\mu$ e^- → μ^- $\overline{\nu}_e$	"
$\overline{\nu}_e$ e^- → μ^- $\overline{\nu}_\mu$	"

Comments Exposed to the 400-GeV wide- and narrow-band neutrino beams for about 4400 hours. The analysis emphasizes neutral current interactions. For a description of the apparatus, see the LBL-91 supplement on detectors.

Papers IEEE TNS 29 (1982) 363, IEEE TNS 29 (1982) 400, PRL 55 (1985) 574, and PRL 55 (1985) 1969.

FNAL-595 (Jan 1978) Approved Jun 1978; Completed Jun 1980.

A STUDY OF CHARM AND PROMPT SINGLE MUON PRODUCTION IN pN AND πN COLLISIONS

CAL TECH – B C Barish, R L Messner, M H Shaevitz, E J Siskind
ROCHESTER U – A Bodek (√ Spokesperson), R Breedon, R N Coleman, W Marsh, S Olsen, J Ritchie, I Stockdale
STANFORD U – G Donaldson, S Wojcicki
CHICAGO U – F S Merritt
FERMILAB – H E Fisk, Y Fukushima, P A Rapidis

Accelerator FNAL *Detector* Calorimeter, Spectrometer

Reactions

π^- Fe → muon(s) hadrons X	278 GeV/c
p Fe → muon(s) hadrons X	350 GeV/c

Particles studied J/ψ, D^0, $\overline{D}^0$, D^+, D^-

Comments Continues work of FNAL-379. Prompt μ production for $x > 0$ is mainly to study charm production. Also puts limits on bottom production. Results published on total charm cross sections, x distributions, and $D^0\overline{D}^0$ mixing. Ran for 1450 hours.

Papers PRL 44 (1980) 230, PL 113B (1982) 77, PL 113B (1982) 82, PL 126B (1983) 499, and PL 138B (1984) 213.

FNAL-597 (Jan 1978) Approved Mar 1978; Completed May 1982.

A HIGH STATISTICS STUDY OF $\overline{p}p$ ANNIHILATIONS AND A COMPARISON OF $\overline{p}$, p, π^-, π^+, AND K^+ INTERACTIONS ON HYDROGEN, MAGNESIUM, SILVER, AND GOLD AT 100 GeV/c UTILIZING THE FERMILAB 30-INCH HYDROGEN BUBBLE CHAMBER AND DOWNSTREAM PARTICLE IDENTIFIER

CAMBRIDGE U – P A Elcombe, M J Goodrick, J C Hill, W W Neale
DUKE U – W Kowald, W D Walker
FERMILAB – P Lucas, L Voyvodic
PENN STATE U – R A Lewis, B Y Oh, G A Smith, W Toothaker, J Whitmore (Spokesperson)
NOTRE DAME U – J M Bishop, N N Biswas, N M Cason, V P Kenney, M C K Mattingly, R C Ruchti, W D Shephard (Spokesperson), S J Y Ting
KANSAS U – R Ammar, D Coppage, R Davis, D Day, J Gress, L Herder, S Kanekal, N Kwak

Accelerator FNAL *Detector* HBC-30IN-HYB

Reactions

$\overline{p}$ p	100 GeV/c
p p	"
π^+ p	"
K^+ p	"
$\overline{p}$ nucleus	"
p nucleus	"
π^+ nucleus	"
K^+ nucleus	"
π^- p	100, 320 GeV/c
π^- nucleus	"

Comments The magnesium, silver, and gold targets are thin foils in the chamber. Uses the downstream particle detector (ISIS/OSIRIS) and a neutral calorimeter. This supercedes the previously approved FNAL-304. Took 658 KPX.

Papers PR D33 (1986) 3167.

FNAL-605 (May 1978, Nov 1978) Approved Mar 1979; Completed Aug 1985.

STUDY OF LEPTONS AND HADRONS NEAR THE KINEMATIC LIMITS

FERMILAB – C N Brown, W Cooper, D Finley, A Ito, A Jonckheere, H Jostlein, L Lederman, G Moreno, R Orava, S Smith, K Sugano
SUNY, STONY BROOK – M Adams, H Glass, D Jaffe, J Kirz, R McCarthy, D Sieh
WASHINGTON U, SEATTLE – D A Forbush, R Gray, K B Luk, R Plaag, J Rothberg, J Rutherfoord (√ Spokesperson), P B Straub, F C Toevs, R W Williams, K Young
COLUMBIA U – J A Crittenden, Y B Hsiung, W Sippach
SACLAY – J R Hubbard, Ph Mangeot, J Mullie, M Neveu, R Praca, J Tichit, A Zadra
KYOTO U – Y Hemmi, K Imai, K Miyake, T Nakumura, Y Sakai, N Sasao, N Tamura, T Yoshida
KEK – A Maki
CERN – R P Bouclier, G Charpak, G P Million, J-C Santiard, F Sauli
FLORIDA STATE U – D Kaplan

Accelerator FNAL *Detector* Spectrometer

Reactions

p nucleus → μ^+ μ^- X	400, 800 GeV/c
p nucleus → e^+ e^- X	"
p nucleus → hadron$^+$ hadron$^-$ X	"

Particles studied axion

Comments Studies single and pair production of leptons and hadrons at very high transverse momenta. The nuclear targets include H_2, D_2, Be, Cu, and W. The dilepton invariant mass resolution is exceptionally good. Ran for 3970 hours. For a description of the apparatus, see the LBL-91 supplement on detectors.

Papers IEEE TNS 28 (1981) 514, IEEE TNS 28 (1981) 528, IEEE MAG 17 (1981) 1903, IEEE TNS 29 (1982) 323, NIM 205 (1983) 403, NIM 216 (1983) 79, NIM 217 (1983) 237, IEEE TNS 30 (1983) 30, IEEE TNS 31 (1984) 1028, IEEE TNS 32 (1985) 692, PRL 55 (1985) 457, NIM A244 (1986) 440, NIM A245 (1986) 338, PRL 57 (1986) 2101, and PR D34 (1986) 2584.

FNAL-609 (Sep 1978) Approved Nov 1978, Jan 1980; Completed Feb 1984.

A STUDY OF THE STRUCTURE OF HIGH p_t HADRONIC INTERACTIONS

LEHIGH U – A Kanofsky
PENN U – L Cormell, M Dris, J Fleischman, E Gardella, C Hitzman, W Kononenko, B Robinson, W Selove (Spokesperson), G Theodosiou, B Yost
WISCONSIN U – H F Chen, A R Erwin, M A Hasan, C E Kuehn, K S Nelson, M Thompson
ARGONNE – M W Arenton, W R Ditzler, T H Fields
FERMILAB – M Harrison

RICE U – M Corcoran, K Johns, H E Miettinen, C Naudet, J Rice, J Roberts
MICHIGAN U – R Gustafson

Accelerator FNAL *Detector* Calorimeter

Reactions

$p\,p \rightarrow$ hadrons	400 GeV/c
$\pi^+\,p \rightarrow$ hadrons	"

Comments Continues study of FNAL-395 of high p_t hadron jets. Ran for 620 hours.

Papers PRL 53 (1984) 1988, PR D31 (1985) 984, PL 150B (1985) 322, and PRL 56 (1986) 808.

FNAL-610 (Oct 1978) Approved Dec 1978; Completed Jun 1980.

PION PRODUCTION OF HEAVY QUARK MESON STATES DECAYING INTO $J/\psi(3097)$

FERMILAB – R G Hicks, T B W Kirk (✓ Spokesperson), R Raja
ILLINOIS U, URBANA – J Cooper, L Holloway, L Koester, U Kruse, R Sard, M Shupe
TUFTS U – R Milburn, W Oliver, R Thornton
HOWARD U & PURDUE U – et al.

Accelerator FNAL *Detector* CCM

Reactions

π^- Be $\rightarrow \mu^+\,\mu^-$ X	225 GeV/c
π^- Be $\rightarrow J/\psi$ X	"
π^- Be $\rightarrow J/\psi\,\pi^+\,\pi^-$ X	"
π^- Be $\rightarrow \psi(3685)$ X	"
π^- Be $\rightarrow J/\psi\,\gamma$ X	"
π^- Be $\rightarrow \chi$(unspec) X	"

Particles studied J/ψ, $\psi(3685)$, χ(unspec)

Comments Continues work of FNAL-369 with the spectrometer upgraded. Tests a gluon-fusion model for χ meson production by pions. Ran for 1250 hours. See also FNAL-673.

Papers PR D28 (1983) 1773, PR D30 (1984) 671, NIM A236 (1985) 307, and PR D31 (1985) 1132. No other papers expected.

FNAL-612 (Oct 1978) Approved Nov 1978; Completed Apr 1982.

MEASUREMENT OF THE DIFFRACTIVE PHOTON DISSOCIATION ON HYDROGEN

ROCKEFELLER U – T Chapin, R Cool, K Goulianos (✓ Spokesperson), K Jenkins, J Silverman, G Snow, H Sticker, S White
BEIJING, IHEP – Y H Chou

Accelerator FNAL *Detector* TPC

Reactions

$\gamma\,p \rightarrow p$ X	80–140 GeV/c
$\gamma\,p \rightarrow p$ vmeson^0	"

Comments Covers $0.02 < -t < 0.1$ GeV^2 and up to 0.1 in M_x^2/s. Ran for 1850 hours.

Papers NIM 197 (1982) 305, and PR D31 (1985) 17. No other papers expected.

FNAL-613 (Sep 1978) Approved Nov 1978; Completed May 1982.

A PROMPT NEUTRINO EXPERIMENT AT FERMILAB

MICHIGAN U – R C Ball, C T Coffin, H R Gustafson, L W Jones, M J Longo, T J Roberts, B P Roe (✓ Spokesperson), E Wang
WISCONSIN U – M Duffy, G K Fanourakis, R J Loveless, D D Reader, D L Schumann, E S Smith
OHIO STATE U – M B Crisler, J S Hoftun, T Y Ling, T A Romanowski, J T Volk
INFN, FLORENCE – C Castoldi, G Conforto
WASHINGTON U, SEATTLE – S Childress

Accelerator FNAL *Detector* Calorimeter

Reactions

p nucleus	400 GeV/c

Particles studied charm

Comments A beam-dump ν experiment with several targets, densities, and intensities. Studies production of charmed particles by hadrons, and searches for various exotic phenomena. Ran for 1800 hours with about 4.3×10^{17} protons on target.

Papers NIM 197 (1982) 371, PRL 51 (1983) 743, PRL 52 (1984) 1865, PRL 53 (1984) 1314, NIM 228 (1984) 37, PRL 55 (1985) 1816, and PRL 57 (1986) 1522.

FNAL-615 (Nov 1978, May 1979) Approved Jul 1979; Completed Jul 1984.

A STUDY OF THE FORWARD PRODUCTION OF MASSIVE PARTICLES

CHICAGO U – C Adolphsen, J Alexander, K J Anderson, J Conway, J Heinrich, K W Merritt, J E Pilcher
PRINCETON U – C Biind, J F Greenhalgh, W C Louis, K T McDonald (✓ Spokesperson), S Palestini, F Shoemaker, A J S Smith
IOWA STATE U – E I Rosenberg, D T Simpson

Accelerator FNAL *Detector* Spectrometer

Reactions

π^- nucleus $\rightarrow \mu^+\,\mu^-$ X	75, 250 GeV/c
π^+ nucleus $\rightarrow \mu^+\,\mu^-$ X	250 GeV/c

Particles studied J/ψ, $\psi(3685)$, Υ(unspec)

Comments Measures the pion structure function at large x. Continues work of FNAL-444.

Papers PRL 55 (1985) 2649, PRL 56 (1986) 1027, PR D34 (1986) 315, and NIM A243 (1986) 323.

FNAL-616 (Jan 1979) Approved Mar 1979; Completed Jan 1980.

MEASUREMENT OF NEUTRINO STRUCTURE FUNCTIONS

CAL TECH – R Blair, J Lee, P Linsay, J Ludwig, R Messner, F Sciulli (Spokesperson), M Shaevitz
FERMILAB – J F Bartlett, E Fisk, Y Fukushima, Q Kerns, T Kondo, S Segler, R Stefanski, D Theriot, D Yovanovitch
ROCHESTER U – A Bodek, R Coleman, W Marsh
ROCKEFELLER U – O Fackler, K Jenkins
COLUMBIA U – et al.

Accelerator FNAL *Detector* LAB-E

Reactions

ν_μ nucleus	25–250 GeV/c
$\bar{\nu}_\mu$ nucleus	"

Comments Uses the E-lab ν detector to continue work of FNAL-356. Special emphasis is on measuring F_L, or R, well. For a description of the apparatus, see the LBL-91 supplement on detectors. Ran for 2900 hours.

Papers PR D23 (1981) 1070, PR D24 (1981) 1400, PRL 51 (1983) 343, ZPHY C26 (1984) 1, NIM 226 (1984) 281, and PL 152B (1985) 404.

FNAL-617 (Jan 1979) Approved Mar 1979; Completed Jun 1982.

A STUDY OF DIRECT CP VIOLATION IN THE DECAY OF THE K^0 VIA A PRECISION MEASUREMENT OF $|\eta_{00}/\eta_{+-}|$

CHICAGO U – R Bernstein, G Bock, D Carlsmith, D Coupal, J W Cronin, W Keling, K Nishikawa, H Norton, B Winstein (✓ Spokesperson)
SACLAY – B Peyaud, R Turlay, A Zylberstejn

Accelerator FNAL *Detector* Spectrometer

Reactions

$K_L \rightarrow \pi^+ \pi^-$	30–200 GeV/c
$K_L \rightarrow \pi^0 \pi^0$	"
$K_L \rightarrow \gamma \gamma$	"
$K^*(892)^0 \rightarrow K^0 \gamma$	"

Particles studied K_L

Comments To reduce bias, measures for each mode ($\pi^+\pi^-$ and $\pi^0\pi^0$) the decay versus regeneration rates in a double-beam arrangement. Ran for 2300 hours.

Papers PRL 54 (1985) 1631, PRL 55 (1985) 566, and PRL 56 (1986) 18. No other papers expected.

FNAL-619 (May 1979) Approved Jul 1979; Completed Jun 1982.

MEASUREMENTS OF THE $\Sigma^0 \rightarrow \Lambda^0$ TRANSITION MAGNETIC MOMENT AND THE WEAK RADIATIVE DECAY $\Xi^0 \rightarrow \Lambda\gamma$

RUTGERS U – A Beretvas, T Devlin (✓ Spokesperson), K B Luk, P C Petersen, G B Thomson, R Whitman
WISCONSIN U – R Handler, B Lundberg, L Pondrom, M Sheaff, C Wilkinson
MICHIGAN U – P Border, J Dworkin, O E Overseth, R Rameika, G Valenti
MINNESOTA U – K Heller, C James

Accelerator FNAL *Detector* Spectrometer

Reactions

Λ nucleus $\rightarrow \Sigma^0$ nucleus	80–350 GeV/c

Particles studied Σ^0, Λ, Ξ^0

Comments Uses the Primakoff effect. Follows on work of FNAL-440, -495, and -620. Ran for 675 hours.

Papers PRL 57 (1986) 949.

FNAL-620 (May 1979) Approved Jul 1979; Completed Jan 1980.

MEASUREMENT OF THE MAGNETIC MOMENTS OF THE Σ^+, Ξ^-, Σ^-, AND Ω^- HYPERONS USING THE FERMILAB NEUTRAL HYPERON BEAM

WISCONSIN U – R Handler, R March, L Pondrom (✓ Spokesperson), M Sheaff
RUTGERS U – A Beretvas, T J Devlin, R Whitman
MICHIGAN U – O E Overseth
MINNESOTA U – K Heller

Accelerator FNAL *Detector* Spectrometer

Reactions Polarized beam

Σ^+	120–250 GeV/c
Ξ^-	"
Σ^-	"
Ω^-	"

Particles studied Σ^+, Ξ^-, Σ^-, Ω^-

Comments Ran for 900 hours.

Papers PRL 46 (1981) 803, PR D28 (1983) 1, PRL 52 (1984) 581, PR D33 (1986) 3172, and PRL (submitted).

FNAL-621 (May 1979) Approved Jul 1981; Completed Aug 1985.

A MEASUREMENT OF THE CP VIOLATION PARAMETER η_{+-0}

RUTGERS U – A Beretvas, A J Carracappa, T Devlin, U P Joshi, K Krueger, A Pal, P Petersen, S Teige, G Thompson (Spokesperson)
MICHIGAN U – P Border, M Longo, O E Overseth
MINNESOTA U – N Grossman, K Heller, C James, M Shupe, K Thorne

Accelerator FNAL-TEV *Detector* Spectrometer

Reactions

$K_L \rightarrow \pi^+ \pi^- \pi^0$	50–200 GeV/c
$K_S \rightarrow \pi^+ \pi^- \pi^0$	"
$K_L \rightarrow \pi^+ \pi^-$	"
$K_S \rightarrow \pi^+ \pi^-$	"

Particles studied K_L, K_S

Comments Uses the neutral hyperon spectrometer. Ran for 2470 hours.

FNAL-622 (May 1979) Approved Jul 1979; Completed Jun 1980.

A SEARCH FOR FRACTIONAL CHARGE PARTICLES FROM A MAGNETIZED BEAM DUMP

MICHIGAN U – H R Gustafson (Spokesperson)

Accelerator FNAL *Detector* Counter

Reactions

p nucleus $\rightarrow$ quark X	400–450 GeV/c

Particles studied quark

Comments Uses the beam dumps of FNAL-361 and -613.

FNAL-623 (May 1979) Approved Nov 1980; Completed Jun 1982.

HIGH-MASS STATES DECAYING INTO $\phi\pi$ AND $\phi\phi$ PRODUCED CENTRALLY IN 400 GeV/c pp INTERACTIONS

ARIZONA U – E Jenkins, K W Lai, A Pifer
FERMILAB – D Green (✓ Spokesperson)
FLORIDA STATE U – J Albright, H Fenker, H Goldman, S Hagopian, J Lannutti
NOTRE DAME U – T Davis, J Poirier
TUFTS U – A Napier, J Schneps
VANDERBILT U – C Roos, J Waters, M S Webster
VIRGINIA TECH – G Collins, J Ficenec, P Trower

Accelerator FNAL *Detector* FMPS

Reactions

$p\,p \rightarrow K^+ K^+ K^- K^-$ X	400 GeV/c
$p\,p \rightarrow K^+ K^-$ pions X	"

Particles studied ϕ, $\phi(1680)$, exotic-meson, $\eta_c(2980)$, glueball

Comments A study of inclusive ϕ and $(4K)^0$ production, a search for glueballs and the η_c in $(4K)^0$, $\phi(2K)^0$, and $\phi\phi$, and a search for exotics in ϕ+pions. For a description of the apparatus, see the LBL-91 supplement on detectors. Ran for 425 hours.

Papers PL 152B (1985) 428, PRL 56 (1986) 1639, PR D33 (1986) 2519, and PR D34 (1986) 707.

FNAL-629 (Feb 1980) Approved Jul 1980; Completed Mar 1981.

MEASUREMENT OF DIRECT PHOTON PRODUCTION IN HADRON-NUCLEUS COLLISIONS

FERMILAB – J Biel, T Droege, A Jonckheere, C A Nelson (✓ Spokesperson)
MINNESOTA U – K Heller, M Marshak, E Peterson, J Povlis, K Ruddick, M Shupe
ROCHESTER U – C Chandlee, S Cihangir, T Ferbel, J Huston, J LeBritton, F Lobkowicz, M McLaughlin, P Slattery
MICHIGAN STATE U – C Bromberg, S Cooper, R Lewis, G A Smith
NORTHEASTERN U – B Brown, D Garelick, G Glass, M Glaubman, S R Han, S Hossain, E Pothier

Accelerator FNAL *Detector* Calorimeter

Reactions

π^+ nucleus $\rightarrow \gamma$(s) hadrons	200 GeV/c
π^+ nucleus $\rightarrow \eta$(s) hadrons	"
π^+ nucleus $\rightarrow \pi^0$(s) hadrons	"

p nucleus → γ(s) hadrons "
p nucleus → η(s) hadrons "
p nucleus → π^0(s) hadrons "

Comments Uses a liquid-argon γ calorimeter. Measures the γ-to-π^0 ratio and π^0 and η production in nuclei for p_t up to 5 GeV/c. Ran for 600 hours.

Papers PRL 51 (1983) 967, PRL 51 (1983) 971, NIM 216 (1983) 381, and PR D33 (1986) 3199.

FNAL-630 (Jan 1980) Approved Mar 1980; Completed Mar 1982.

STUDY OF *B* PARTICLE AND CHARMED PARTICLE PRODUCTION AND DECAY USING A HIGH RESOLUTION STREAMER CHAMBER

YALE U – T Cardello, M Catalano, P Cooper, S Dhawan, Y Li, R Majka, P McBride, O Murphy, P Nemethy, J Sandweiss (√ Spokesperson), A J Slaughter, H Taft, L Teig, L Tzeng
FERMILAB – M Johnson
LBL – et al.

Accelerator FNAL *Detector* Streamer chamber

Reactions

n nucleus → muon(s) X 300 GeV/c

Particles studied bottom, charm

Comments An extension of FNAL-490. Ran for 1150 hours.

Papers PRL 55 (1985) 1172.

FNAL-631 (Feb 1980) Approved Dec 1980; Completed Jun 1981.

A MEASUREMENT OF NUCLEAR CALIBRATION CROSS SECTIONS FOR PROTONS BETWEEN 100 AND 1000 GeV

FERMILAB – S I Baker (√ Spokesperson), C R Kerns, S Pordes
BROOKHAVEN – J B Cumming, A Soukas
CERN – V Agoritsas, G R Stevenson

Accelerator FNAL *Detector* Counter

Reactions

p nucleus 400 GeV/c

Comments Took 41 exposures.

Papers NIM 222 (1984) 467. No other papers expected.

FNAL-632 (May 1980) Approved Jun 1982.

AN EXPOSURE OF THE 15-FOOT BUBBLE CHAMBER WITH A NEON-HYDROGEN MIXTURE TO A WIDEBAND NEUTRINO BEAM FROM THE TEVATRON

BIRMINGHAM U – G T Jones, R Jones, B Kennedy, S O'Neale
BRUSSELS U, IIHE – P Marage, J Moreels, J Sacton, P Vilain, E A de Wolf
CERN – C Brand, A M Cooper, H Drevermann, H Foeth, K K Geissler, G Harigel, H Klein, J Mittendorfer, D R O Morrison (Spokesperson), A Parker, P Schmid, H Wachsmuth
PANJAB U – J M Kohli, I S Mitra, J Singh, P M Sood
FERMILAB – W Smart, L Voyvodic
IMPERIAL COLL – K W J Barnham, J R Campbell, E Clayton, D Miller, M M Mobbayyen, P R Nailor
ILLINOIS TECH – J B Barclay, R A Burnstein, D Cullen, R G Dillenberg, J E Hanlon, D Karatas, C P Mailander, R Naon, H A Rubin
JAMMU U – G L Kaul, J Prakash, N K Rao
MUNICH, MAX PLANCK INST – M Aderholz, L L Deck, N Schmitz, W Wittek
OXFORD U – G Corrigan, J J Lloyd, G Myatt, D Radojicic
RUTGERS U – M S Kalelkar, R J Plano, P E Stamer
RUTHERFORD – B Franck, J Guy, G Kalmus, P Kasper, R L Sekulin, M Tyndal, W A Venus
SACLAY – J P Baton, C Coutures, M Faccini-Turluer, M Jabiol, M Neveu
STEVENS TECH – E B Brucker, E L Koller
TUFTS U – H Akbari, T Kafka, T Mann, R H Milburn, A Napier, J Schneps
UC, BERKELEY H H Bingham, P Dingus, J E Lys, G P Yost
HAWAII U – R J Cence, F A Harris, V Jain, M D Jones, M W Peters, V Z Peterson

Accelerator FNAL-TEV *Detector* HLBC-15FT

Reactions

ν_μ nucleus → μ^- X 10–400 GeV/c
$\overline{\nu}_\mu$ nucleus → μ^+ X "

Particles studied charm, bottom, top, τ

Comments The main aim is an exploratory search for new particles and effects in a new energy range. Also studies (1) production of like-sign dileptons, (2) production of charmed and heavier-quark particles and τ leptons, (3) quark and gluon fragmentation functions, the transverse momentum behavior of hadrons, and other aspects of the hadron system, and (4) the inelastic structure functions. Uses high-resolution optics and holography. In progress, with 154 KPIX taken as of September 85. Scheduled to resume March 87.

FNAL-635 (Apr 1980, Mar 1983) Approved Nov 1983:

SEARCH FOR AXION-LIKE OBJECTS

VIRGINIA TECH – C Church, L W Mo (√ Spokesperson), T Nunamaker
FERMILAB – J Kilmer, R Orr, T Toohig

Accelerator FNAL-TEV *Detector* Calorimeter

Reactions

$\nu_\mu\ e^- \rightarrow \nu_\mu\ e^-$ < 400 GeV/c
$\overline{\nu}_\mu\ e^- \rightarrow \overline{\nu}_\mu\ e^-$ "

Particles studied axion, nuino

Comments A beam-dump experiment to search for axion-like objects, particularly in the $\mu^+\mu^-$ decay mode. Also studies the elastic-scattering reactions listed. The detector is two calorimeters separated by about 50 feet. Unscheduled (November 86).

FNAL-636 (Apr 1980) Approved Nov 1980.

STUDY OF BEAM-DUMP PRODUCED NEUTRINOS

MIT – B Blatner, E S Hafen, P Haridas, J L Harton, R I Hulsizer, M Mars, S H Oh, I A Pless (Spokesperson), T B Stroughton, B F Wadsworth, R K Yamamoto
BROWN U – D Brick, H Rudnicka, A Shapiro, M Widgoff
FERMILAB – S R Childress, N M Gelfand, C T Murphy
BEIJING, IHEP – D Huang, Y Wu, S-W Xu
INDIANA U – E D Alyea
OAK RIDGE – H O Cohn
SETON HALL U – P E Stamer
TECHNION – S Dado, J Goldberg
TEL AVIV U – G Alexander, Y Gnat, R Heifetz, A Levy
TENNESSEE U – W M Bugg, G T Condo, T Handler, E L Hart
TOHOKU GAKUIN U – M Higuchi, M Sato
TOHOKU U – K Abe, K Hasegawa, Y Hayashino, T Kitagaki, T Nakajima, T Takayama, K Tamai, S Tanaka, A Yamaguchi, H Yuta

Accelerator FNAL-TEV *Detector* HLBC-36IN-HYB

Reactions

ν_τ nucleus → τ X 10–250 GeV/c
ν_e nucleus "
ν_μ nucleus "

Particles studied τ, ν_τ, charm

Comments The main goal is to establish the existence of the ν_τ. The detector is a new freon rapid-cycling bubble chamber with a holographic camera plus the Fermilab hybrid

spectrometer with a μ identifier. Size of run unspecified. Scheduled to run in 1987–88.

FNAL-646 (Apr 1980) Approved Jul 1981.

SEARCH FOR THE τ NEUTRINO AND STUDY OF PROMPT NEUTRINO PRODUCTION

UC, BERKELEY – H H Bingham, J E Lys, G Yost
COLUMBIA U – C Baltay, G Harigel, M Hibbs, J Okamitsu
FERMILAB – J Schmidt, W Smart, L Voyvodic
HAWAII U – R Cence, F Harris, V Jain, M Jones, M Peters (Spokesperson), V Peterson
RUTGERS U – P Jacques, M Kalelkar, R Plano, P E Stamer

Accelerator FNAL-TEV *Detector* HLBC-15FT

Reactions

ν_τ Ne $\rightarrow \tau^-$ X	10–200 GeV/c
$\bar{\nu}_\tau$ Ne $\rightarrow \tau^+$ X	"
ν_e Ne $\rightarrow e^-$ X	"
$\bar{\nu}_e$ Ne $\rightarrow e^+$ X	"
ν_μ Ne $\rightarrow \mu^-$ X	"
$\bar{\nu}_\mu$ Ne $\rightarrow \mu^+$ X	"
ν Ne $\rightarrow \nu$ X	"
$\nu_e e^- \rightarrow \nu_e e^-$	"
$\bar{\nu}_e e^- \rightarrow \bar{\nu}_e e^-$	"

Particles studied ν_τ, τ, hvy-lepton, charm, D_s^+, D_s^-

Comments A beam-dump experiment. Uses a holographic camera system with a resolution of about 100 microns. Unscheduled as of October 86.

FNAL-650 (Apr 1980) Approved Jul 1980; Completed Dec 1980.

SEARCH FOR CHARM PRODUCTION IN HADRON INTERACTIONS

PRINCETON U – V L Fitch, A Montag, S Sherman, R Webb (Spokesperson), M Witherell
SACLAY – B Devaux, J Teiger, R Turlay, A Zylberstejn
TURIN U – R Cester, D Maurizio, G Rinaudo
BROOKHAVEN – M May
TEXAS A AND M – et al.

Accelerator FNAL *Detector* Spectrometer

Reactions

π^- Be $\rightarrow D^*(2010)^+$ X	275 GeV/c
π^- Be $\rightarrow D^*(2010)^-$ X	"
π^- Be $\rightarrow J/\psi$ X	"

Particles studied D^0, $D^*(2010)^+$, $D^*(2010)^-$

Comments A continuation of FNAL-567. Ran for 550 hours.

FNAL-652 (May 1980) Approved Jul 1980.

NEUTRINO PHYSICS AT THE TEVATRON

CHICAGO U – F Merritt, M Oreglia, P Reutens, B A Schumm
COLUMBIA U – P Auchincloss, K T Bachmann, R H Bernstein, R Blair, C Foudas, W C Lefmann, S Mishra, E Oltman, F Sciulli (Spokesperson), M Shaevitz, W Smith
FERMILAB – F O Borcherding, D A Edwards, E Fisk, D Jovanovitch, Q A Kerns, M J Lam, W Marsh, K W Merritt, P Rapidis
ROCHESTER U – A Bodek, H S Budd, K Lang

Accelerator FNAL-TEV *Detector* LAB-E

Reactions

ν_μ nucleus $\rightarrow$ muon(s) X	20–600 GeV/c
$\bar{\nu}_\mu$ nucleus $\rightarrow$ muon(s) X	"

Comments A continuation of FNAL-616 to TeV energies. Extends the useful Q^2 range by a factor of two or three and allows much better tests of asymptotic QCD predictions. Also studies like-sign dimuons. For a description of the apparatus, see the LBL-91 supplement on detectors. Approved for 2×10^{18} protons. Scheduled to run in 1986 and 1987.

FNAL-653 (May 1980) Approved Jul 1981.

STUDY OF CHARM AND BEAUTY USING HADRONIC PRODUCTION IN A HYBRID EMULSION SPECTROMETER

AICHI U OF EDUCATION – N Ushida
UC, DAVIS – W Ko, R L Lander, A Moktarani, V Paolone, J T Volk, P M Yager
CARNEGIE MELLON U – R M Edelstein, R Fisher, R J Lipton, W R Nichols, D Potter, J S Russ
CHONNAM NATIONAL U – J-Y Kim, K H Oh
GIFU U – S Tasaka
GYEONGSANG NATIONAL U – I G Park, J S Song
JEONBUG NATIONAL U – P W Rho
KOBE U – G Fujioka, H Fukushima, T Hara, Y Homma, T Nakayama, Y Takahashi, Y Tsuzuki, C Yokoyama
KOREA U – K P Hong, J S Kang, C O Kim, S N Kim, K A Moon, K S Sim
NAGOYA U – S Aoki, K Chiba, H Fuchi, K Hoshino, M Miyanishi, M Nakamura, K Niu, K Niwa, M Ohashi, H Sasaki, O Yamakawa, Y Yanagisawa
OHIO STATE U – I Aubrecht, S Chittipeddi, J Dunlea, S F Krivatch, S Kuramata, B G Lundberg, G A Oleynik, N W Reay (Spokesperson), K Reibel, R A Sidwell, N R Stanton
OKAYAMA U – K Moriyama, H Shibata
OKLAHOMA U – G R Kalbfleisch, P L Skubic, J M Snow, J A White, S E Willis
OSAKA U – O Kusumoto, Y Noguchi, M Teranaka
OSAKA PREFECTURE U, SCI EDUC INST – H Okabe, J Yokota
SOOKMYONG WOMENS U – D Kim, J N Park
TOHO U – M Kazuno, H Shibuya
WON KWANG U – S Y Bahk

Accelerator FNAL-TEV *Detector* Emulsion, Spectrometer

Reactions

π^- nucleus $\rightarrow$	350 GeV/c

Particles studied charm, bottom

Comments For a description of the apparatus, see the LBL-91 supplement on detectors. In progress, with 1100 hours run as of September 85. Scheduled to resume Spring 1987.

FNAL-660 (Jun 1980) Approved Nov 1980; Completed Jun 1982.

A STUDY OF THE EFFECT OF BENT CRYSTALS ON CHANNELING NEAR THE CRITICAL RADIUS OF BENDING

FERMILAB – S Baker, R Carrigan, T Toohig
SUNY, ALBANY – W Gibson (✓ Spokesperson), I-J Kim, S Salman, C R Sun, K Wang, G O Williams, R Wong
DUBNA – Z Guzik, T S Nigmanov, E N Tsyganov, A S Vodopianov
CERN & CHALK RIVER, AECL & NEW MEXICO U & STRASBOURG – et al.

Accelerator FNAL *Detector* Wire chamber

Reactions

charged$^+$ crystal	12–180 GeV/c
charged$^-$ crystal	"

Comments Ran for 425 hours.

Papers NIM 194 (1982) 205, NIM 194 (1982) 239, PRL 48 (1982) 488, NP B203 (1982) 40, NIM B2 (1984) 9, NIM B2 (1984) 54, PL 137B (1984) 129, and NIM A234 (1985) 602.

FNAL-663 (Sep 1980) Approved Nov 1980; Completed Jun 1981.

COMPARISON OF POLARIZATIONS OF INCLUSIVELY PRODUCED Λ's AND $\bar{\Lambda}$'s BY PROTONS, ANTIPROTONS, KAONS, AND PIONS ON HYDROGEN

UC, DAVIS – S Gourlay, P M Yager

UC, SAN DIEGO – H Kobrak (Spokesperson), R E Pitt, R A Swanson
CARLETON U – K W Edwards
MICHIGAN STATE U – M A Abolins, H Melanson, D P Owen
FERMILAB – W R Francis

Accelerator FNAL *Detector* Spectrometer

Reactions

$p\ p \rightarrow \Lambda\ X$	175 GeV/c
$p\ p \rightarrow \bar{\Lambda}\ X$	"
$\bar{p}\ p \rightarrow \Lambda\ X$	"
$\bar{p}\ p \rightarrow \bar{\Lambda}\ X$	"
$K^-\ p \rightarrow \Lambda\ X$	"
$K^-\ p \rightarrow \bar{\Lambda}\ X$	"
$\pi^-\ p \rightarrow \Lambda\ X$	"
$\pi^-\ p \rightarrow \bar{\Lambda}\ X$	"

Comments Ran for 500 hours.

FNAL-665 (Oct 1980) Approved Jul 1981.

MUON SCATTERING WITH HADRON DETECTION AT THE TEVATRON

ARGONNE – D F Geesaman, M C Green, H Jackson, S Kaufman
UC, SAN DIEGO – W R Francis, R Kennedy, H G E Kobrak, A Salvarani, R A Swanson
CRACOW – A Eskreys, P Malecki, K Olkiewicz, B Pawlik
FERMILAB – F Bartlett, G Coutrakon, J Hanlon, T B W Kirk (✓ Spokesperson), H Melanson, H Montgomery, J Morfin, R Raja, L Sexton, S Wolbers
FREIBURG U – T Dreher, M Erdmann, A Haas, W Mohr, H E Stier
HARVARD U – J Conrad, D Michael, R Nickerson, F M Pipkin, M Schmitt, R Wilson
ILLINOIS U, CHICAGO – M Adams, C Halliwell, S Magill, D McLeod
MARYLAND U – S Aid, S Kunori, S O'Day, E J Ramberg, A Skuja, G Snow, P Steinberg, R Talaga
MIT – P Anthony, M Baker, W Busza, T Lyons, L Osborne, J J Ryan
MUNICH, MAX PLANCK INST – I Derado, V Eckardt, H J Gebauer, G Jancso, A Manz, N Schmitz, J Seyerlein, H J Trost, M Vidal, G Wolf
WASHINGTON U, SEATTLE – A Bhatti, T H Burnett, D Jansen, S Krzywdzinski, J Lord, H J Lubatti, J Wilkes, T Zhao
WUPPERTAL U – H Braun, U Ecker, A Roeser
YALE U – S Dhawan, V Hughes, P Schuler, H Venkataramania

Accelerator FNAL-TEV *Detector* CCM

Reactions

muon $p \rightarrow$ muon hadrons	< 750 GeV/c
muon nucleus $\rightarrow$ muon hadrons nucleus	"

Comments Studies (1) the properties of hadron systems recoiling from deep inelastic muon collisions, and (2) the nucleon structure functions. Also uses the superconducting vertex magnet from CERN. For a description of the apparatus, see the LBL-91 supplement on detectors. Approved for 1000 hours. Scheduled to run Spring 87.

FNAL-666 (Dec 1980) Approved Dec 1980; Completed Mar 1981.

EMULSION EXPOSURE TO Σ^- BEAM AT FERMILAB

WASHINGTON U, SEATTLE – R J Wilkes (✓ Spokesperson)
WASHINGTON U, SEATTLE & CRACOW – et al.

Accelerator FNAL *Detector* Emulsion

Reactions

Σ^- nucleus	20–350 GeV/c

Comments Exposed 6 stacks. Rerun as FNAL-730 due to poor emulsion quality.

FNAL-672 (Jan 1981) Approved Jul 1981.

A STUDY OF HADRONIC FINAL STATES PRODUCED IN ASSOCIATION WITH HIGH-MASS DIMUONS

CAL TECH – R Gomez
FERMILAB – J Krider
ILLINOIS U, CHICAGO – H Goldberg, S Margulies, J Solomon
INDIANA U – R Crittenden, A Dzierba, S Kartik, T Marshall, J Martin, P Smith, T Sulanke, A Zieminski (✓ Spokesperson)
LOUISVILLE U – C Davis
MICHIGAN U, FLINT – L Dauwe
SERPUKHOV – A Abramov, Yu Antipov, B Baldin, S Denisov, V Glebov, Y Gorin, V Koreshev, V Kryshkin, A Petrukhin, S Polovnikov, V Sirotenko, R Sulyaev

Accelerator FNAL-TEV *Detector* FMPS

Reactions

p nucleus $\rightarrow \mu^+\ \mu^-\ X$	500, 1000 GeV/c
π^+ nucleus $\rightarrow \mu^+\ \mu^-\ X$	500 GeV/c
π^- nucleus $\rightarrow \mu^+\ \mu^-\ X$	"

Particles studied J/ψ, χ(unspec)

Comments Runs with thin-foil targets. For a description of the apparatus, see the LBL-91 supplement on detectors. Ran parasitically with FNAL-557 in 1983. To run simultaneously with FNAL-706 beginning March 1987.

FNAL-673 (Jan 1981) Approved Jul 1981; Completed Apr 1982.

χ MESON PRODUCTION BY HADRONS

FERMILAB – J Cooper (✓ Spokesperson), T Kirk, S Pordes, A Wehmann
ILLINOIS U, URBANA – G Alverson, G Ascoli, J Bellinger, S Cihangir, T Graff, L Holloway, I Karliner, L Koester, U Kruse, W-G Li, P Lukens, R Sard
PURDUE U – V Barnes, C Davis, A Garfinkel, A Laasanen, J Simmons, J Wilson
TUFTS U – W Oliver, R Thornton
PENN U – D Bauer

Accelerator FNAL *Detector* CCM

Reactions

p Be $\rightarrow \mu^+\ \mu^-\ X$	200, 250 GeV/c
p Be $\rightarrow J/\psi\ \gamma\ X$	"
p Be $\rightarrow \chi$(unspec) X	"
π^- Be $\rightarrow \mu^+\ \mu^-\ X$	185 GeV/c
π^- Be $\rightarrow J/\psi\ \gamma\ X$	"
π^- Be $\rightarrow \chi$(unspec) X	"

Particles studied J/ψ, χ(unspec)

Comments An extension of FNAL-610. Ran for 1100 hours.

Papers PRL 54 (1985) 753, and NIM A236 (1985) 307.

FNAL-683 (Feb 1981) Approved Dec 1983.

PHOTOPRODUCTION OF HIGH p_t JETS

LEHIGH U – N Akcurin, A Kanofsky
RICE U – B Bonner, J Buchanan, J Clement, M Corcoran (✓ Spokesperson), J Kruk, H Miettenen, G Mutchler, F Nessi, M Nessi, G C Phillips, J Roberts
VANDERBILT U – J Marraffino, C Roos, J Waters, M S Webster
WISCONSIN U – A R Erwin, C Findeisen, B Fletcher, K Nelson
TEXAS U – H McNaughten, B O'Neal, Y Onel, P Riley, S Sen
MARYLAND U – H Breuer, C C Chang, H D Holmgren, D Zhang
MICHIGAN U – M Longo
HOUSTON U – B Mays
BALL STATE U – B Ober, G Thomas

Accelerator FNAL-TEV *Detector* Spectrometer, Calorimeter

Reactions

$\gamma\ p \rightarrow$ jets X	200–600 GeV/c

Comments Studies in particular 3- and 4-jet events and the A dependence of jet production. Scheduled to run in 1988.

FNAL-687 (Jan 1981) Approved Jul 1981, Dec 1983.

HIGH ENERGY PHOTOPRODUCTION OF STATES CONTAINING HEAVY QUARKS AND OTHER RARE PHENOMENA

FERMILAB – M Binkley, J Butler (Spokesperson), I Gaines (Spokesperson), P H Garbincius, M Gormley, D Harding, A E Kreymer, P L G Lebrun, J Peoples
COLORADO U – P Coteus, S W Culy, J Cumalat (Spokesperson)
INFN, MILAN – D Pedrini
MILAN U – G Bellini, M Dicorato, P Frabetti, P F Manfredi, D Menasce, L Moroni, F Palombo, L Perasso, S Sala, M Szaswlowski
NORTHWESTERN U – L Buchholz, B Gobbi, R Yoshida
NOTRE DAME U – J Bishop, N Biswas, N Cason, S Grenquist, V Kenney, E J Mannel, R Ruchti, W D Shephard, P Wilkins
FRASCATI – M Dario, M Enorini, F L Fabbri, A Maccari, G Rivellini, A Zallo
ILLINOIS U, URBANA – M Diesburg, L Koester, J Wiss

Accelerator FNAL-TEV *Detector* Spectrometer

Reactions

γ nucleus $\rightarrow \mu^+ \mu^-$ X	200–500 GeV/c
γ nucleus $\rightarrow$ muon X	"
γ nucleus $\rightarrow e^+ e^-$ X	"
γ nucleus $\rightarrow e^{\pm}$ X	"

Particles studied ψ(unspec), charm, Υ(unspec), bottom

Comments Continues studies of FNAL-087 and -401. Uses γ's from a new wideband electron beam, a new large-aperture multiparticle spectrometer, an active silicon target, and a silicon microstrip decay-vertex detector. Scheduled to run Spring 1987.

FNAL-690 (Jan 1981) Approved Jul 1981, Nov 1983.

STUDY OF CHARM AND BOTTOM PRODUCTION

NEVIS LABS, COLUMBIA U – M Church, E Gottschalk, R Hylton, B Knapp (✓ Spokesperson), B Stern, L Wiencke
MASSACHUSETTS U, AMHERST – E Hartouni, D Jensen, M Kreisler, M Rabin
MEXICO U – C Avilez
FERMILAB – D Christian, G Gutierrez, S Holmes, A Wehmann
TEXAS ACCELERATOR CENTER – R Huson, J White

Accelerator FNAL-TEV *Detector* Spectrometer

Reactions

hadron p	200–2000 GeV/c

Particles studied charm, bottom

Comments Initial goals include (1) a systematic study of exclusive reactions, particularly diffraction dissociation, (2) cataloguing 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. Scheduled to run in 1987 and 1988.

FNAL-691 (Feb 1981) Approved Nov 1983; Completed Aug 1985.

CHARM PRODUCTION WITH THE TAGGED PHOTON SPECTROMETER

FERMILAB – J A Appel, V K Bharadwaj, P M Mantsch, T Nash, M V Purohit, K Sliwa, M D Sokoloff, W J Spalding
UC, SANTA BARBARA – T Browder, S F McHugh, R J Morrison, M S Witherell (✓ Spokesperson)
CARLETON U – P Estabrooks, J Pinfold
RIO DE JANEIRO, CBPF – J Anjos, A Santoro, M Souza
COLORADO U – L M Cremaldi, J R Elliott, M Gibney, U Nauenberg
NATIONAL RESEARCH COUNCIL, OTTAWA – M J Losty
TORONTO U – S B Bracker, G F Hartner, B R Kumar, G J Luste, J F Martin, S Menary, A Stundzia
SAO PAULO U – C Escobar
YALE U – P Karchin

Accelerator FNAL-TEV *Detector* TPS

Reactions

$\gamma p \rightarrow$ charm X	100–260 GeV/c

Particles studied D^0, D^+, $D^*(2010)$, D_s^+, J/ψ, Λ_c^+

Comments Ran for 1400 hours and collected 100 million events with a silicon microstrip detector. See also FNAL-516. For a description of the apparatus, see the LBL-91 supplement on detectors.

Papers PRL 57 (1986) 3003, and PRL 58 (1987) 311.

FNAL-701 (Mar 1981) Approved Jul 1981; Completed Jun 1982.

A SEARCH FOR NEUTRINO OSCILLATIONS WITH $(\Delta m)^2 > 10$ eV^2

COLUMBIA U – P Auchincloss, B Blair, C Haber, F Sciulli, M Shaevitz (✓ Spokesperson), W Smith, R Zhu
CHICAGO U – F Merritt, M Oreglia, P Reutens
FERMILAB – R Coleman, E Fisk, B Jin, D Levinthal, W Marsh, P Rapidis, D Yovanovitch
ROCHESTER U – A Bodek, F Borcherding, N Giokaris, K Lang, I Stockdale

Accelerator FNAL *Detector* LAB-E

Reactions

ν_μ Fe $\rightarrow \mu^-$ X	30–230 GeV/c
$\overline{\nu}_\mu$ Fe $\rightarrow \mu^+$ X	"

Particles studied ν_μ, $\overline{\nu}_\mu$

Comments Measures the change in ν flux with distance by detecting the numbers of charged current events in two detectors at different distances. Ran for 2250 hours.

Papers PRL 52 (1984) 1384, and ZPHY C27 (1985) 53.

FNAL-705 (Sep 1981) Approved Dec 1981.

A STUDY OF CHARMONIUM AND DIRECT PHOTON PRODUCTION BY 300 GeV/c $\overline{p}$, p, π^+, AND π^- BEAMS

FERMILAB – B Cox (✓ Spokesperson), S Delchamps, C M Jenkins, P Mazur, C T Murphy, R Rakeika, C J Serritella, R Smith, F Turkot, W Yang
ATHENS U, NUCL PHYS LAB – E Anassontzis, P Ioannou, S Katsanevas, P Kostarakis, C Kourkoumelis, A Manousakis-Kaftsikakis, P Premantiatis, L Resvanis, M Vassiliou, G Voulgaris
MCGILL U – S Conetti, M Haire, J Kuziminski, A Marchionni, M Rosati, D Ryan, D Stairs, L Turnbull, G Zioukas
SHANDONG U – M He, C-H Shen, C-H Wang, N Zhang, X Zhang
NORTHWESTERN U – J Rosen, L Spiegel, S Tzamarias
ARIZONA U – M Arenton, T Y Chen, K Lai, N Yao
DUKE U – L Fortney, S Oh, Q Shen, R Tesarek, T Turkington
FLORIDA A AND M UNIV – K Guffey, D J Judd, W P Tucker, D E Wagoner

Accelerator FNAL-TEV *Detector* Spectrometer

Reactions

p deut $\rightarrow \mu^+ \mu^-$ X	300, 750 GeV/c
p deut $\rightarrow \gamma$(s) X	"
p deut $\rightarrow J/\psi\ \gamma$ X	"
p deut $\rightarrow \chi$(unspec) X	"
$\overline{p}$ deut $\rightarrow \mu^+ \mu^-$ X	"
$\overline{p}$ deut $\rightarrow \gamma$(s) X	"
$\overline{p}$ deut $\rightarrow J/\psi\ \gamma$ X	"
$\overline{p}$ deut $\rightarrow \chi$(unspec) X	"

π^+ deut → $\mu^+ \mu^-$ X	"
π^+ deut → γ(s) X	"
π^+ deut → $J/\psi\ \gamma$ X	"
π^+ deut → χ(unspec) X	"
π^- deut → $\mu^- \mu^-$ X	"
π^- deut → γ(s) X	"
π^- deut → $J/\psi\ \gamma$ X	"
π^- deut → χ(unspec) X	"

Particles studied J/ψ, χ(unspec), charm, bottom

Comments Uses the FNAL-537 spectrometer, a large-aperature general-purpose detector. Approved for 1500 hours. In progress, with 1500 hours run as of September 85. Scheduled to resume Spring 1987.

Papers NIM 219 (1984) 487, NIM 219 (1984) 491, NIM A236 (1985) 42, NIM A238 (1985) 315, and NIM A238 (1985) 321.

FNAL-706 (Oct 1981) Approved Dec 1981, Oct 1983.

A COMPREHENSIVE STUDY OF DIRECT PHOTON PRODUCTION IN HADRON INDUCED COLLISIONS

DELHI U – T Chand, B M Rajaram, R K Shivpuri
FERMILAB – M Afdal, W Baker, D Berg, D Carey, T Droege, H Johnstad, C Johnstone, C A Nelson, Jr
MICHIGAN STATE U – C Bromberg, D Brown, J Huston, R Miller
MINNESOTA U – R Benson, P Lukens, K Ruddick
NORTHEASTERN U – G Alverson, W Faissler, D Garelick, G Glass, M Glaubman, I Kourbanis, C Lirakis, E Pothier, A Sinanidis, G H Wu, T Yasuda, C Yosef
PENN STATE U – S Easo, K Hartman, B Oh, T Thwaites, W Toothaker, J Whitmore
PITTSBURGH U – E Engels, Jr , P Koehler, S Manni, P F Shepard, J A Thompson, R Tosh
RAJASTHAN U – K B Bhalla, V Kumar, S Lokanathan
ROCHESTER U – G Ballocchi, W Desoi, G Fanourakis, T Ferbel, G Ginther, P Gutierrez, A Lanaro, F Lobkowicz, J Mansour, G Pedeville, E Prebys, R Roser, D Skow, P Slattery (√ Spokesperson), M Zielinski

Accelerator FNAL-TEV *Detector* Spectrometer

Reactions

p nucleus → γ(s) X	400, 800 GeV/c
π^+ nucleus → γ(s) X	530 GeV/c
π^- nucleus → γ(s) X	"

Comments Studies the gluon structure functions of hadrons and investigates gluon fragmentation by analyzing the production of direct γ's and their accompanying hadrons in collisions of pions, kaons, and protons with a variety of nuclear targets. Approved for 1000 hours. Scheduled to run March 87.

Papers NIM A235 (1985) 332, APP B17 (1985) 435, and NIM A253 (1987) 523.

FNAL-710 (Feb 1982) Approved Jun 1982.

MEASUREMENTS OF ELASTIC SCATTERING AND TOTAL CROSS SECTIONS AT THE FERMILAB $\bar{p}p$ COLLIDER

BOLOGNA U – G Giacomelli, F Rimondi, S Zucchelli
CORNELL U – R Desalvo, J Orear (Spokesperson)
FERMILAB – W F Baker, D P Eartly, A J Lennox, S M Pruss, R Rubinstein (Spokesperson)
NORTHWESTERN U – N Amos, M M Block
MARYLAND U – R Ellsworth, J Goodman, G Yodh

Accelerator FNAL-COLLIDER *Detector* Counter, Wire chamber

Reactions

$\bar{p}\ p$ → X	300–2000 GeV (E_{cm})
$\bar{p}\ p$ → $\bar{p}\ p$	"

Comments The range is $0 < -t < 1$ GeV^2. Being installed (July 86).

FNAL-711 (Aug 1982) Approved Jul 1983.

A STUDY OF THE ANGULAR AND ENERGY DEPENDENCE OF CONSTITUENT SCATTERING THROUGH MEASUREMENTS OF THE REACTION pN → HADRON HADRON X

FERMILAB – M B Crisler, S H Pordes, H B White
MICHIGAN U – M A Cummings, H R Gustafson
UC, DAVIS – J T Volk
FLORIDA STATE U – C Georgiopoulos, J H Goldman, S L Hagopian, V Hagopian, D M Kaplan, D A Levinthal (Spokesperson), F V Lopez, K R Turner, C J Young

Accelerator FNAL-TEV *Detector* Spectrometer, Calorimeter

Reactions

p Be → hadron hadron X	900 GeV/c

Comments Studies the energy, angular, and flavor dependence of the quark-quark scattering cross section. In progress, with 400 hours run as of September 85. Scheduled to resume Spring 1987.

FNAL-713 (Jan 1982) Approved Jun 1982.

A SEARCH FOR HIGHLY IONIZING PARTICLES FOR THE D0 AREA AT FERMILAB

UC, BERKELEY & UC, BERKELEY, SPACE SCI DEPT – K Kinoshita, P B Price (√ Spokesperson)

Accelerator FNAL-TEV *Detector* Plastic

Reactions

$\bar{p}\ p$ → monopole X	300–2000 GeV (E_{cm})

Particles studied monopole

Comments Uses Lexan and CR-39 plastic detectors outside and phosphate glass detectors inside the vacuum pipe. Detects any highly ionizing exotic particles, not just monopoles. Setting up in 1986.

FNAL-715 (Feb 1982) Approved Jun 1982; Completed Feb 1984.

PRECISION MEASUREMENT OF THE DECAY Σ^- → $ne^-\nu$

ELMHURST COLL – E Swallow
FERMILAB – J P Berge, A Brenner, P Grafstrom, E Jastrzembski, J Lach, J Marriner, R Raja
LENINGRAD, INP – A Denisov, V Grachev, A Kulikov, V Schegelsky, D Seliverstov, N Smirnov, N Terentiev, I Tkach, A Vorobyov
YALE U – P S Cooper (√ Spokesperson), P Razis, L J Teig
IOWA STATE U – E W Anderson
IOWA U – E McCliment, C Newsom
CHICAGO U – S Y Hsueh, D Mueller, J Tang, R Winston, G Zapalac

Accelerator FNAL *Detector* Combination

Reactions Polarized beam

$\Sigma^- \rightarrow n\ e^-\ \nu_e$	250 GeV/c

Particles studied Σ^-

Comments Uses the apparatus of FNAL-497 augmented by a neutron detector and a double level of electron identification. Expects 100,000 polarized Σ^- beta decays. Ran for 820 hours.

Papers PRL 54 (1985) 2399, and PRL 57 (1986) 1526.

FNAL-720 (Jan 1982) Approved Mar 1982, Jun 1982; Completed Aug 1982.

A SEARCH FOR +1/3 e STABLE PARTICLES USING CRYOGENIC SOURCES

ARGONNE – D Frekers, W Henning, W Kutschera, M Paul, J P Schiffer (√ Spokesperson), K W Shepard
FERMILAB – C D Curtis, C W Schmidt

Accelerator FNAL *Detector* ?

Particles studied quark(1/3), quark(2/3)
Papers PR D29 (1984) 791. No other papers expected.

FNAL-721 (Jun 1982) Approved Mar 1984.

CP VIOLATION

FERMILAB – B Cox, G G Hale, C M Jenkins, D Judd, P Mazur, C T Murphy, R Rakeika, C J Serritella, R Smith, F Turkot, D Wagoner, W Yang
ATHENS U, NUCL PHYS LAB – E Anassontzis, P Ioannou, S Katsanevas, P Kostarakis, C Kourkoumelis, A Manousakis-Kaftsikakis, A Markou, P Premantiatis, L Resvanis, S Tzamarias, G Voulgaris
MCGILL U – S Conetti, M Haire, A Marchionni, D Ryan, D Stairs, L Turnbull, G Zioukas
SHANDONG U – M He, C-H Shen, Q Shen, C-H Wang, N Zhang, X Zhang
NORTHWESTERN U – D Buchholtz, C Guss, H Hensley, D H Miller, J Rosen (Spokesperson), L Spiegel
ARIZONA U – M Arenton, V Bentley, J Byrd, L Cormell, E J Gallas, K Lai
DUKE U – L Fortney, S Oh, T Turkington

Accelerator FNAL *Detector* Spectrometer

Reactions

$K_L \rightarrow \pi^+ \pi^-$	5–10 GeV/c

Particles studied K_L

Comments Studies CP violation in the decay of K_L produced by $\bar{p}$'s to see if there is any difference in the decay amplitude from that when the K_L is produced by p's. In test stage (July 86).

FNAL-723 (Oct 1982) Approved Mar 1984; Completed Aug 1985.

TEST OF A GRAVITATIONAL DETECTOR AT THE FERMILAB COLLIDER

ROCHESTER U – A C Melissinos (Spokesperson), P Reiner, J Rogers, J Semertzidis, W Wuensch
FERMILAB – W B Fowler, M Kuchnir

Accelerator FNAL-COLLIDER *Detector* Other

Comments Test running completed. The eventual goal is to measure the near-zone gravitational interaction between a bunch of particles stored in the accelerator and a stationary detector. The immediate goal is to detect a signal, due to the passage of the beam, that is not of electromagnetic origin.

Papers NC 62B (1981) 190, PL 104A (1984) 341, and PL 176B (1986) 233.

FNAL-729 (Nov 1982) Approved Dec 1983; Completed Apr 1985.

CHARM AND MULTIPARTICLE PRODUCTION IN 1 TeV PROTON-EMULSION COLLISIONS

TATA INST – T Aziz, S N Ganguli, A Gurtu (✓ Spokesperson), P K Malhotra

Accelerator FNAL-TEV *Detector* Emulsion

Reactions

p nucleus → charm X	1000 GeV/c

Particles studied charm

Comments Exposed 2 emulsion stacks. The emulsion was defective, and it is hoped that another exposure will be possible in 1987.

FNAL-730 (Dec 1982) Approved Feb 1984; Completed Feb 1984.

EMULSION EXPOSURE TO 250 GeV Σ^-

CRACOW – S Krzywdzinski, H Wilczynski, W Wolter
WASHINGTON U, SEATTLE – J J Lord, R J Wilkes (✓ Spokesperson)

Accelerator FNAL *Detector* Emulsion

Reactions

Σ^- nucleus	250 GeV/c

Comments Ran for 4 hours. Analysis is in progress.

FNAL-731 (Feb 1983) Approved Jul 1983.

A PRECISION MEASUREMENT OF THE CP VIOLATION PARAMETER ϵ'/ϵ IN THE K^0 SYSTEM

CHICAGO U – L Gibbons, K Nishikawa, V Papadimitriou, R Patterson, Y Wah, B Winstein (✓ Spokesperson), R Winston, M Woods, H Yamamoto
ELMHURST COLL – E C Swallow
FERMILAB – G Bock, R Coleman, B Hsuing, K Stanfield, R Stefanski, T Yamanaka
SACLAY – J C Brisson, P Debu, R Doudin, P Jarry, B Peyaud, R Turlay, B Vallage
PRINCETON U – G Gollin, G Grazer, M Karlson, J Okamitsu

Accelerator FNAL-TEV *Detector* Spectrometer

Reactions

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

Particles studied K_L

Comments A 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. Has test run 1400 hours. Final run to begin April 87.

FNAL-733 (Feb 1983, Sep 1983) Approved Nov 1983.

STUDY OF HIGH ENERGY ν INTERACTIONS WITH THE TEVATRON WIDE BAND TRIPLET BEAM

FERMILAB – L Stutte
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, R W Hatcher, D Owen, G J Perkins, M Tartaglia, H Weerts
FLORIDA STATE U – J K Walker

Accelerator FNAL-TEV *Detector* Calorimeter

Reactions

ν_μ nucleus	0–500 GeV/c
$\bar{\nu}_\mu$ nucleus	"

Comments The detector is the Lab-C 200-ton flash-chamber proportional-tube calorimeter. In addition to standard topics such as scaling, studies same-sign dimuon production, weak neutral currents, inverse μ decay, and coherent ν scattering. For a description of the apparatus, see the LBL-91 supplement on detectors. In progress, with 1900 hours run as of September 85. Scheduled to resume Spring 1987.

FNAL-735 (Apr 1983, Sep 1983) Approved Dec 1983.

SEARCH FOR A DECONFINED QUARK-GLUON PHASE OF STRONGLY INTERACTING MATTER IN $\bar{p}p$ INTERACTIONS AT E_{cm} NEAR 2 TeV

DUKE U – L R Fortney, A T Goshaw, S Oh, W J Robertson, W D Walker
FERMILAB – C Hojvat, P W Lucas, F Turkot
PURDUE U – R J De Bonte, A Bujak, D D Carmony, J E Finn, L J Gutay (Spokesperson), A S Hirsch, N Morgan, N T Porile, F A Rickey, R P Scharenberg, B C Stringfellow
WISCONSIN U – A Erwin, A Hasan, K Nelson, M Thompson
IOWA STATE U – E W Anderson
LIVERMORE – M Duong-Van
NOTRE DAME U – J M Bishop, N N Biswas, N Cason, P Kenney, J Piekarz

Accelerator FNAL-COLLIDER *Detector* Spectrometer

Reactions

$\bar{p}\ p$	2000 GeV (E_{cm})

Comments Measures the transverse momentum distributions up to p_t =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. Being installed (July 86).

FNAL-740 (Sep 1983) Approved Feb 1984.

A STUDY OF $\bar{p}p$ COLLISION USING A LARGE DETECTOR AT D0

BROOKHAVEN – S Aronson, B Gibbard, H Gordon, W Guryn, S Kahn, S Prototopescu, P Yamin
BROWN U – D Cutts, J Hoftun, R Lanou, R Partridge, D Pilipovic, R Zeller
RIO DE JANEIRO, CBPF – J Anjos, A Santoro, M Souza
COLUMBIA U – P Franzini, P M Tuts, S Youssef
FERMILAB – A Bross, C Brown, W Cooper, B Cox, G Dugan, D Eartly, H Fenker, D Finley, H E Fisk, D Green, H Haggerty, S Hansen, A Ito, M Johnson, A Jonckheere, H Jostlein, P Koehler, E Malamud, P Martin, P Mazur, J McCarthy, T Oshima, R Raja, R Smith, R Yamada
FLORIDA STATE U – H Goldman, S Hagopian, V Hagopian, D Kaplan, S Linn, H Wahl
FLORIDA U – R Belusivic, S Majewski, J Walker, A White, A Wolmelsey
INDIANA U – R Crittendon, A Dzierba, T Marshall, J Martin, D Zieminska, A Zieminski
LBL – A Clark, O Dahl, W Hofmann, L Kerth, C Klopfenstein, S Loken, R Madaras, P Oddone, A Spadafora, M L Stevenson, M Strovink, T Trippe, W Wenzel
MARYLAND U – S Kunori, P Rapp
MICHIGAN STATE U – M Abolins, R Brock, D Edmunds, J Linnemann, D Owen, B Pi, B Pope, S Stampke, M Tartaglia, H Weerts
NEW YORK U – J Christenson, P Nemethy, D Nesic, J Sculli
NORTHWESTERN U – D Buchholz, D Claes, B Gobbi, S Park
PENN U – R Van Berg, E Gardella, W Kononenko, R Ruland, W Selove, G Theodosiou
ROCHESTER U – G Blazey, P Draper, G Fanourakis, T Ferbel, F Lobkowicz, P Slattery
SACLAY – Y Ducros, R Feinstein, J R Hubbard, P Mangeot, B Mansoulie, J Tieger, A Zylberstejn
SUNY, STONY BROOK – S Ahn, E Barasch, T Behnke, R Engelmann, G Finocchiaro, M L Good, P Grannis (√ Spokesperson), D Hedin, J Lee-Franzini, M Marx, R McCarthy, K Ng, K Nishikawa, M Rijssenbeek, R D Schamberger, F Stocker
YALE U – N Hadley, M Zeller

Accelerator FNAL-COLLIDER *Detector* D0

Reactions

$\bar{p}\,p$	2000 GeV (E_{cm})

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

Comments Under construction. For a description of the apparatus, see the LBL-91 supplement on detectors.

Papers NIM 216 (1983) 45, NIM A244 (1986) 356, and NIM A248 (1986) 379.

FNAL-741 (Aug 1981) Approved Apr 1982.

THE COLLIDER DETECTOR AT FERMILAB

ARGONNE – D Ayres, R Diebold, E May, B Musgrave, L Nodulman, J Sauer, R Wagner, A B Wicklund
CHICAGO U – H Frisch, C Grosso-Pilcher, M Shochet
FERMILAB – M Atac, F Bedeschi, A Brenner, T Collins, T Droege, J Elias, J Freeman, I Gaines, J Grimson, D Gross, D Hanssen, H Jensen, R Kadel, H Kautzky, R Kephart, M Ono, R Thatcher, D Theriot, A Tollestrup (Spokesperson), R Yamada, J Yoh
FRASCATI – S Bertolucci, M Cordelli, P Giromini, P Sermoneta
HARVARD U – G Brandenburg, R Schwitters (Spokesperson)
ILLINOIS U, URBANA – G Ascoli, B Eisenstein, L Holloway, U Kruse
KEK – S Inaba, M Mishina, K Ogawa, F Takasaki, Y Watase
LBL – W Carithers, W Chinowsky, K Shinsky
PISA U – G Bellettini, R Bertani, L Bosisio, C Bradaschia, R DelFabbro, E Focardi, M A Giorgi, A Menzione, L Ristori, A Scribano, G Tonelli
PURDUE U – V Barnes, R S Christian, C Davis, A F Garfinkel, A Laasanen
TEXAS A AND M – P McIntyre, T Meyer, R Webb
TSUKUBA U – Y Asano, S Kim, K Kondo, S Miyashita, H Miyata, S Mori, I Nakano, Y Takaiwa, K Takikawa, Y Yasu
WISCONSIN U – D Cline, R Loveless, R Morse, L Pondrom, D Reeder, J Rhoades, M Sheaff

Accelerator FNAL-COLLIDER *Detector* CDF

Reactions

$\bar{p}\,p$	500–2000 GeV (E_{cm})

Particles studied W^+, W^-, Z^0, higgs, top

Comments Being installed (October 86). For a description of the apparatus, see the LBL-91 supplement on detectors.

Papers NIM 204 (1983) 351, NIM 204 (1983) 361, NIM 205 (1983) 113, NIM 216 (1983) 127, NIM 219 (1984) 472, JP 45 (1984) 333, and NIM A238 (1985) 18.

FNAL-743 (Sep 1983) Approved Dec 1983; Completed Aug 1985.

CHARM PRODUCTION IN pp COLLISIONS WITH LEBC-FMPS AT 1 TeV

AACHEN, TECH HOCHSCH, III PHYS INST – V Commichau, A Roth, W Struczinski
BRUSSELS U, IIHE – J Lemonne, B Vonck, J Wickens
CERN – J J Hernandez, J Hrubec, M Iori, H Leutz, A Poppleton, S Reucroft (√ Spokesperson), M C Touboul
DUKE U – A Goshaw, W Robertson, W Walker, C F Wild
FERMILAB – R Dixon, H C Fenker, J M Marriffino, M Nikolic, L Voyvodic
KANSAS U – R Ammar, S Ball, R Davis, J Gress, N Kwak, X Liu
MICHIGAN U – R C Ball, C T Coffin, T O Dersham, L W Jones, I D Leedom, B P Roe, M F Weber
MICHIGAN STATE U – C Bromberg, R Miller, A Nguyen
MONS U – J-F Baland, V P Henri, P Legros, P Pilette
NOTRE DAME U – R Brun, G E Canough, N Giokaris, S Mikocki, J Poirier
VANDERBILT U – C Roos, M F Senko, J Waters, M Webster
TATA INST – T Aziz, S Banerjee, S N Ganguli, A Gurtu, P K Malhotra, R Raghavan, A Subramanian
BERLIN, DAW – U Gensch, D Knauss, G E Mendez, T Naumann, H Nowak
INNSBRUCK U & VIENNA, OAW – P Girtler, D Kuhn, G Neuhofer, K Rasner

Accelerator FNAL-TEV *Detector* HBC-LEBC-HYB, FMPS

Reactions

$p\,p \rightarrow$ charm X	800 GeV/c

Particles studied D^0, D^+, D_s^+, Λ_c^+

Comments Uses LEBC from CERN-NA-027 (a similar experiment at 400 GeV) as the vertex detector. The main aim is to measure precisely the charm total cross section at 39-GeV c.m. energy to compare with a similar measurement at 27 GeV. Took 1256 KPIX.

Papers PL 178B (1986) 124, and PL 183B (1987) 110.

FNAL-744 (Sep 1983) Approved Nov 1983; Completed Aug 1985.

HIGH STATISTICS STUDIES OF CHARGED CURRENT INTERACTIONS USING THE TEVATRON QUAD TRIPLET BEAM

CHICAGO U – F Merritt (Spokesperson), M Oreglia, P Reutens, B Schumm
COLUMBIA U – P Auchincloss, K Bachman, R Berstein, R Blair, C Foudas, W C Lefmann, S Mishra, E Oltman, F Sciulli (Spokesperson), M Shaevitz, W Smith

FERMILAB – F O Borcherding, D A Edwards, H E Fisk, D Jovanovic, Q A Kerns, M Lamm, W Marsh, W Merritt, P Rapidis
ROCHESTER U – A Bodek, H Budd, K Lang

Accelerator FNAL-TEV *Detector* LAB-E

Reactions

ν_μ nucleus → muon(s) X	< 400 GeV/c
$\bar{\nu}_\mu$ nucleus → muon(s) X	"

Comments Studies opposite-sign dimuon events, same-sign dimuon events, and structure functions. Continues work of FNAL-616 and -701. Ran for 1900 hours.

FNAL-745 (Sep 1983) Approved Dec 1983.
MUON NEUTRINO EXPERIMENT USING THE TOHOKU HIGH RESOLUTION ONE METER BUBBLE CHAMBER

BROWN U – D Brick, M Widgoff
FERMILAB – N Gelfand, T Murphy
INDIANA U – E D Alyea, Jr
BEIJING, IHEP – C Mao, Y Tai, S Wang, Y Wu, S W Xu, C Zhao
MIT – D A Goloskie, E S Hafen, P Haridas, R I Hulsizer, M Mars, C Milstene, I A Pless, B F Wadsworth, R K Yamamoto
NAGOYA U – S Fukui
OAK RIDGE – H O Cohn
TECHNION – S Dado, J Goldberg
TEL AVIV U – G Alexander, G Bela, Y Gnat, J Grunhaus, A Levy
TENNESSEE U – W M Bugg, G T Condo, T Handler, J Hargis, E L Hart, J Shimony
TOHOKU U – K Abe, Y Chiba, K Furuno, K Hasegawa, J Katayama, N Kato, T Kitagaki (Spokesperson), H Kurino, S Nakai, T Nakajima, K Numano, H Sagawa, M Sasaki, T Takayama, K Tamai, S Tanaka, A Yamaguchi, Y Yanokura, 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^+

Comments Uses the Tohoku high-resolution 1-meter freon bubble chamber. Studies charm production, and neutrino interactions in the high Q^2 region. In progress, with 193 KPIX taken as of September 85. Scheduled to resume Spring 1987.

FNAL-747 (Feb 1984) Approved Apr 1985; Completed Aug 1985.
A SEARCH FOR FRACTIONALLY CHARGED PARTICLES AT THE TEVATRON

UC, IRVINE – A A Hahn (Spokesperson), G L Shaw
FERMILAB – R Tokarek
LBL – H S Matis, H G Pugh
LOS ALAMOS – K Lackner, R Slansky
SAN FRANCISCO STATE U – R Bland, C L Hodges
CAL TECH – R Milner
HEWLETT-PACKARD & LBL – G Hirsch
LIVERMORE – C D Hendricks
ROCHESTER U – D Elmore
TORONTO U – K H Chang

Accelerator FNAL-TEV *Detector* Other

Reactions

p nucleus → quark X	1000 GeV/c

Particles studied quark

Comments Searches for fractionally charged particles stopped in tanks of freon or in mercury.

FNAL-750 (1984) Approved Jul 1984; Completed Jul 1985.
STUDY OF MULTIPARTICLE PRODUCTION IN INTERACTIONS OF 1 TeV PROTONS WITH EMULSION NUCLEI

DELHI U – T Chand, A Gaur, S K Jha, B Rajaram, R K Shivpuri (Spokesperson)

Accelerator FNAL-TEV *Detector* Emulsion

Reactions

p nucleus	1000 GeV/c

Comments Exposed one emulsion stack.

FNAL-751 (Jun 1984) Approved Jul 1984; Completed Apr 1985.
INTERACTIONS OF PROTONS AT 1 TeV IN NUCLEAR EMULSION

SUNY, BUFFALO – P L Jain (✓ Spokesperson)

Accelerator FNAL-TEV *Detector* Emulsion

Reactions

p nucleus	1000 GeV/c

Comments Exposed 1 emulsion stack.

Papers PR D34 (1986) 2886, PL B (submitted), and PR D (submitted).

FNAL-753 (Sep 1984) Approved Nov 1984; Completed Jul 1985.
IMPROVING THE DEFLECTION OF HIGH ENERGY PARTICLE BEAMS BY CHANNELING IN BENT CRYSTALS OF Si AND Ge

CHALK RIVER, AECL – J S Forster (✓ Spokesperson), H Hatton, I V Mitchell, R J Toone
FERMILAB – S I Baker, R A Carrigan, Jr
BELL NORTHERN RESEARCH, OTTAWA – G Este
NEW MEXICO U – J A Ellison
SUNY, ALBANY – W M Gibson, R Wijayawardana

Accelerator FNAL *Detector* Wire chamber

Reactions

charged$^+$ crystal	30–200 GeV/c

Comments Also uses Si and Ge detectors. Continues studies of FNAL-660. See also FNAL-754. Ran for 150 hours.

FNAL-754 (1984) Approved Nov 1984.
CRYSTAL CHANNELING TESTS IN M-BOTTOM INCLUDING FOCUSING WITH DEFORMED CRYSTALS AND STUDIES OF HIGH Z CRYSTALS

SUNY, ALBANY – S Alam, W Gibson, I J Kim, C R Sun (✓ Spokesperson), F Sun, R Wijayawardana
FERMILAB – S Baker, R Carrigan, J Morfin, T Toohig
GENERAL ELECTRIC, SCHENECTADY – R Wentorf
CASE WESTERN RESERVE U – G E Welsch
SANDIA – W Beezhold

Accelerator FNAL *Detector* Wire chamber

Reactions

charged$^+$ crystal	20–200 GeV/c
charged$^-$ crystal	"

Comments Continues studies of FNAL-660. See also FNAL-753. Unscheduled as of November 86.

FNAL-756 (Oct 1984) Approved Jun 1985.
MEASUREMENT OF THE MAGNETIC MOMENT OF THE Ω^-

WASHINGTON U, SEATTLE – K B Luk (Spokesperson)
FERMILAB – R Rameika
MICHIGAN U – P Border
MINNESOTA U – C James
RUTGERS U – P Petersen

Accelerator FNAL *Detector* Spectrometer

Reactions

p Be $\rightarrow \Omega^-$ X	800 GeV/c
Σ^- Cu $\rightarrow \Omega^-$ X	300–800 GeV/c

Particles studied Ω^-

Comments Approved for 1000 hours. Scheduled to run Spring 1987.

FNAL-758 (Mar 1985) Approved Mar 1985; Completed Apr 1985.

STUDY OF THE MECHANISM OF MULTIPARTICLE PRODUCTION IN EMULSION NUCLEI AT 800 GeV PROTONS

TOHO U – M Kazuno, H Shibuya

Accelerator FNAL-TEV *Detector* Emulsion

Reactions

p nucleus	800 GeV/c

Comments Exposed 2 emulsion stacks.

FNAL-759 (Mar 1985) Approved Mar 1985; Completed Apr 1985.

A STUDY OF NUCLEAR INTERACTIONS OF 800 GeV PROTONS IN EMULSION

KOBE U – T Abe, G Fujioka, K Fujiwara, H Fukushima, T Hara, H Takahashi, K Taruma, Y Tsuzuki (√ Spokesperson)
OSAKA CITY U – M Teranaka
OSAKA PREFECTURE U, SCI EDUC INST – H Okabe, J Yokota

Accelerator FNAL-TEV *Detector* Emulsion

Reactions

p nucleus	800 GeV/c

Comments Exposed 2 emulsion stacks.

FNAL-760 (Mar 1985) Approved Jun 1985.

INVESTIGATION OF THE FORMATION OF CHARMONIUM STATES USING THE $\bar{p}$ ACCUMULATOR RING

FERMILAB – V Bharadwaj, J Griffin, S Holmes, W Kells, J MacCarthy, J MacLachlan, J Peoples, P Rapidis, D Young
FERRARA U – R Calabrese, P Dalpiaz, P Ferretti-Dalpiaz, E Lupi, F Petrucci, M Saurie
GENOA U – M Mainelli, M Mattera, F Tommassini, V Valbusa
TURIN U – G Borreani, R Cester (Spokesperson), E Menichetti, S Palestini, N Pastrone, G Rinaudo, L Tecchio

Accelerator FNAL *Detector* Calorimeter

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

Comments Uses a gas-jet target. Unscheduled (July 86).

FNAL-761 (Apr 1985) Approved Jun 1985.

AN ELECTROWEAK ENIGMA: HYPERON RADIATIVE DECAYS

FERMILAB – E Jastrzembski, J Lach, J Marriner
LENINGRAD, INP – V Golovtsov, A Krivshich, V Schegelsky, N Smirnov, N Terentyev, L Uvarov, A A Vorobyev (Spokesperson)
IOWA U – E McCliment, C Newsom, E Norbeck
YALE U – P S Cooper

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^-

Comments Measures branching fractions and asymmetry parameters of $\Sigma^+ \rightarrow p\gamma$ and $\Xi^- \rightarrow \Sigma^-\gamma$ decays. Unscheduled (July 86).

FNAL-762 (Jun 1985) Approved Jun 1985; Completed Jul 1985.

CASCADE SHOWERS ORIGINATED IN PROTON-NUCLEUS COLLISIONS

KOBE U – S Dake (Spokesperson), K Nakata, H Oda
TOKYO U, COSMIC RAY LAB – T Ogata, T Saito, T Tabuki
OSAKA U – T Tominaga
OKAYAMA U – M Fuki
AOYAMA GAKUIN U – T Shibata

Accelerator FNAL-TEV *Detector* Emulsion

Reactions

p nucleus	800 GeV/c

Comments Emulsion and lead plates are interleaved. Exposed 18 such stacks.

FNAL-763 (Jun 1985) Approved Jun 1985; Completed Jul 1985.

PROTON-NUCLEUS INTERACTIONS AT TEVATRON ENERGY

TOKYO U, COSMIC RAY LAB – T Ogata (Spokesperson), T Tabuki
KOBE U – S Dake, K Nakata, H Oda
OSAKA U – T Tominaga
OKAYAMA U – M Fuki

Accelerator FNAL-TEV *Detector* Emulsion

Reactions

p nucleus	800 GeV/c

Comments Emulsion and metal plates are interleaved. Exposed 2 stacks.

FNAL-764 (Jun 1985) Approved Jun 1985; Completed Jul 1985.

THE EXCLUSIVE INVESTIGATION OF MULTIPLE PRODUCTION IN RAPIDITY SPACE

HIROSAKI U – K Ishikawa, H Nanjo (√ Spokesperson), Y Noto

Accelerator FNAL-TEV *Detector* Emulsion

Reactions

p nucleus	800 GeV/c

Comments Emulsion and acryl plates are interleaved. Exposed 1 stack.

FNAL-765 (Jun 1985) Approved Jun 1985; Completed Jul 1985.

TRANSVERSE MOMENTUM MEASUREMENT OF SECONDARY PARTICLES IN PROTON-EMULSION COLLISIONS AT 800 GeV

OKAYAMA U – M Fuki, K Imaeda (√ Spokesperson), H Kobayashi

Accelerator FNAL-TEV *Detector* Emulsion

Reactions

p nucleus	800 GeV/c

Comments Exposed 7 emulsion stacks.

FNAL-766 (Jul 1985) Approved Jul 1985; Completed Oct 1985.

NEUTRON ENERGY SPECTRUM MEASUREMENTS IN TEVATRON TUNNEL — APPLICATION TO SSC

LBL – J McCaslin (Spokesperson), B Swanson

Accelerator FNAL-TEV *Detector* Counter

Reactions

p nucleus → n X	—

Comments A test relevant to radiation damage at the SSC.

FNAL-769 (Nov 1985) Approved Dec 1985.

PION AND KAON PRODUCTION OF CHARM AND CHARM-STRANGE STATES

RIO DE JANEIRO, CBPF – G A Alves, J C C Anjos, H da Motta, A F S Santoro, M H G Souza
FERMILAB – J A Appel (√ Spokesperson), R Dixon, H Fenker, D Green, P M Mantsch, T Nash, K Sliwa, W J Spalding, M Streetman
NORTHEASTERN U – I D Leedom, S Reucroft
TORONTO U – S B Bracker, C Gay, R Jedicke, G J Luste
TUFTS U – T Kafka, J Metheny, R Milburn, A Napier, J Schneps
WISCONSIN U – M Sheaff
YALE U – P Karchin

Accelerator FNAL *Detector* TPS

Reactions

pion nucleus → charm X	250 GeV/c
kaon nucleus → charm X	"

Particles studied D^0, D^+, D^-, $D^*(2010)$, D_s^+, D_s^-, Λ_c^+

Comments A sequel to FNAL-691. Scheduled to start March 87.

FNAL-770 (Dec 1985) Approved Dec 1985.

NEUTRINO PHYSICS AT THE TEVATRON

CHICAGO U – F Merritt, M Oreglia, P Reutens, B Schumm
COLUMBIA U – P Auchincloss, K Bachman, R Berstein, R Blair, C Foudas, W C Lefmann, S Mishra, E Oltman, F Sciulli, M Shaevitz, W Smith (√ Spokesperson)
FERMILAB – F O Borcherding, D A Edwards, H E Fisk, D Jovanovic, Q A Kerns, M Lamm, W Marsh, W Merritt, P Rapidis
ROCHESTER U – A Bodek, H Budd, K Lang

Accelerator FNAL-TEV *Detector* LAB-E

Reactions

ν_μ nucleus → muon(s) X	< 600 GeV/c
$\bar{\nu}_\mu$ nucleus → muon(s) X	"

Comments Uses flash ADC calorimeter drift chamber readout. A continuation of FNAL-744. Scheduled to run in 1987.

FNAL-772 (Mar 1986) Approved 1986.

STUDY OF THE NUCLEAR ANTIQUARK SEA VIA $pN \rightarrow$ DIMUONS

LOS ALAMOS – G Garvey, J Moss (Spokesperson), J-C Peng
SUNY, STONY BROOK – R L McCarthy
FERMILAB – C N Brown, W E Cooper, A M Jonckheere
ILLINOIS U, CHICAGO – M Adams

Accelerator FNAL-TEV *Detector* Spectrometer

Reactions

p deut → $\mu^+ \mu^-$ X	900 GeV/c
p Ca → $\mu^+ \mu^-$ X	"

Comments A precise measurement of the A dependence of the Drell-Yan process with particular emphasis on the kinematic region ($M > 4$ GeV, $x > 0.2$) most sensitive to beam-valence-quark target-antiquark annihilation. Uses the FNAL-605 spectrometer. Scheduled to run Spring 1987.

FNAL-773 (Mar 1986) Approved 1986.

MEASUREMENT OF THE PHASE DIFFERENCE BETWEEN η_{00} AND η_{+-} TO A PRECISION OF 1°

CHICAGO U – Y W Wah, B Winstein, R Winston
ELMHURST COLL & CHICAGO U – E C Swallow
FERMILAB – G J Bock, R N Coleman, Y B Hsiung, K C Stanfield, R Stefanski, T Yamanaka
PRINCETON U – G D Gollin (√ Spokesperson), J K Okamitsu
SACLAY – P Debu, B Peyaud, R Turlay

Accelerator FNAL-TEV *Detector* Spectrometer

Reactions

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

Particles studied K_L, K_S

Comments CPT conservation requires the phase difference to be < 1°. The current value is approximately 10^{+1}_{-5}°. 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. Scheduled to run in 1989.

FNAL-775 (May 1986) Approved 1986.

THE UPGRADED COLLIDER DETECTOR AT FERMILAB

ARGONNE – R Diebold, W Li, L Nodulman, J Proudfoot, R Rezmer, P Schoessow, D Underwood, R Wagner, A B Wicklund
BRANDEIS U – J Bensinger, C Blocker, M Contreras, L DeMortier, P Kesten, L Kirsch, H Piekarz, S Tarem
CHICAGO U – D Amidei, M Campbell, H Frisch, C Grosso-Pilcher, J Hauser, T Liss, G Redlinger, H Sanders, M Shochet, R Snider, J Ting, Y Tsay
FERMILAB – M Atac, E Barsotti, P Berge, M Binkley, J Bofill, J T Carroll, J Cooper, C Day, F Dittus, T Droege, J Elias, G W Foster, J Freeman, I Gaines, J Grimson, J Huth, C van Ingen, H Jensen, R Kadel, R Kephart, A Mukherjee, C Nelson, C Newman-Holmes, J O'Meara, A Para, J Patrick, D Quarrie, S Segler, D Theriot, A Tollestrup (Spokesperson), K Turner, R Vidal, R Wagner, T Yamanouchi, G P Yeh, J Yoh
FRASCATI – S Bertolucci, M Cordelli, M Curatolo, B Esposito, P Giromini, S Miozzi, S Miscetti, A Sansoni
HARVARD U – G Brandenburg, D Brown, R Carey, R St Denis, M Eaton, A Feldman, E Kearns, J Oliver, E Sadowski, R Schwitters (Spokesperson), M Shapiro
ILLINOIS U, URBANA – G Ascoli, S Bhadra, R Downing, S Errede, L Holloway, I Karlinger, H Keutelian, U Kruse, R Sard, V Simaitis, D Smith, T Westhusing
KEK – Y Arai, Y Fukui, S Mikamo, M Mishina
LBL – W Carithers, W Chinowsky, R Ely, M Franklin, C Haber, R Harris, B Hubbard, J Siegrist
PENN U – D Connor, L Gladney, S Hahn, N Lockyer, M Miller, T Rohlay, R VanBerg, J Walsh, H Williams
PISA U – G Appollinari, F Bedeschi, G Bellettini, N Bonavita, L Bosisio, F Cervelli, M Dell'Orso, R Del Fabbro, E Focardi, P Giannetti, M A Giorgi, A Menzione, R Paoletti, G Punzi, L Ristori, A Scribano, P Sestini, A Stefanini, G Tonelli, F Zetti
PURDUE U – V Barnes, A Byon, K Chadwick, A F Garfinkel, S Kuhlmann, A Laasanen, M Schub, J Simmons, A Di Virgilio
ROCKEFELLER U – S Belforte, T Chapin, G Chiarelli, N Giokaris, K Goulianos, R Plunkett, S White
RUTGERS U – A Beretvas, T Devlin, U Joshi, K Kazlauskis, N Pearson, T Watts
TEXAS A AND M – J Buchholz, S Cihangir, D DiBitonto, F Marchetto, P McIntyre, T Meyer, R Webb
TSUKUBA U – F Abe, Y Hayashide, M Ito, T Kamon, S Kanda, Y Kikuchi, S Kim, K Kondo, M Masuzawa, T Mimashi, S Miyashita, H Miyata, S Mori, Y Morita, T Ozaki, M Sekiguchi, M Shibata, Y Takaiwa, K Takikawa, A Yamashita, K Yasuoka
WISCONSIN U – J Bellinger, D Carlsmith, D Cline, R Handler, J Jaske, G Ott, L Pondrom, J Rhoades, M Sheaff, J Skarha, T Winch

Accelerator FNAL-COLLIDER *Detector* CDF

Reactions

$\bar{p}\ p$	500–2000 GeV (E_{cm})

INS-ES-101 Completed 1984.

STUDY OF HIGH ENERGY PHOTONUCLEAR FRAGMENTATION

TOKYO U, INS – S Shibata (√ Spokesperson), et al.

Accelerator TOKYO *Detector* ?

Reactions

γ nucleus	—

INS-ES-102 Completed 1984.

CHANNELLING RADIATION BY AN ELECTRON BEAM AT SEVERAL HUNDRED MeV

TOKYO U – F Fujimoto, et al.

Accelerator TOKYO *Detector* ?

Reactions

γ crystal	500 MeV/c

INS-ES-103 Completed Oct 1985.

MEASUREMENT OF THE BACKWARD DIFFERENTIAL CROSS SECTION FOR $\gamma d \rightarrow \pi^0 d$

TOKYO U, INS – A Imanishi, T Miyachi (√ Spokesperson), H Tezuka
TOKYO U OF AGRIC TECH – T Emura, M Nishimura, K Takahashi
HIROSHIMA U – M Asai, S Kasai, Y Morita, Y Sumi
HIROSHIMA SHUDO U – K Baba
MEIJI COLL, PHARMACY – Y Wada
KOREA U – Y Kim

Accelerator TOKYO *Detector* Single-arm spectrometer

Reactions

γ deut $\rightarrow \pi^0$ deut	0.5–1.0 GeV (E_{lab})

Comments Measured over c.m. angles 140 to 156°. Studied the effect of the double scattering term and found no indication for dibaryon resonances.

INS-ES-105 Completed 1984.

MEASUREMENT OF $\gamma\ ^4$He $\rightarrow pN(p)$ ANYTHING

TOKYO U, INS – S Homma (√ Spokesperson), M Koike, H Okuno, M Sudo, M Torikoshi
AKITA U – A Sasaki
TOHOKU U – Y Fujii

Accelerator TOKYO *Detector* Double-arm spectrometer

Reactions

γ He $\rightarrow p\ n$ X	0.2–0.45 GeV (E_{lab})
γ He $\rightarrow p\ p$ X	"

Comments A continuation of INS-19-2.

INS-ES-107 Completed 1985.

CUMULATIVE EFFECT IN PHOTONUCLEAR REACTIONS

TOKYO U, INS – Y Murata, et al.

Accelerator TOKYO *Detector* ?

INS-ES-110 Completed 1985.

PHOTONUCLEAR SPALLATION REACTIONS IN VARIOUS NUCLEI

TOKYO U, INS – S Shibata (√ Spokesperson), et al.

Accelerator TOKYO *Detector* ?

INS-ES-111 Started Jan 1986; Completed Mar 1986.

MEASUREMENT OF TRIPLET PHOTOPRODUCTION BY POLARIZED γ's

HIROSHIMA U – I Endo (√ Spokesperson), M Harada, S Kasai, K Niki, Y Sumi, M Tobiyama
TOKYO U, INS – M Mutou, H Tsujikawa, K Watanabe, K Yoshida
HIROSHIMA SHUDO U – K Baba

Accelerator TOKYO *Detector* Counter

Reactions Polarized beam

$\gamma\ e^- \rightarrow e^+\ e^-\ e^-$	120–400 MeV/c

INS-ES-112 Completed Jul 1986.

MEASUREMENT OF THE BACKWARD DIFFERENTIAL CROSS SECTION FOR $\gamma d \rightarrow \pi^0 d$

TOKYO U, INS – M Koike, T Miyachi (√ Spokesperson), M Mutou, K Yoshida
TOKYO U OF AGRIC TECH – T Emura, M Nishimura, O Nitoh, T Takahashi, J Yoshizawa
TOKYO METROPOLITAN U – S Kitamura
HIROSHIMA U – M Asai
HIROSHIMA SHUDO U – K Baba

Accelerator TOKYO *Detector* Single-arm spectrometer

Reactions

γ deut $\rightarrow \pi^0$ deut	0.4–0.8 GeV (E_{lab})

Comments Uses a tagged γ beam. Measures over the c.m. angles 160 to 170°.

INS-ES-113 Approved 1985; Started 1986.

STUDY OF DIBARYON RESONANCES USING γd INTERACTIONS

HIROSHIMA U – S Asai, I Endo, M Harada, H Hasai, K Iwatani, S Kasai, K Niki, Y Sumi (√ Spokesperson), T Tobiyama
HIROSHIMA SHUDO U – K Baba
KITAKYUSHU, UNIV OCCUP ENVIR HEALTH – T Maki
MEIJI COLL, PHARMACY – Y Wada
SAGA UNIV, JAPAN – H Ito
SASKATCHEWAN U – C Rangacharyulu
TOKYO INST TECH – H Shimizu
TOKYO U, INS – T Hasegawa, S Kato, K Maruyama, Y Murata, M Mutou, K Yoshida

Accelerator TOKYO *Detector* TAGX

Reactions

γ deut $\rightarrow$ charged(s)	—

Comments Uses a tagged γ beam with a large duty factor (> 10%), and a large-aperture magnetic spectrometer (TAGX) which consists of an analyzer magnet with a large gap (60 cm), two sets of scintillation counter hodoscopes, and a central drift chambers. The geometrical acceptance is about π sr.

INS-14-3 Approved May 1977; Started Jul 1979; Completed 1981.

MEASUREMENT OF THE DIFFERENTIAL CROSS SECTION FOR THE REACTION $\gamma p \rightarrow \eta p$ WITH A TAGGED γ BEAM

TOKYO U, INS – S Homma (√ Spokesperson), M Kanazawa, K Maruyama, Y Murata, H Okuno
AKITA U – A Sasaki
HIROSHIMA U – T Taniguchi

Accelerator TOKYO *Detector* Wide-angle spectrometer

Reactions

$\gamma\ p \rightarrow \eta\ p$	800–1000 MeV (T_{lab})

INS-14-4 Approved May 1977; Started May 1979; Completed 1981.

MEASUREMENT OF THE POLARIZED TARGET ASYMMETRY OF THE REACTION $\gamma n \rightarrow \pi^- p$ IN THE SECOND RESONANCE REGION

NAGOYA U – K Fujii, H Hayashii, S Iwata, R Kajikawa (√ Spokesperson), A Miyamoto, T Nakanishi, Y Ohashi, S Okumi, H Ozaki, T Tauchi, T Yamaki
OSAKA U – Y Takeuchi
NAGOYA UNIV COLL MEDICAL TECH – K Mori

Accelerator TOKYO *Detector* Double-arm spectrometer

Reactions Polarized target

$\gamma n \rightarrow \pi^- p$	0.55–0.9 GeV (T_{lab})

Comments Measured for c.m. angles between 60 and 120°.

Papers NP B187 (1981) 53.

INS-15-1 Approved Feb 1979; Completed Apr 1981.

MEASUREMENT OF THE RECOIL PROTON POLARIZATION IN THE REACTION $\gamma p \rightarrow \pi^0 p$

TOKYO U, INS – A Imanishi, S Kato (√ Spokesperson), T Miyachi, K Sugano, K Toshioka, K Ukai
TOKYO METROPOLITAN U – M Chiba
KYOTO U – K Egawa, T Ishii
TOHOKU GAKUIN U – Y Yoribayashi
TOKYO U OF AGRIC TECH – K Joh, H Nara, T Noguchi, T Shinohara, K Takahashi
MEIJI COLL, PHARMACY – Y Wada

Accelerator TOKYO *Detector* Double-arm spectrometer

Reactions

$\gamma p \rightarrow \pi^0 p$	600–1100 MeV (T_{lab})
$\gamma p \rightarrow \gamma p$	"

Papers NP B168 (1980) 1, NC 63A (1981) 57, and NP B247 (1984) 313.

INS-15-2 Approved Feb 1979; Completed Dec 1980.

MEASUREMENT OF $\gamma p \rightarrow (\pi^{\pm}$ OR $p)X$ WITH A TAGGED γ BEAM

AKITA U – A Sasaki (Spokesperson), et al.

Accelerator TOKYO *Detector* ?

Reactions

$\gamma p \rightarrow \pi^+ X$	< 1.3 GeV/c
$\gamma p \rightarrow \pi^- X$	"
$\gamma p \rightarrow p X$	"

INS-15-3 Approved Feb 1979; Started Jan 1980; Completed Sep 1980.

MEASUREMENT OF THE BACKWARD DIFFERENTIAL CROSS SECTION FOR THE (γ, p) REACTION OFF DEUTERIUM AND CARBON

HIROSHIMA U – K Baba, I Endo (√ Spokesperson), H Fukuma, K Inoue, T Kawamoto, T Ohsugi, Y Sumi, T Takeshita, S Uehara, Y Yano
INDUSTRIAL MEDICAL COLL, KITAKYUSHU – T Maki

Accelerator TOKYO *Detector* Single-arm spectrometer

Reactions

γ deut $\rightarrow p n$	350–850 MeV (T_{lab})
γ deut $\rightarrow p X$	"
γ deut $\rightarrow \pi^0$ deut	"
γ nucleus $\rightarrow p X$	"

Papers PRL 48 (1982) 729, PL 113B (1982) 459, PR C28 (1983) 286, and NP A415 (1984) 462.

INS-15-4 Approved Feb 1979; Started Sep 1980; Completed Oct 1980.

PHOTOPRODUCTION OF $\ell^-\ell^+$ OFF NUCLEI

TOKYO U, INS – H Terazawa (√ Spokesperson), et al.

Accelerator TOKYO *Detector* Wide-angle spectrometer

Reactions

γ nucleus $\rightarrow e^- e^+ X$	740–980 MeV (T_{lab})

INS-16-1 (Mar 1980) Approved Mar 1980; Started Apr 1980; Completed Jul 1980.

MEASUREMENT OF POLARIZED TARGET ASYMMETRY IN THE REACTION $\gamma d \rightarrow pn$ IN THE ENERGY RANGE BETWEEN 300 AND 650 MeV

TOKYO U, INS – T Ishii, S Kato (√ Spokesperson), H Okuno, T Shimomura, K Ukai
NAGOYA U – N Awaji, K Fujii, H Hayashii, N Horikawa (√ Spokesperson), S Iwata, R Kajikawa, A Miyamoto, K Mori, T Nakanishi, Y Ohashi, S Okumi, H Ozaki, T Tauchi, T Yamaki
OSAKA U – Y Takeuchi

Accelerator TOKYO *Detector* Single-arm spectrometer

Reactions Polarized target

γ deut $\rightarrow p n$	0.30–0.65 GeV/c

Comments Same apparatus as INS-14-4.

Papers PL 110B (1982) 441.

INS-16-2 (May 1980) Approved Jun 1980; Started Apr 1981; Completed Aug 1981.

MEASUREMENT OF THE π^- PHOTOPRODUCTION RATE ON NUCLEUS TARGET

NIHON U, TOKYO – T Hayakawa, N Nakamura, T Ozaki, M Saito, K Sato (√ Spokesperson)

Accelerator TOKYO *Detector* Single-arm spectrometer

Reactions

γ nucleus $\rightarrow \pi^- X$	0.2–1.0 GeV/c

INS-17-1 Approved May 1981; Started Jan 1982; Completed Nov 1982.

MEASUREMENT OF THE DIFFERENTIAL CROSS SECTION FOR PROTON COMPTON SCATTERING

TOKYO U, INS – K Egawa, A Imanishi, T Ishii (√ Spokesperson), S Kato, K Ukai
TOKYO U OF AGRIC TECH – T Noguchi, T Ohmori, N Shimura, K Takahashi
MEIJI COLL, PHARMACY – Y Wada

Accelerator TOKYO *Detector* Double-arm spectrometer

Reactions

$\gamma p \rightarrow \gamma p$	0.9–1.15 GeV/c

Papers NP B254 (1985) 458.

INS-17-2 Approved May 1981; Started Nov 1982; Completed Feb 1983.

STUDY OF QUASI-FREE DEUTERONS IN LIGHT NUCLEI

TOKYO U, INS – S Homma (√ Spokesperson), M Kanazawa, M Koike, Y Murata, H Okuno, F Soga, N Yoshikawa
AKITA U – A Sasaki

Accelerator TOKYO *Detector* Double-arm spectrometer

Reactions

γ nucleus $\rightarrow p n X$	200–450 MeV/c

Comments Uses a tagged γ beam.

Papers PRL 45 (1980) 706, PR C27 (1983) 31, PRL 52 (1984) 2026, and PRL 53 (1984) 2536.

INS-18-1 (Jul 1982) Approved Jul 1982; Started Jun 1983; Completed Apr 1984.

ANGULAR DISTRIBUTION OF PHOTODISINTEGRATION OF QUASI-FREE DEUTERONS IN LIGHT NUCLEI

TOKYO U, INS – S Homma (√ Spokesperson), M Kanazawa, M Koike, Y Murata, H Okuno, F Soga, M Yoshikawa
AKITA U – A Sasaki

Accelerator TOKYO *Detector* Double-arm spectrometer

Reactions

γ nucleus $\rightarrow$ p n X	200–450 MeV/c

Comments Uses a tagged γ beam.

INS-18-3 Approved Jul 1982; Started Jun 1983; Completed Apr 1984.

MEASUREMENT OF DIFFERENTIAL CROSS SECTION OF THE $\gamma d \rightarrow \pi^0 d$ REACTION

TOKYO U, INS – A Imanishi, T Ishii, S Kato (✓ Spokesperson), T Miyachi, A Nakamura, Y Takechi, K Ukai
TOKYO U OF AGRIC TECH – T Noguchi, T Ohmori, N Shimura, K Takahashi
HIROSHIMA U – K Baba, Y Morita, Y Sumi
MEIJI COLL, PHARMACY – Y Wada
TOKYO KOGANEI U – K Kurita

Accelerator TOKYO *Detector* Double-arm spectrometer

Reactions

γ deut $\rightarrow$ π^0 deut	500–1000 MeV/c

Papers PRL 54 (1985) 2497.

INS-19-1 (1984) Approved Mar 1984; Completed Mar 1984.

MEASUREMENT OF DIFFERENTIAL CROSS SECTIONS FOR THE $\gamma d \rightarrow \pi^0 d$ REACTION AT BACKWARD ANGLES

TOKYO U, INS – A Imanishi, T Ishii, S Kato, T Miyachi (✓ Spokesperson), A Nakamura, Y Takeuchi, K Ukai
TOKYO U OF AGRIC TECH – T Noguchi, T Ohmori, N Shimura, K Takahashi
HIROSHIMA U – K Baba, Y Morita, Y Sumi
MEIJI COLL, PHARMACY – Y Wada
TOKYO GAKUGEI U – K Kurita

Accelerator TOKYO *Detector* Single-arm spectrometer

Reactions

γ deut $\rightarrow$ π^0 deut	0.5–1.0 GeV (E_{lab})

Comments Measures over c.m. angles 80 to 130°.

Papers PRL 54 (1985) 2497.

INS-19-2 (1984) Approved Mar 1984; Started Apr 1984; Completed Jun 1984.

STUDY OF THE REACTION γ ^{4}He $\rightarrow$ $pN(p)X$

TOKYO U, INS – S Homma (✓ Spokesperson), M Koike, H Okuno, M Sudo, M Torikoshi
AKITA U – A Sasaki
TOHOKU U – Y Fujii

Accelerator TOKYO *Detector* Double-arm spectrometer

Reactions

γ He $\rightarrow$ p n X	0.2–0.45 GeV (E_{lab})
γ He $\rightarrow$ 2p X	"

Comments Uses a tagged γ beam.

INS-19-3 (1984) Approved Mar 1984.

STUDY OF CUMULATIVE EFFECTS IN PHOTONUCLEAR REACTIONS

TOKYO U, INS – Y Murata (Spokesperson)
AKITA U & TOHOKU U & TOKYO U & HIROSHIMA U & SAGA UNIV, JAPAN – et al.

Accelerator TOKYO *Detector* Single-arm spectrometer

Reactions

γ nucleus $\rightarrow$ p X	0.35–0.60 GeV (E_{lab})

ITEP-E-761 (1976) Approved 1976; Started 1978; Completed 1982.

STUDY OF RARE K^0 DECAYS

MOSCOW, ITEP – V V Barmin, V G Barylov, T A Chistyakova, I V Chuvilo, G V Davidenko, V S Demidov, A G Dolgolenko, V A Ergakov, V N Golubchikov, V A Matveev, A G Meshkovsky, G S Mirosidi, V I Moskalev, V A Shebanov (Spokesperson), N N Shishov, M M Sokolov, Y V Trebukhovsky, B S Volkov, N K Zobkovskaya
PADUA U – M Baldo-Ceolin, E Calimani, S Ciampolillo, F Mattioli, G Miari, A Sconza

Accelerator ITEP *Detector* HLBC-2M

Reactions

K^+ Xe $\rightarrow$ K^0 X	0.8 GeV/c
$K^0 \rightarrow 3\pi^0$	—
$K^0 \rightarrow \pi^+ \pi^0 \pi^-$	—
$K^0 \rightarrow 2\gamma$	—
$K^0 \rightarrow 2\pi^0 \gamma$	—
$K^0 \rightarrow \pi^+ \pi^- \gamma$	—

Particles studied K^0

Papers PL 128B (1983) 129, ZETFP 38 (1983) 459 = JETPL 38 (1983) 557, YF 39 (1984) 428 = SJNP 39 (1984) 269, and YF 41 (1985) 1187 = JETPL 41 (1985) 759.

ITEP-E-771 (1977) Approved 1977; Started 1978; Completed 1982.

STUDY OF THE INCLUSIVE PROPERTIES OF DEEP INELASTIC NUCLEAR REACTIONS

MOSCOW, ITEP – Y D Bayukov, P V Degtyarenko, B L Druzhinin, V B Fedorov, B A Fominikh, V B Gavrilov, N A Goryainov, Y G Grishchuk, O B Gushchin, M V Kolosov, N L Kornienko, L N Kuleshova, G A Leksin (Spokesperson), S V Shevchenko, S M Shuvalov, B B Shvartsman, D A Suchkov, V P Surin, A V Vlasov

Accelerator ITEP *Detector* Spectrometer

Reactions

p nucleus $\rightarrow$ p X	1–9 GeV/c
p nucleus $\rightarrow$ n X	"
p nucleus $\rightarrow$ deut X	"
p nucleus $\rightarrow$ trit X	"
p nucleus $\rightarrow$ ^{3}He X	"
p nucleus $\rightarrow$ π^+ X	"
p nucleus $\rightarrow$ π^- X	"
π^+ nucleus $\rightarrow$ p X	"
π^+ nucleus $\rightarrow$ n X	"
π^+ nucleus $\rightarrow$ deut X	"
π^+ nucleus $\rightarrow$ trit X	"
π^+ nucleus $\rightarrow$ ^{3}He X	"
π^+ nucleus $\rightarrow$ π^+ X	"
π^+ nucleus $\rightarrow$ π^- X	"
π^- nucleus $\rightarrow$ p X	"
π^- nucleus $\rightarrow$ n X	"
π^- nucleus $\rightarrow$ deut X	"
π^- nucleus $\rightarrow$ trit X	"
π^- nucleus $\rightarrow$ ^{3}He X	"
π^- nucleus $\rightarrow$ π^+ X	"
π^- nucleus $\rightarrow$ π^- X	"

Comments The targets are He, ^{6}Li, ^{7}Li, Be, ^{11}B, C, Al, Ti, Fe, ^{58}Ni, ^{64}Ni, Ni, Cu, Zn, Nb, Cd, In, ^{112}Sn, ^{124}Sn, Sn, Ta, Pb, and U.

Papers PTE 3 (1982) 25, YF 33 (1981) 183 = SJNP 33 (1981) 94, YF 34 (1981) 785 = SJNP 34 (1981) 437, YF 35 (1982) 960 = SJNP 35 (1982) 558, YF 37 (1983) 344 = SJNP 37 (1983) 206, YF 41 (1985) 158 = SJNP 41 (1985) 101, YF 41 (1985) 1541 = SJNP 41 (1985) 976, YF 42 (1985) 185 = SJNP 42 (1985) 116, and YF 42 (1985) 377 = SJNP 42 (1985) 238.

ITEP-E-782 (1978) Approved 1978; Started 1978; Completed 1980.

STUDY OF LIGHT NUCLEUS INTERACTIONS WITH PROTONS IN THE INTERMEDIATE ENERGY REGION

MOSCOW, ITEP – A V Blinov, I V Chuvilo, V V Drobot, V A Ergakov, V E Grechko, L A Kondratyuk, Y V Korolev, Y M Selektor (Spokesperson), V N Shulyachenko, V V Solovyev, Y V Trebuhovsky, V F Turov, I A Vanyushin, S M Zombkovsky

Accelerator ITEP *Detector* HBC-80CM

Reactions

trit $p \rightarrow$ X	2.5, 5 GeV/c
trit $p \rightarrow$ trit p	"
trit $p \rightarrow {}^3$He n	"
trit $p \rightarrow$ deut p n	"
trit $p \rightarrow 2p$ $2n$	"
^{3}He $p \rightarrow$ X	"
^{3}He $p \rightarrow {}^3$He p	"
^{3}He $p \rightarrow$ deut $2p$	"
^{3}He $p \rightarrow 3p$ n	"
^{3}He $p \rightarrow 2p$ $2n$ π^+	"

Particles studied ^{3}He

Comments A study of the non-nucleon admixture in wave functions of ^{3}He and ^{3}H.

Papers PL 91B (1980) 349, NP A377 (1982) 585, ZETFP 32 (1980) 538 = JETPL 32 (1980) 519, YF 35 (1982) 523 = SJNP 35 (1982) 301, YF 39 (1984) 260 = SJNP 39 (1984) 161, YF 40 (1984) 581 = SJNP 40 (1984) 372, YF 41 (1985) 719 = SJNP 41 (1985) 457, and YF 41 (1985) 1440 = SJNP 41 (1985) 913.

ITEP-E-783 (1978) Started 1978.

STUDY OF TRITIUM β DECAY TO MEASURE THE $\bar{\nu}$ MASS

MOSCOW, ITEP – S D Boris, A I Golutvin, L P Lapin, V A Lyubimov, V V Nagovitzin, E G Novikov, V Z Nozik, V A Soloshenko, L N Tikhomirov, E F Tretyakov (Spokesperson)

Accelerator NONE *Detector* Spectrometer

Reactions

trit $\rightarrow {}^3$He e^- $\bar{\nu}_e$	0 GeV/c

Particles studied ν_e

Comments Valine target.

Papers PL 94B (1980) 266, ZETF 81 (1981) 1158 = JETP 54 (1981) 616, ZETFP 42 (1985) 107 = JETPL 42 (1985) 130, and PL 159B (1985) 217.

ITEP-E-784 (1978) Approved 1978; Started 1979; Completed 1981.

STUDY OF DOUBLE CHARGE-EXCHANGE INCLUSIVE REACTIONS INDUCED BY π^+ AND π^- MESONS ON NUCLEI

MOSCOW, ITEP – V M Abramov, I A Dushovskoy, I I Isaev, V V Kishkurno, L A Kondratyuk, A P Krutenkova, V V Kulikov, M A Matsyuk, P A Murat, I A Radkevich (Spokesperson), E N Turdakina

Accelerator ITEP *Detector* Optical spark chamber

Reactions

π^- ^{6}Li $\rightarrow \pi^+$ X	2.6 GeV/c
π^- ^{7}Li $\rightarrow \pi^+$ X	"
π^- C $\rightarrow \pi^+$ X	"
π^- Bi $\rightarrow \pi^+$ X	"
π^+ C $\rightarrow \pi^+$ X	"
π^+ Bi $\rightarrow \pi^+$ X	"

ITEP-E-801 (1980) Approved 1980; Started 1982.

STUDY OF POLARIZATION EFFECTS IN PROCESSES WITH TWO CHARGED PARTICLES IN THE FINAL STATE AT INTERMEDIATE ENERGIES

MOSCOW, ITEP – P E Budkovskii, T S Cherkalina, V M Dobrov, V L Hohlov, V P Kanavets (Spokesperson), I I Levintov, V L Martynov, B V Morozov, V M Nesterov, V V Ryltsov, A V Soskov, A D Sulimov

Accelerator ITEP *Detector* Wire chamber

Reactions Polarized target

π^- $p \rightarrow p$ π^-	1.4–2.1 GeV/c
π^- $p \rightarrow n$ π^+ π^-	"
π^- $p \rightarrow n$ ρ^0	"
π^+ $p \rightarrow p$ π^+	"

Comments The target polarization is 75±5%.

ITEP-E-802 (1981) Approved 1980; Started 1981.

STUDY OF K^+ INTERACTIONS WITH XENON

MOSCOW, ITEP – V V Barmin, V G Barylov, T A Chistyakova, G V Davidenko, V S Demidov, A G Dolgolenko, V Luchmanov, A G Meshkovsky, G S Mirosidi, A N Nikitenko, V A Shebanov (Spokesperson), N N Shishov, N K Zombkovskaya

Accelerator ITEP *Detector* HLBC-2M

Reactions

K^+ Xe $\rightarrow K^+$ X	0.79 GeV/c
K^+ Xe $\rightarrow K^0$ X	"

Comments Study of the cumulative effects in xenon. The detector (DIANA) is a 700-liter xenon bubble chamber.

ITEP-E-811 (1981) Approved 1981; Started Dec 1981; Completed Jun 1982.

STUDY OF $K_L \rightarrow 2\gamma$ AND SEARCH FOR $K_S \rightarrow 2\gamma$ DECAYS

MOSCOW, ITEP – M Y Balatz (Spokesperson), V M Berezin, E T Bogdanova, V I Chistilin, N P Dobrovolskaya, G B Dzyubenko, N D Galanina, E T Gedvillo, A D Kamensky, N A Khaldeeva, V S Lanaev, A M Lipkin, V N Markisov, V V Metelov, V A Murysov, A A Nedosekin, A Y Ostapchuk, V A Sadykov, S F Semin, A I Sitnikov, E I Tarkovsky, M E Vishnevsky (Spokesperson), V E Vishnyakov, M O Vlasova, S V Zhelnin

Accelerator ITEP *Detector* Spectrometer

Reactions

K_L Cu $\rightarrow$ Cu K_S	1–8 GeV/c
$K_L \rightarrow 2\gamma$	"
$K_S \rightarrow 2\gamma$	"

Particles studied K_L, K_S

ITEP-E-812 (1981) Approved 1981; Started 1981; Completed 1984.

STUDY OF CUMULATIVE PARTICLE PRODUCTION IN PION NUCLEUS INTERACTIONS

MOSCOW, ITEP – A E Buklej, N A Burgov, M M Chumakov, N A Fedyushkina, S A Gerzon, Y T Kiselev, G A Leksin, A N Martemjanov, N A Pivnyuk, S V Semenov, V L Stolin, Y V Terekhov (Spokesperson), V I Ushakov, M K Vlasov, L S Vorobyev

Accelerator ITEP *Detector* Spectrometer

Reactions

π^+ nucleus $\rightarrow \pi^+$ X	1.5 GeV/c
π^+ nucleus $\rightarrow p$ X	"
π^+ nucleus $\rightarrow$ deut X	"
π^- nucleus $\rightarrow \pi^+$ X	"
π^- nucleus $\rightarrow p$ X	"
π^- nucleus $\rightarrow$ deut X	"

Comments The targets are Li, C, O, Cu, and Pb.

Papers YF 32 (1980) 423 = SJNP 32 (1980) 219, YF 36 (1983) 1313 = SJNP 36 (1983) ?, and YF 39 (1984) 801 = SJNP 39 (1984) 506.

ITEP-E-813 (1981) Approved 1981; Started 1982; Completed 1983.

STUDY OF CUMULATIVE PARTICLE CORRELATIONS

MOSCOW, ITEP – Y D Bayukov, P V Degtyarenko, Y V Efremenko, V B Fedorov, V B Gavrilov, N A Goryainov, Y G Grishuk, M V Kosov, L N Kuleshova, G A Leksin (Spokesperson), S M Shuvalov, B B Shvartsman, A V Stavinsky, D A Suchkov, A V Vlasov, L S Vorobyev

Accelerator ITEP *Detector* Spectrometer

Reactions

p nucleus → 2nucleon X	2.5, 5.0 GeV/c
p nucleus → deut p X	"
π^- nucleus → 2nucleon X	"
π^- nucleus → deut p X	"

Comments The spectrometer (BAS) is a large hadron spectrometer. The targets are Be, C, Al, Ti, Cu, Nb, Cd, Ta, Pb, and U.

Papers YF 39 (1984) 1482 = SJNP 39 (1984) 938.

ITEP-E-821 (1982) Approved 1980; Started 1981; Completed 1983.

SEARCH FOR K_L → 2CHARGED e^+e^- DECAY

MOSCOW, ITEP – M Y Balatz (Spokesperson), V M Berezin, E T Bogdanova, V I Chistilin, N P Dobrovolskaya, G B Dzyubenko, N D Galanina, E T Gedvillo, A D Kamensky, N A Khaldeeva, V S Lanaev, A M Lipkin, V N Markisov, V V Metelov, V A Murysov, A A Nedosekin, A Y Ostapchuk, V A Sadykov, S F Semin, A I Sitnikov, E I Tarkovsky, M E Vishnevsky, V E Vishnyakov, M O Vlasova, S V Zhelnin

Accelerator ITEP *Detector* Spectrometer

Reactions

$K_L \to \pi^+ \pi^- e^- e^+$	1–8 GeV/c
$K_L \to \mu^- \mu^+ e^- e^+$	"
$K_L \to 2e^- 2e^+$	"

Particles studied K_L

Papers YF 38 (1983) 927 = SJNP 38 (1983) 556.

ITEP-E-822 (1982) Approved 1982; Started 1983.

SEARCH FOR BOUND AND RESONANT STATES IN THE ΛΛ SYSTEM

MOSCOW, ITEP – V M Berezin, E T Bogdanova, V I Chistilin, N P Dobrovolskaya, N D Galanina, E T Gedvillo, N A Khaldeeva, A M Lipkin, V N Markisov, V V Metelov, V A Murysov, A A Nedosekin, A Y Ostapchuk, V A Sadykov, E I Tarkovsky, M E Vishnevsky (Spokesperson), M O Vlasova

Accelerator ITEP *Detector* Spectrometer

Reactions

n nucleus → 2Λ X	2.0–9.5 GeV/c
n nucleus → dibaryon($S = -2$) X	"

Particles studied dibaryon($S = -2$)

ITEP-E-823 (1982) Approved 1982; Started Jan 1983.

MEASUREMENT OF COULOMB-NUCLEAR INTERFERENCE IN $\pi^\pm$ NUCLEUS SCATTERING

MOSCOW, ITEP – V N Afonasjev, V S Borisov (Spokesperson), I N Borodina, G K Bysheva, L L Goldin, L N Gusev, A V Semenov, V P Tchernyshev, G K Tumanov, A O Vaisenberg, Y V Zubkov

Accelerator ITEP *Detector* Counter

Reactions

π^+ nucleus → π^+ X	1.85, 3.0 GeV/c
π^- nucleus → π^- X	"

Comments The targets are ^{6}Li, ^{7}Li, C, and Be. The detector (IRA) consists of proportional chambers and scintillation counters.

Papers YF 40 (1984) 34 = SJNP 40 (1984) 22.

ITEP-E-824 (1982) Approved 1982; Started 1984.

STUDY OF $K_L \to \pi e \nu \gamma$ AND $K_L \to 2\pi e \nu$ DECAYS

MOSCOW, ITEP – M Y Balatz, V M Berezin, E T Bogdanova, V I Chistilin, N P Dobrovolskaya, G B Dzyubenko, N D Galanina, E T Gedvillo, A D Kamensky, N A Khaldeeva, V S Lakaev, A M Lipkin, V N Markisov, V V Memelov, V A Murysov, A A Nedosekin, A Y Ostapchuk, V A Sadykov, S F Semin, A I Sitnikov, E I Tarkovsky, M E Vishnevsky (Spokesperson), V E Vishnyakov, M O Vlasova, S V Zhelnin

Accelerator ITEP *Detector* Wire chamber

Reactions

$K_L \to \pi^+ e^- \bar{\nu}_e \gamma$	1–8 GeV/c
$K_L \to \pi^- e^+ \nu_e \gamma$	"
$K_L \to \pi^+ \pi^0 e^- \bar{\nu}_e$	"
$K_L \to \pi^0 \pi^- e^+ \nu_e$	"

Particles studied K_L

ITEP-E-831 (1983) Approved 1983; Started 1984.

MEASUREMENT OF π^-, π^+, p, ^{2}H, ^{3}H, AND ^{3}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, A A Sibirzev, N Smirnov, N V Stepanov, Y V Trebukhovsky (Spokesperson), I A Voronzov

Accelerator ITEP *Detector* Spectrometer

Reactions

p nucleus → π^+ X	3.7–9.2 GeV (T_{lab})
p nucleus → π^- X	"
p nucleus → p X	"
p nucleus → deut X	"
p nucleus → trit X	"
p nucleus → ^{3}He X	"

KEK-PF-000 (1986) Approved Feb 1986; Started Jan 1986; Completed Jul 1986.

SEARCH FOR AXION-LIKE PARTICLES

KYOTO U – K Imai, H Kobayashi, A Konaka, A Masaike, K Miyake, N Nagamine, T Nakamura, N Sasao (√ Spokesperson)

KEK – A Enomoto, Y Fukushima, E Kikutani, H Koiso, H Matsumoto, K Nakahara, S Ohsawa, I Sato, T Taniguchi, J Urakawa

Accelerator KEK-PF-LINAC *Detector* Wide-angle spectrometer

Reactions

e^- Wt → axion X	2.5 GeV (E_{lab})

Particles studied axion

Comments Looks for e^+e^- and $\gamma\gamma$ decay modes of the axion.

Papers PRL 57 (1986) 659.

KEK-TE-001 Approved Mar 1983.

TRISTAN e^+e^- EXPERIMENTS BY THE VENUS COLLABORATION

OSAKA U – J Haba, T Kamitani, H Kaneko, Y Nagashima (✓ Spokesperson), H Osabe, S Sugimoto, S Tatsumi, T Yamashita
KYOTO U – Y Hemmi, R Kikuchi, K Kubo, H Kurashige, K Miyake, T Nakamura, N Sasao, N Tamura, Z Yamada
HIROSHIMA U – M Asai, I Endo, I Hayashibara, S Kajiyama, Y Kurihara, K Morita, T Osugi, Y Sumi, R Tanaka, J Uehara, S Yasuishi
TSUKUBA U – Y Asano, S Mori, I Nakano, M Nishiyama, M Shioten, Y Takada, K Takikawa
TOHOKU GAKUIN U – M Higuchi, Y Hoshi, M Sato
KOBE U – Y Homma, Y Noguchi, A Ono, H Sakae
FUKUI U – J Iwahori, H Yoshida
TOKYO U OF AGRIC TECH – T Emura
RIKKYO U – H Murakami
KYUSHU U – K Ishibashi
TOKYO METROPOLITAN U – M Chiba, I Hirata, T Hirose, M Murashita, Y Nakagawa, J Saito, T Watanabe
KEK – K Amako, R Arai, Y Arai, M Fukawa, Y Fukushima, K Hayashi, N Ishihara, J Kanzaki, T Kondo, T Koriki, S Kurokawa, T Matsui, S Nakamura, T Obama, S Odaka, K Ogawa, H Sakamoto, H Sakuda, J Shirai, F Suekane, T Sumiyoshi, F Takasaki (✓ Spokesperson), Y Teramoto, K Tobimatsu, T Tsuboyama, S Uehara, Y Unno, M Wake, Y Watase

Accelerator KEK-TRISTAN *Detector* VENUS

Reactions

$e^+ e^-$	< 70 GeV (E_{cm})

Comments For a description of the apparatus, see the LBL-91 supplement on detectors.

KEK-TE-002 Approved Mar 1983.

STUDY OF e^+e^- ANNIHILATION PHENOMENA BY A DETECTOR WITH PARTICLE IDENTIFICATION

TOPAZ COLLABORATION

TOKYO U – H Aihara, H Fujii, K Ishikawa, R Itoh, T Kamae, T Kishida, N Kusuki, M Kuze, F Sai, A Shirahashi, J Toyoura, S S Yamamoto
TOKYO U, INS – A Imanishi, T Ishii, S Katoh, K Maruyama, T Ohshima, H Okuno, K Ukai, M Yoshioka
NAGOYA U – I Adachi, J Fujimoto, R Kajikawa (✓ Spokesperson), S Kuroda, H Masuda, H Ozaki, A Sugiyama, S Suzuki, T Takahashi, H Takamure, T Tsukamoto, S Uno
NARA WOMENS U – N Fujiwara, H Hayashii, N Iida, N Nishiwaki, S Noguchi, S Yamashita
OSAKA CITY U – S Azuma, C Chou, A Maruyama, T Okusawa, T Satoh, T Takahashi, T Tanaka
KOBE U – T Fujii
TOKYO U OF AGRIC TECH – K Takahashi, T Ueda
OKAYAMA U – T Suwada
KEK – H B Dijkstra, R Enomoto, K Fujii, H Ikeda, H Iwasaki, S Iwata (✓ Spokesperson), S Kawabata, H Kichimi, M Kobayashi, T Matsuda, A Miyamoto, K Nakamura, F Ochiai, T Satoh, R Sugahara, T Tauchi, Y Watanabe, O Yamakawa, A Yamamoto, M Yamauchi, Y Yoshimura

Accelerator KEK-TRISTAN *Detector* TOPAZ

Reactions

$e^+ e^-$	< 70 GeV (E_{cm})

Comments Searches for new particles such as heavy quarks, heavy leptons, and various scalar 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. For a description of the apparatus, see the LBL-91 supplement on detectors.

KEK-TE-003 (1983) Approved Nov 1983.

AMY — A HIGH RESOLUTION LEPTON DETECTOR FOR TRISTAN

AMY COLLABORATION

ROCHESTER U – A Bodek, H Budd, T Gentile, F Lobkowicz, S L Olsen (Spokesperson), R Poling, C Rosenfeld, W Sakamoto, E H Thorndike, K Ueno
OHIO STATE U – H A Kagan, R D Kass
VIRGINIA TECH – A Abashian, K Gotow, F Kajino, S Schnetzer
UC, DAVIS – W Ko, R Lander
BEIJING, IHEP – C P Chen, Y C Zhu
TOKYO INST TECH – R Chiba, K Hara, K Ichimaru, S Igarashi, J Kato, Y Mihara, T Mori, K Nakayama, H Yokota
NIIGATA U – K Miyano
SAITAMA U – T Ishizuka
SAGA UNIV, JAPAN – H Choji, H Itoh, S Kobayashi, S Masumoto, A Murakami, K Toyoshima
KOREA U – J S Kang, K S Sim
CHUNGNAN U, DEAJEON – H Y Lee
CHUO U, TOKYO – S Matsumoto, R Tanaka
KEK – A Abe, M Ando, A Maki (Spokesperson), T Nozaki, Y Sakai, S Terada, K Tsuchiya, H Yoshiki

Accelerator KEK-TRISTAN *Detector* AMY

Reactions

$e^+ e^-$	< 70 GeV (E_{cm})

KEK-TE-004 (Nov 1984) Approved Apr 1985.

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

$e^+ e^-$	60 GeV (E_{cm})

Particles studied monopole

KEK-010 (Mar 1975) Approved Feb 1976; Started Jan 1979; Completed Dec 1980.

SEARCH FOR RARE DECAY MODES $K^+ \to \pi^+\nu\bar{\nu}$, $K^+ \to \pi^+ 2\gamma$, AND $K^+ \to \pi^+$ AXION

KEK – Y Asano, S Kurokawa, M Miyajima, Y Nagashima (✓ Spokesperson), S Sugimoto, Y Yoshimura
TOKYO U – E Kikutani, T Shinkawa
TOKYO U, INS – T Miyachi

Accelerator KEK-PS *Detector* Wire chamber

Reactions

$K^+ \to \pi^+ \nu \bar{\nu}$	500–700 MeV/c
$K^+ \to \pi^+ \gamma \gamma$	"
$K^+ \to \pi^+$ axion	"
$K^+ \to \mu^+$ hvy-ν	"

Particles studied K^+

Papers PL 104B (1981) 84, PL 107B (1981) 159, and PL 113B (1982) 195.

KEK-034 (Jan 1976) Approved Feb 1976; Started Jan 1979; Completed Dec 1980.

MEASUREMENT OF THE POLARIZATION FOR THE REACTIONS $K^+n \to K^+n$, $\to K^0p$ AT 1.06, 1.28, 1.39, AND 1.49 GeV/c

KEK – H Hirabayashi, N Hiramatsu, H Isagawa, S Kabe, A Masaike, M Morimoto, F Takasaki (Spokesperson), Y Watase
SAGA UNIV, JAPAN – H Ito, S Kobayashi, A Murakami
TOKYO U, INS – K Toshioka, K Watanabe, N Yamashita
TOKYO U OF AGRIC TECH – I Kita
TSUKUBA U – S Miyashita

HIROSHIMA U – S Suetake
TOKYO U – N Kim

Accelerator KEK-PS *Detector* TELAS

Reactions Polarized target

$K^+ n \to K^+ n$	1.06, 1.28, 1.39, 1.49 GeV/c
$K^+ n \to K^0 p$	"

Papers NIM 189 (1981) 369, PL 112B (1982) 75, PL 112B (1982) 80, and NIM 192 (1982) 175.

KEK-049 (Aug 1976) Approved Mar 1978; Started Nov 1981; Completed Nov 1983.

PRODUCTION OF Λ^0 AND K_S^0 BY 12-GeV PROTONS ON NUCLEAR TARGETS

TSUKUBA U – F Abe, Y Asano, K Hara, Y Iguchi, S Kim, K Kondo, S Miyashita, H Miyata, S Mori, I Nakano, T Sugaya, K Takikawa (√ Spokesperson), R Tanaka, Y Yamamoto, T Yasuda, K Yasuoka
KEK – Y Fukui, S Kurokawa, A Maki

Accelerator KEK-PS *Detector* Double-arm spectrometer

Reactions

p nucleus $\to \Lambda$ X	12 GeV/c
p nucleus $\to K_S$ X	"

Particles studied Λ, K_S

Papers PRL 50 (1983) 1102, JPSJ 52 (1983) 4107, NIM 220 (1984) 293, JJAP 23 (1984) 492, PR D30 (1984) 1861, and PR D34 (1986) 1950.

KEK-057 (Nov 1977) Approved Jun 1978; Started Jun 1979; Completed Jun 1981.

STUDIES OF pp INTERACTIONS IN THE MOMENTUM RANGE 0.9–2.0 GeV/c

TOKYO U – H Koiso, Y Kubota, F Sai, S Sakamoto, F Shimizu, S S Yamamoto (√ Spokesperson)

Accelerator KEK-PS *Detector* HBC-1M

Reactions

$p\ p$	0.9–2.0 GeV/c

Papers NP A386 (1982) 571, and NP A389 (1982) 445.

KEK-062 (Mar 1979) Approved Mar 1979, Feb 1980; Started Jun 1979; Completed Jul 1981.

STUDY OF $\bar{p}p$ REACTIONS IN THE 3 TO 5 GeV/c REGION

KEK – M Fukawa, F Ochiai, A Ono, T Sato, R Sugahara, K Takahashi, Y Yoshimura (√ Spokesperson)
NARA WOMENS U – N Fujiwara, S Noguchi, S Yamashita
NIIGATA U – K Miyano

Accelerator KEK-PS *Detector* HBC-1M

Reactions

$\bar{p}\ p$	3.0, 3.5, 4.0, 4.5 GeV/c

Papers ZPHY C23 (1984) 369, ZPHY C24 (1984) 297, and PRL 53 (1984) 1725.

KEK-064 (May 1978) Approved Jun 1979; Started Dec 1981; Completed Feb 1984.

STUDY OF 2π AND 3π STATES IN $\pi^- p$ INELASTIC FORWARD SCATTERING

KEK – A Ando, S Inaba, T Inagaki, T Satoh, K Takamatsu, T Tsuru (√ Spokesperson), Y Yasu
KYOTO U – K Imai, Y Inagaki, T Nakamura, J Shirai, R Takashima, N Tamura
TOKYO U, INS – K Maruyama, H Okuno
TOKYO U – A Itano
SAGA UNIV, JAPAN – S Kobayashi, A Murakami
AKITA U – A Sasaki
TSUKUBA U – K Ohmi

Accelerator KEK-PS *Detector* SUPERBENKEI

Reactions

$\pi^- p \to n \pi^+ \pi^-$	< 8 GeV/c
$\pi^- p \to n \pi^+ \pi^- \pi^0$	"
$\pi^- p \to n \pi^+ \pi^- \eta$	"

Papers Cryogenics (Feb. 1984) 83, NIM 225 (1984) 347, and PRL 57 (1986) 1296.

KEK-074 (Dec 1979) Approved Feb 1980; Started Jan 1981; Completed Jul 1981.

SEARCH FOR BARYONIUM STATES IN $\bar{p}N$ INTERACTIONS

TOKYO U – J Chiba, T Fujii, H Iwasaki, T Kageyama, S Kuribayashi, K Nakamura (√ Spokesperson), T Sumiyoshi, T Takeda
KEK – H Ikeda
TSUKUBA U – Y Takada

Accelerator KEK-PS *Detector* Single-arm spectrometer

Reactions

$\bar{p}\ p \to$ X	335–960 MeV/c
$\bar{p}\ p \to \bar{p}\ p$	"
$\bar{p}$ deut $\to$ X	"
$\bar{p}$ deut $\to \bar{p}$ X	"

Comments See also KEK-074A for the continuation.

Papers PRL 49 (1982) 628, NIM 206 (1983) 451, JJAP 22 (1983) 1606, and PRL 52 (1984) 731.

KEK-074A (Jul 1981) Started Oct 1982; Completed Feb 1983.

SEARCH FOR BARYONIUM STATES IN $\bar{p}N$ INTERACTIONS

TOKYO U – T Fujii, T Kageyama, K Nakamura (√ Spokesperson), F Sai, S Sakamoto, S Sato, T Takahashi, T Tanimori, S S Yamamoto
TSUKUBA U – Y Takada

Accelerator KEK-PS *Detector* Wide-angle spectrometer

Reactions

$\bar{p}\ p \to \bar{p}\ p$	390–780 MeV/c
$\bar{p}\ p \to \bar{n}\ n$	"
$\bar{p}\ p \to \pi^+ \pi^-$	"
$\bar{p}\ p \to K^+ K^-$	"

Comments Phase II of KEK-074.

Papers NIM 215 (1983) 357, NIM 216 (1983) 57, PRL 53 (1984) 885, PR C31 (1985) 1853, PRL 55 (1985) 1835, and JJAP 24 (1985) 1522.

KEK-075 (Dec 1979) Approved Feb 1980; Started Jan 1980; Completed May 1980.

MEASUREMENTS OF POLARIZATION PARAMETERS IN ELASTIC pn SCATTERING

KEK – S Isagawa, S Ishimoto, A Masaike, K Morimoto, K Ogawa (√ Spokesperson), F Takasaki, Y Watase
SAGA UNIV, JAPAN – S Kobayashi, A Murakami
KYOTO U – N Hoshizaki, M Sakuda
TOKYO U – N Kim, K Nakajima

Accelerator KEK-PS *Detector* TELAS

Reactions Polarized target

$p\ n \to p\ n$	1.3, 1.39, 1.59, 1.82 GeV/c

Papers PR D25 (1982) 2004.

KEK-079 (Feb 1980) Approved Feb 1980; Started Apr 1980; Completed Jun 1980.

CALIBRATION OF ELECTRON/PION IDENTIFICATION EFFICIENCY IN THE BUBBLE CHAMBER

TOHOKU U – K Abe, K Hasegawa, T Hayashino, T Kitagaki (√ Spokesperson), M Kiyono, S Kunori, Y Ohtani,

H Takanashi, K Tamai, S Tanaka, Y Unno, A Yamaguchi, H Yuta
TOHOKU GAKUIN U – M Chikawa, M Higuchi, Y Kawada, M Sato
NARA WOMENS U – N Fujiwara, E Muraoka, K Noda, S Noguchi, S Yamashita
KEK – K Takahashi

Accelerator KEK-PS *Detector* HBC-1M

Comments Ta and Pb plates in the chamber.

KEK-080 (Apr 1980) Approved May 1980; Started May 1981; Completed Jul 1981.

STUDY OF *dp* REACTIONS FROM 2.0 TO 4.0 GeV/*c*

TOKYO U – M Kajita, N Katayama, H Koiso, Y Kubota, F Sai (√ Spokesperson), S Sakamoto, F Shimizu, T Tsuboyama, S Yamamoto

Accelerator KEK-PS *Detector* HBC-1M

Reactions

deut p	2–4 GeV/c

Papers NP A423 (1984) 410, NP A438 (1985) 685, and PRL 55 (1985) 2668.

KEK-081 (May 1980) Approved May 1980; Started Nov 1981; Completed Jul 1982.

ASYMMETRY IN THE ELASTIC SCATTERING OF K^+ AND π^+ FROM DEUTERIUM NEAR 1.5 GeV/*c*

UCLA – M Gazzaly, M Hajisaeid, G J Igo (Spokesperson), F Irom, T Kobayashi, G Pauletta, A T H Wang
KEK – M Fukawa, S Isagawa, S Ishimoto, A Masaike (Spokesperson), K Morimoto
TOKYO U – T Hasegawa, K Nisimura, F Soga
NIHON U, TOKYO – I Yamauchi
KYOTO U OF EDUCATION – A Okihana
HIROSHIMA U – H Hasai, K Iwatani, F Nishiyama
NAGOYA U – N Horikawa, T Nakanishi, Y Ohashi

Accelerator KEK-PS *Detector* TELAS

Reactions Polarized target

K^+ deut → K^+ deut	1.5, 1.7 GeV/c
π^+ deut → π^+ deut	0.74, 1.5 GeV/c

KEK-082 (Jun 1980) Approved Oct 1980; Completed 1985.

NUCLEAR REACTIONS WITH HIGH ENERGY PARTICLE BEAMS

TSUKUBA U – Y Asano, S Mori (√ Spokesperson), M Noguchi, M Sakano
KEK – H Hirabayashi, H Ikeda, K Kato, K Kondo, M Takasaki, A Yamamoto

Accelerator KEK-PS *Detector* Counter

Reactions

p nucleus	< 13 GeV/c

Papers PR C28 (1983) 1718, PR C28 (1983) 1840, and JPSJ 54 (1985) 3734.

KEK-083 (Aug 1980) Approved Oct 1980; Started Jan 1982; Completed Jul 1982.

MEASUREMENT OF πd ELASTIC SCATTERING

HIROSHIMA U – M Akemoto, K Baba, I Endo, H Himemiya, K Inoue, T Kawamoto, Y Maeda, T Ohsugi, R Ohtani, Y Sumi (√ Spokesperson), T Takeshita, T Uehara, T Umeda
KITAKYUSHU, UNIV OCCUP ENVIR HEALTH – T Maki, M Nakano

Accelerator KEK-PS *Detector* Double-arm spectrometer

Reactions

π^- deut → π^- deut	0.42–1.16 GeV/c
π^+ deut → p p	0.48–1.16 GeV/c

Particles studied dibaryon

Papers NIM 188 (1981) 51, PRL 50 (1983) 400, PRL 51 (1983) 1838, PL 149B (1984) 321, and PTP 75 (1986) 646.

KEK-084 (Sep 1980) Approved Oct 1980; Started Feb 1981; Completed Jul 1981.

STUDY OF HADRON-NUCLEUS INTERACTIONS WITH EMULSION CHAMBERS

NAGOYA U – H Fuchi, S Fukui (√ Spokesperson), K Hoshino, K Niu, K Niwa, T Yamaki, Y Yanagisawa
TOKYO U, INS – T Hasagawa, M Koike

Accelerator KEK-PS *Detector* Emulsion

Reactions

p nucleus	3 GeV/c
$\bar{p}$ nucleus	"
π^- nucleus	2–4 GeV/c

KEK-089 (Oct 1980) Approved Oct 1980; Started Oct 1981; Completed Feb 1982.

SEARCH FOR A HEAVY NEUTRINO EMITTED IN $K^+ \to \mu^+\nu$ DECAY

TOKYO U – R Enomoto, T Fujii, R S Hayano, S Sato, T Taniguchi, T Tanimori, T Yamanaka, T Yamazaki (√ Spokesperson)
KEK – Y Asano, S Kurokawa, S Schnetzer

Accelerator KEK-PS *Detector* Wire chamber

Reactions

$K^+ \to \mu^+ \nu$	< 0.5 GeV/c
$K^+ \to \pi^+$ X	"

Papers PL 104B (1981) 84, PRL 49 (1982) 1305, and PRL 52 (1984) 1089.

KEK-090 (Jan 1981) Approved Oct 1981; Completed Feb 1984.

STUDY OF HIGH ENERGY NUCLEAR REACTIONS WITH LARGE APERTURE MULTIPARTICLE DETECTOR

TOKYO U – I Arai, K Nakai (Spokesperson), H Nobuyo, S Sasaki, T Shibata
TOKYO INST TECH – R Chiba, K Ichimaru, Y Mihara, K Nakayama, H Yokota

Accelerator KEK-PS *Detector* FANCY

Reactions

p nucleus	1–5 GeV/c
π^+ nucleus	"

Papers NP A418 (1984) 163C.

KEK-092 (Jan 1981) Approved Feb 1981; Started Apr 1982; Completed Feb 1984.

MEASUREMENTS OF ASYMMETRY PARAMETER IN $\Sigma^+ \to p\gamma$ DECAY

KYOTO U – J Baba, Y Hemmi, H Kawai, R Kikuchi, M Kobayashi, K Miyake (Spokesperson), S Nakamura, T Nakamura, K Nishimura, N Sasao, A Tamura, S Yoshioka

Accelerator KEK-PS *Detector* TELAS

Reactions

Σ^+	—

Comments Approved for 960 hours.

KEK-094 (Feb 1981) Approved Jun 1981; Completed Nov 1983.

REACTION MECHANISMS IN π-NUCLEUS INTERACTIONS

SAGA UNIV, JAPAN – H Ito (Spokesperson), S Kobayashi, A Murakami
TOKYO METROPOLITAN U – T Hirose, T Wada

KEK – S Kishiro
TOKYO U OF AGRIC TECH – K Takahashi
TOKYO U, INS – C Nagoshi
INDUSTRIAL MEDICAL COLL, KITAKYUSHU – T Maki
KYUSHU U – A Yoshimura

Accelerator KEK-PS *Detector* Streamer chamber

Reactions

π^+ nucleus → n X	0.2–2.0 GeV/c
π^- nucleus → n X	"

KEK-099 (Jan 1982) Approved Mar 1982; Started May 1982; Completed Jul 1982.

STUDY OF μ^+ POLARIZATION IN $K_{\mu 2}$ DECAY

TOKYO U – R Hayano (√ Spokesperson), T Ishikawa, T Taniguchi, T Yamanaka, T Yamazaki
KEK – S R Schnetzer

Accelerator KEK-PS *Detector* Single-arm spectrometer

Reactions

$K^+ \rightarrow \mu^+ \nu$	0 GeV/c

Comments Same setup as KEK-089.

Papers PRL 52 (1984) 329, and PR D34 (1986) 85.

KEK-104 (May 1982) Completed Oct 1982.

SEARCH FOR HEAVY NEUTRINOS IN $K^+ \rightarrow \mu^+\nu$, $\rightarrow e^+\nu$

TOKYO U – Y Akiba, R Hayano, T Ishikawa, M Iwasaki, A Otake, T Taniguchi, T Yamanaka, T Yamazaki (√ Spokesperson)
KEK – S R Schnetzer

Accelerator KEK-PS *Detector* Single-arm spectrometer

Reactions

$K^+ \rightarrow \mu^+ \nu$	—
$K^+ \rightarrow e^+ \nu$	—

Papers PRL 52 (1984) 1089, PR D32 (1985) 2911, and PRL 54 (1985) 102.

KEK-113 (Mar 1983) Approved Apr 1983; Started Dec 1983; Completed Feb 1984.

DEUTERON FROM p NUCLEUS REACTIONS

TOKYO U – H Enyo, Y Miake (Spokesperson), T Nagae, S Nagamiya, K Nakai, H Sano, S Sasaki, K Tokujuku
TOKYO INST TECH – K Ichimaru
TOKYO U, INS – Y Murata, I Tanihata, M Yoshikawa

Accelerator KEK-PS *Detector* TOKIWA

Reactions

p nucleus → deut X	1–4 GeV/c

Comments Approved for 480 hours.

KEK-117 (Mar 1983) Approved Feb 1984.

STUDIES OF Λ AND Σ HYPERNUCLEI BY STOPPED K^-

TOKYO U – R Hayano (√ Spokesperson), T Ishikawa, M Iwasaki, H Outa, H Tamura, T Yamazaki
KEK – K Tanaka
HEIDELBERG, MAX PLANCK INST – W Brueckner, H Doebbling, S Paul, B Povh, A Sakaguchi, R Schuessler

Accelerator KEK-PS *Detector* Double-arm spectrometer

Reactions

K^- nucleus → π^- p X	0 MeV/c

Particles studied hypernuc

KEK-121 (Mar 1983) Approved Apr 1983; Started Nov 1983; Completed Feb 1984.

STUDY OF FEW PION STATES IN THE $\pi^- p$ EXCHANGE REACTION

KEK – A Ando, S Inabe, T Inagaki (√ Spokesperson), T Satoh, K Takamatsu, T Tsuru, Y Yasu
KYOTO U – K Imai, Y Inagaki, T Nakamura, J Shirai, R Takashima, N Tamura
TSUKUBA U – K Ohmi
SAGA UNIV, JAPAN – S Kobayashi, A Murakami
AKITA U – A Sasaki

Accelerator KEK-PS *Detector* SUPERBENKEI

Reactions

$\pi^- p \rightarrow n \eta K^0 \overline{K}^0 \pi^0$	8 GeV/c

Comments An extension of KEK-064.

KEK-125 (Sep 1983) Approved Feb 1984; Started Jan 1986; Completed Mar 1986.

STUDIES OF *dd* INTERACTIONS IN THE RANGE OF 2–4 GeV/c

TOKYO U – F Sai, S S Yamamoto (√ Spokesperson)
KYOTO U – K Imai
HIROSHIMA U – K Baba, I Endo, Y Sumi
KEK – A Masaike
TOKYO U, INS – K Nishimura

Accelerator KEK-PS *Detector* Counter

Reactions

deut deut → X	1.5–4 GeV/c

Comments Measures the total cross section.

KEK-131 Approved Oct 1984; Completed Mar 1986.

CONFIRMATION OF THE NARROW STATE $X(1935)$ IN THE REACTION $\bar{p}p \rightarrow K^+K^-$ AND $\pi^+\pi^-$

KOBE U – T Fujii (√ Spokesperson)
TOKYO U, INS – S Homma, M Sudo
KEK – Y Fujii, S Ishimoto, B Tanaka, T Tanimori
KYOTO U – Y Sugimoto
TOHOKU U – T Kono
HIROSHIMA U – K Morita, K Nakamura, Y Sumi

Accelerator KEK-PS *Detector* ?

Reactions

$\bar{p}\, p \rightarrow K^+ K^- \pi^+ \pi^-$	—
$\bar{p}\, p \rightarrow \pi^+ \pi^-$	—

Particles studied $X(1935)$

KEK-132 (Oct 1984) Approved Apr 1985.

A STUDY OF CUMULATIVE Λ PRODUCTION IN HIGH ENERGY HADRON-NUCLEUS REACTIONS

TSUKUBA U – I Arai (√ Spokesperson), A Manabe, M Ninomiya, H Nunokawa, M Tanaka, K Tomizawa, K Yagi
TOKYO U – T Nagae, H Sano, S Sasaki, K Tokushuku
KEK – J Chiba, T Kobayashi, K Nakai

Accelerator KEK-PS *Detector* FANCY

Reactions

pion ^{12}C → Λ X	< 4 GeV/c
p ^{12}C → Λ X	"

Comments Approved for 50 shifts. Measures inclusive cross sections and polarizations, and studies multi-nucleon correlations in nuclei.

KEK-133 Approved Oct 1984; Started Jul 1985; Completed Dec 1985.

STUDY OF EXCITED NUCLEONS IN NUCLEI

KEK – J Chiba (√ Spokesperson), K Nakai
TOKYO U – T Nagae, H Sano, S Sasaki, M Sekimoto, K Tokushuku

TSUKUBA U – K Aoki, I Arai, A Manabe, H Nunokawa, H Sakamoto

Accelerator KEK-PS *Detector* FANCY

Reactions

p nucleus → $\Delta(1232\,P_{33})^0$ X	3.9 GeV/c

Comments Quasi-free production of Δ^0 isobars in proton nucleus reactions. The nuclear targets are C, Al, Cu, Li, and CD_2.

Papers NIM A237 (1985) 559.

KEK-135 (Sep 1984) Approved Feb 1985; Started Jan 1986; Completed Jul 1986.

MESON SPECTROSCOPY BY CHARGE-EXCHANGE REACTIONS

KEK – S Inaba, T Inagaki, T Satoh, K Takamatsu, T Tsuru (√ Spokesperson), Y Yasu
KYOTO U – Y Inagaki, T Nakamura
KYOTO U OF EDUCATION – R Takashima
TSUKUBA U – K Ohmi
NAGOYA U – S Fukui, N Horikawa, T Iwata, T Kinashi, M Kurashina, I Maeda, T Matsuda, K Mori, T Nakanishi
MIYAZAKI U – Y Ishizaki

Accelerator KEK-PS *Detector* SUPERBENKEI

Reactions

$\pi^- p \rightarrow \eta \pi^+ \pi^- n$	9 GeV/c
$\pi^- p \rightarrow \pi^+ \pi^- 4\gamma n$	"

Particles studied $f_0(1590)$, $X(1700)$, $f_2(1720)$

KEK-136 (Jan 1985) Approved Feb 1985; Completed 1986.

SEARCH FOR LONG-LIVED HADRONS WITH CHARGE TWO

KYOTO U – K Imai, H Kobayashi, A Konaka, A Masaike, K Miyake, T Nakamura, N Sasao (√ Spokesperson), Y Yamada

Accelerator KEK-PS *Detector* Wire chamber

Reactions

p nucleus → hadron X	12 GeV (E_{lab})

Particles studied longlived

KEK-137 Approved Oct 1985.

STUDY OF THE RARE DECAY $K_L \rightarrow \mu e$

KEK – T Inagaki (Spokesperson), M Kobayashi, T Satoh, T Shinkawa, K Takamatsu, Y Yoshimura
TOKYO U – F Sai, S S Yamamoto
KYOTO U – Y Hemmi

Accelerator KEK-PS *Detector* Wire chamber

Reactions

$K_L \rightarrow \mu^+ e^-$	2–8 GeV/c
$K_L \rightarrow \mu^- e^+$	"

Particles studied K_L

KEK-146 Approved Feb 1986.

CHEMISTRY OF π^- MESONIC ATOMS — STUDIES OF ELECTRONIC CHARGE DISTRIBUTION AROUND HYDROGEN IN MATTER

KYOTO U – I Fujiwara, N Imanishi, M Iwasaki (√ Spokesperson), S Iwata, T Mukoyama, Y Takeuchi, K Toyada
TOHOKU U – K Hashimoto, H Kaji, T Sekini, K Yoshihara
OSAKA U – H Baba, T Saito, A Shinohara, S Yakamatsu, A Yokohama
KEK – Y Yoshimura

Accelerator KEK-PS *Detector* ?

Reactions

π^-	140 MeV/c

Comments Approved for 30 shifts.

KEK-150 (Feb 1986) Approved Feb 1986.

STUDY OF HYPERNUCLEI VIA (π^-, K^-) REACTIONS

TOKYO U – J Imazato, T Ishikawa, M Iwasaki, K Nagamine, O Sasaki, E Takada, H Tamura
OSAKA U – H Ejiri, T Fukuda, M Fukufa, T Irie, H Noumi, H Osumi, T Shibata (√ Spokesperson)
TOKYO U, INS – H Hamagaki, O Hashimoto (√ Spokesperson), S Homma, M Koike, Y Matsuyama, K Omata, Y Shida, F Soga, N Yoshikawa
KEK – R Hayano, K H Tanaka
YAMAGATA U – S Kato
KYOTO INDUSTRIAL U – F Takeuchi
TOHOKU U – K Maeda

Accelerator KEK-PS *Detector* Spectrometer

Reactions

π^- nucleus → K^- X	1.0–1.2 GeV/c

Comments Approved for 100 shifts.

LAMPF-015 (Jun 1977) Started Aug 1978; Completed Jan 1980.

ELASTIC SCATTERING AND TOTAL CROSS SECTION MEASUREMENTS OF PROTONS ON HYDROGEN, DEUTERIUM, AND HELIUM

LOS ALAMOS – N Tanaka (Spokesperson)
BROOKHAVEN – R E Chrien, T Kozlowski, H Palevsky, R J Sutter
MINNESOTA U – N M Hintz, M Oothoudt
UCLA – J C Fong, G J Igo (Spokesperson), R J Ridge, C A Whitten

Accelerator LAMPF *Detector* LAHRS

Reactions Polarized beam

$p\,p \rightarrow p\,p$	800 MeV (T_{lab})
p deut → p deut	"
p He → p He	"

Comments Lab angles 1–15° span from dominant coulomb to nuclear scattering. Ran 324 hours.

Papers PL 97B (1980) 33.

LAMPF-032 (Mar 1971) Started Feb 1974; Completed Nov 1980.

PRECISION MEASUREMENT OF THE PROCESSES $\pi^{\pm} \rightarrow \pi^0 e^{\pm} \nu$

TEMPLE U – L B Auerbach, F G Gaille, V L Highland, E Jastrzembski, W K McFarlane (√ Spokesperson)
LOS ALAMOS – F H Cverna, C M Hoffman, G E Hogan, R J Macek (√ Spokesperson), R E Morgado, J Pratt, R D Werbeck

Accelerator LAMPF *Detector* Counter

Reactions

$\pi^+ \rightarrow \pi^0 e^+ \overline{\nu}$	520 MeV/c
$\pi^+ p \rightarrow \pi^0 n$	522 MeV/c

Particles studied π^+

Comments The detector is a lead glass hodoscope. A decay-in-flight technique was used to obtain the most precise measurement to date for this decay rate. The result is (0.394±0.015)/s, in good agreement with the prediction of (0.4027±0.018)/s based on the conserved-vector-current hypothesis and measured nuclear beta-decay rates.

Papers PRL 51 (1983) 249, PR D30 (1984) 2408, and PR D32 (1985) 547. No other papers expected.

LAMPF-058-120 (Aug 1972) Started Sep 1980; Completed Jul 1982.

MEASUREMENT OF $\pi^- p \to \gamma n$, AND MEASUREMENT OF THE POLARIZATION ASYMMETRY AND THE DIFFERENTIAL CROSS SECTION OF πN CHARGE EXCHANGE FROM 160 TO 500 MeV

UCLA – P Glodis, R P Haddock, K C Leung, B M K Nefkens (√ Spokesperson)
CATHOLIC U – D I Sober (√ Spokesperson)
LOS ALAMOS – C F Hwang

Accelerator LAMPF *Detector* Counter

Reactions Polarized target

$\pi^- p \to \gamma n$	247, 687 MeV/c
$\pi^- p \to \pi^0 n$	"
$\pi^- p \to \pi^- p$	"
$\pi^+ p \to \pi^+ p$	"

Comments Ran 1580 hours. The analysis is continuing.

Papers NP A416 (1984) 193, NP A416 (1984) 217, and NP A416 (1984) 513.

LAMPF-190 Started Oct 1981.

A PRECISION MEASUREMENT OF THE π^--π^0 MASS DIFFERENCE

VIRGINIA U – J Comiso, R C Minehart, K O H Ziock (Spokesperson)

Accelerator LAMPF *Detector* Counter

Reactions

$\pi^- p \to \pi^0 n$	25–50 MeV (T_{lab})

Particles studied π^-, π^0

Comments An attempt to measure the π^--π^0 mass difference to an accuracy of 500 eV by measuring the neutron energy. Approved for 200 hours.

LAMPF-194 (Aug 1974) Started Nov 1979; Completed Apr 1981.

PROTON-PROTON D, R, AND A MEASUREMENTS

CASE WESTERN RESERVE U – H W Baer, P R Bevington, F H Cverna, M W McNaughton, H B Willard (Spokesperson), E Winkelman
VIRGINIA TECH – R A Arndt, L D Roper
TEXAS A AND M – R A Bryan
SUNY COLLEGE, GENESEO – J R Chen
LOS ALAMOS – E P Chamberlin, R R Stevens, Jr
FERMILAB – P A Thompson
IDAHO U – H Willmes
UC, DAVIS – N King

Accelerator LAMPF *Detector* Counter

Reactions Polarized beam

$p p \to p p$	647, 800 MeV (T_{lab})

Comments Measures D_{NN}, D_{LS}, K_{NN}, K_{SS}, and K_{SL} from 46 to 90° c.m. Ran 499 hours.

LAMPF-225 (Feb 1975) Started Sep 1983; Completed Dec 1986.

A STUDY OF NEUTRINO-ELECTRON SCATTERING

UC, IRVINE – R C Allen, H H Chen (√ Spokesperson), P J Doe, W P Lee, X Q Lu, M Potter
LOS ALAMOS – T J Bowles, R L Burman, R D Carlini, D R F Cochran, J S Frank, E Piasetzky, V D Sandberg
MARYLAND U – D A Krakauer, R L Talaga

Accelerator LAMPF *Detector* Counter

Reactions

$\nu_e e^- \to \nu_e e^-$	20–53 MeV (T_{lab})

Comments A 15-ton detector system giving 120 elastic events in two years. Measures cross sections. Subsidiary results would be a test of multiplicative lepton-number conservation in μ^+ decay, a search for $\bar{\nu}_\mu \to \bar{\nu}_e$ oscillations, a measurement of the inverse beta cross section in ^{12}C, and a search for anomalous neutrino events.

Papers PRL 55 (1985) 2401.

LAMPF-295 (Jul 1976) Completed.

STUDY OF THE πd SINGLE CHARGE-EXCHANGE REACTION $d(\pi^-, \pi^0)2n$

LOS ALAMOS – J D Bowman (√ Spokesperson), M D Cooper, W R Gibbs, R H Heffner, C M Hoffman, J Potter, G J Stephenson, M Zaider
TEL AVIV U & LOS ALAMOS – M A Moinester (√ Spokesperson)
TEL AVIV U – J Alster, S Gilad
CASE WESTERN RESERVE U – H W Baer, P R Bevington, F H Cverna, M W McNaughton

Accelerator LAMPF *Detector* Spectrometer

Reactions

π^- deut $\to \pi^0 n n$	30–230 MeV (T_{lab})

Comments Measures the double differential cross section at 6 energies and 8 angles.

LAMPF-336 (Jun 1977) Completed Jul 1982.

STUDY OF THE SPIN DEPENDENCE OF pp PION PRODUCTION REACTIONS

RICE U – S D Baker, J M Clement, I M Duck, G S Mutchler (√ Spokesperson), G P Pepin, G C Phillips, E A Umlond
HOUSTON U – A D Hancock, E V Hungerford, B W Mayes, L S Pinsky (√ Spokesperson), T M Williams
LOS ALAMOS – C F Hwang, M W McNaughton
BOSKOVIC INST, ZAGREB – M Furic

Accelerator LAMPF *Detector* Spectrometer

Reactions Polarized beam

$p p \to p \pi^+ n$	500, 650, 800 MeV (T_{lab})
$p p \to p \pi^0 p$	"

Comments The first kinematically complete measurements using a polarized proton beam. Analyzing powers and cross sections were measured for 12 angle pairs.

Papers PR C27 (1983) 2742.

LAMPF-360 (Nov 1977) Started Mar 1979; Completed Jan 1980.

THE MEASUREMENT OF THE POLARIZATION TRANSFER COEFFICIENTS D_T AND A'_T AT 800 MeV FOR THE REACTIONS $d(p,n)2p$, ^{6}Li$(p,n)^6$Be, AND ^{9}Be$(p,n)^9$B

LOS ALAMOS – B E Bonner, J E Simmons (Spokesperson)
TEXAS U – C L Hollas, C R Newson, R D Ransome, P J Riley (Spokesperson)
TEXAS A AND M – T S Bhatia, G Glass, J C Hiebert, L C Northcliffe, W B Tippens

Accelerator LAMPF *Detector* Single-arm spectrometer

Reactions Polarized beam

p deut $\to n$ X	800 MeV (T_{lab})
p Be $\to n$ X	"

Comments Measures the spin transfer coefficients K_{LL} and K_{NN} at 0°.

Papers PL 103B (1981) 313.

LAMPF-366 (Nov 1977) Started Jan 1980; Completed Mar 1980.

NONRESONANT PION PRODUCTION IN THE REACTION $np \to \pi^- pp$

RICE U – J M Clement, W H Dragoset, I M Duck, G S Mutchler (√ Spokesperson), G P Pepin, G C Phillips
HOUSTON U – J C Allred, E V Hungerford, B W Mayes (√ Spokesperson), L Pinsky, T M Williams

LOS ALAMOS – B E Bonner
TEXAS A AND M – G Glass
BOSKOVIC INST, ZAGREB – M Furic
TEXAS U – C L Hollas, P J Riley

Accelerator LAMPF *Detector* Double-arm spectrometer

Reactions

$n\ p \rightarrow \pi^-\ p\ p$	790 MeV (T_{lab})

Comments Makes kinematically complete measurements at 11 angle pairs. Comparison with $pp \rightarrow pp\pi^0$ data gives information on isospin-0 amplitudes.

LAMPF-385 (May 1978) Started May 1979; Completed Mar 1980.

MEASUREMENT OF THE POLARIZED *pn* ANALYZING POWER $A_Y(\theta)$ FROM 10–70° C.M.

LOS ALAMOS – J F Amann, B E Bonner, G W Hoffmann (Spokesperson), J B McClelland
TEXAS U – M Barlett, R Fergerson, B Hoistad, J Marshall, J A McGill, E C Milner, L Ray
SOUTH CAROLINA U – G S Blanpied

Accelerator LAMPF *Detector* ?

Reactions Polarized beam

p deut	1.46 GeV/c
$p\ n \rightarrow p\ n$	"
$p\ p \rightarrow p\ p$	"

Papers PR C27 (1983) 682.

LAMPF-392 (May 1978) Started 1980; Completed 1983.

A MEASUREMENT OF THE TRIPLE-SCATTERING PARAMETERS D, R, A, R', AND A' FOR *pp* AND *pn* SCATTERING AT 800 MeV

LOS ALAMOS – J F Amann, B E Bonner, J B McClelland
TEXAS U – M L Barlett, R W Fergerson, G W Hoffmann (Spokesperson), J A Marshall, J A McGill, E C Milner

Accelerator LAMPF *Detector* Counter

Reactions Polarized beam

$p\ n \rightarrow p\ n$	500, 800 MeV (T_{lab})
$p\ p \rightarrow p\ p$	"

Papers PR C30 (1984) 279.

LAMPF-400-445 (Jun 1979) Started Dec 1983; Completed 1985.

STUDY OF $\pi^0 \rightarrow 3\gamma$ AND $\pi^+ \rightarrow e^+\gamma\nu$ DECAYS, AND SEARCH FOR LEPTON FLAVOR-VIOLATING DECAYS $\mu^+ \rightarrow e^+e^+e^-$, $\mu^+ \rightarrow e^+2\gamma$, AND $\mu^+ \rightarrow e^+\gamma$

LOS ALAMOS – R D Bolton, J D Bowman, R Carlini, M D Cooper, M Duong-Van, J S Frank, A L Hallin, P Heusi, C M Hoffman (√ Spokesperson), G E Hogan, F G Mariam, H S Matis, R E Mischke, D E Nagle, V D Sandberg, G H Sanders, U Sennhauser, R L Talaga, R Werbeck, R A Williams
STANFORD U – R Hofstadter, E B Hughes, M Ritter, S Wilson
CHICAGO U – D Grosnick, S C Wright
TEMPLE U – V Highland, J McDonough

Accelerator LAMPF *Detector* CRYS-BOX

Reactions

$\pi^0 \rightarrow 3\gamma$	0 MeV/c
$\pi^+ \rightarrow e^+\ \gamma\ \nu_e$	"
$\mu^+ \rightarrow e^+\ e^+\ e^-$	"
$\mu^+ \rightarrow e^+\ \gamma\ \gamma$	"
$\mu^+ \rightarrow e^+\ \gamma$	"

Particles studied μ^+, π^0, π^+

Comments Measures branching ratios for the rare muon decays of 10^{-11}, two orders better than before.

Papers PRL 53 (1984) 1415, PRL 56 (1986) 2461, and PRL 57 (1986) 1402.

LAMPF-402 (May 1978) Started Mar 1979; Completed Mar 1980.

A MEASUREMENT OF THE POLARIZATION TRANSFER COEFFICIENTS $D_T(0°)$ AND $A'_T(0°)$ IN THE REACTION $pp \rightarrow nX$ AT 800 MeV

TEXAS A AND M – T S Bhatia, G C Glass (Spokesperson), J C Hiebert, L C Northcliffe, B Ver West
LOS ALAMOS – B E Bonner, J E Simmons (Spokesperson)
TEXAS U – C L Hollas, C R Newsom, R D Ransome, P J Riley

Accelerator LAMPF *Detector* Single-arm spectrometer

Reactions Polarized beam

$p\ p \rightarrow n\ X$	800 MeV (T_{lab})

Comments Measures the spin transfer coefficients K_{LL} and K_{NN} in the forward direction.

Papers AIP Conf. Proc. 69 (1981) 166.

LAMPF-403 (May 1978) Started Nov 1979; Completed Jan 1980.

A MEASUREMENT OF THE TRIPLE-SCATTERING PARAMETER D_T FOR THE CHARGE-EXCHANGE REGION IN *np* SCATTERING

LOS ALAMOS – B E Bonner (√ Spokesperson), W R Gibbs, M W McNaughton, J E Simmons
TEXAS A AND M – T S Bhatia, G Glass, J C Hiebert, L C Northcliffe, W B Tippens
TEXAS U – C L Hollas, R D Ransome, P J Riley

Accelerator LAMPF *Detector* Single-arm spectrometer

Reactions Polarized beam

$n\ p \rightarrow p\ n$	790 MeV (T_{lab})

Comments Measures the analyzing power A and the spin-transfer parameters K_{NN}, K_{SS}, K_{SL}, and K_{LL} for charge exchange.

Papers PRL 48 (1982) 781.

LAMPF-421 (Jun 1978) Started Sep 1980.

SENSITIVE SEARCH FOR $\mu^- \rightarrow e^-$ CONVERSION

YALE U – V W Hughes (Spokesperson), P A Souder (Spokesperson)
PENN U – S Frankel (Spokesperson)

Accelerator LAMPF *Detector* Wire chamber

Reactions

μ^- nucleus $\rightarrow e^-$ nucleus	0 MeV/c

Particles studied μ^-

Comments The branching ratio relative to ordinary muon capture is predicted to be greater than 10^{-12}. The present upper limit is 10^{-10}. This experiment should test to 10^{-11} or better. Approved for 850 hours.

LAMPF-455 (Nov 1978) Started Jul 1981; Completed.

HIGH-PRECISION STUDY OF THE μ^+ DECAY SPECTRUM

LOS ALAMOS – H L Anderson (√ Spokesperson), J D Bowman (√ Spokesperson), C M Hoffman, H S Matis, R J McKee, D E Nagle
CHICAGO U – W W Kinnison
NATIONAL RESEARCH COUNCIL, OTTAWA – C K Hargrove, H Mes
CARLETON U – A L Carter, D Kessler

Accelerator LAMPF *Detector* Spectrometer

Reactions Polarized beam

$\mu^+ \rightarrow e^+\ \nu_e\ \bar{\nu}_\mu$	0 MeV/c

Particles studied μ^+

Comments By measuring the asymmetry of the e^+ over the energy range, the decay parameters ρ, η, ξ, and δ are determined better than before. Tests $V-A$ theory accuracy.

LAMPF-457 (Nov 1978) Started Feb 1981; Completed Apr 1981.

MEASUREMENT OF THE QUASI-FREE *pn* AND *pp* AND FREE *pp* ANALYZING POWERS, 500–800 MeV

LOS ALAMOS – J E Simmons (Spokesperson)
TEXAS A AND M – T S Bhatia (Spokesperson), G Glass, J C Hiebert, L C Northcliffe, W B Tippens
CASE WESTERN RESERVE U – H B Willard

Accelerator LAMPF *Detector* Single-arm spectrometer

Reactions Polarized beam

$p\ n \rightarrow p\ n$	800 MeV (T_{lab})
$p\ p \rightarrow p\ p$	"

Comments Quasi-elastic, uses deuteron target. Measures for $20 < \theta_{cm} < 75°$.

LAMPF-462 (Nov 1978) Started Feb 1981; Completed Apr 1981.

ANALYZING POWER AND DIFFERENTIAL CROSS SECTIONS FOR THE REACTIONS *pp* → $d\pi^+$ AND *pd* → $t\pi^+$ AT ABOUT 600 MeV AND 400 MeV

NORTHWESTERN U – S G Iversen, M O Kaletka, H Nann (Spokesperson), K K Seth (Spokesperson)
LOS ALAMOS – R L Burman

Accelerator LAMPF *Detector* LAHRS

Reactions Polarized beam

$p\ p \rightarrow$ deut π^+	800 MeV (T_{lab})
p deut → trit π^+	"

Comments Differential cross section and asymmetry measured for c.m. angles 16 to 92°.

Papers PL 88B (1979) 257.

LAMPF-478 (Jun 1979) Started Jan 1980; Completed Mar 1980.

π^+ AND π^- ELASTIC SCATTERING FROM DEUTERIUM

COLORADO U – E F Gibson, J J Kraushaar, T G Masterson (√ Spokesperson), R J Peterson, R S Raymond, R A Ristinen
LOS ALAMOS – R L Boudrie

Accelerator LAMPF *Detector* EPICS

Reactions

π^+ deut → π^+ deut	143 MeV (T_{lab})
π^- deut → π^- deut	"

Comments Tests charge symmetry.

Papers PRL 47 (1981) 220, and PR C26 (1982) 2091.

LAMPF-492 (Jun 1979) Started Jun 1980; Completed Nov 1980.

POLARIMETER CALIBRATIONS AND SEARCH FOR ENERGY-DEPENDENT STRUCTURE IN *pp* ELASTIC SCATTERING VIA CROSS SECTION, ANALYZING POWER, AND WOLFENSTEIN PARAMETER MEASUREMENTS

LOS ALAMOS – R E Anderson, B E Bonner, E P Chamberlin, F H Cverna, O B van Dyck, E W Hoffman, N S P King, M W McNaughton (√ Spokesperson), R E Morgado, G G Ohlsen, R R Stevens, Jr , R L York
CASE WESTERN RESERVE U – P R Bevington, H B Willard (√ Spokesperson)
NEW MEXICO STATE U – G Burleson
TEXAS U – C L Hollas, P J Riley

Accelerator LAMPF *Detector* Combination

Reactions Polarized beam and target

$p\ p \rightarrow p\ p$	1.10, 1.46 GeV/c

Comments Measures the Wolfenstein parameters for *pp* elastic scattering for $5 < \theta_{cm} < 90°$.

Papers PR C24 (1981) 1778, NIM 201 (1982) 315, PL 143B (1984) 343, and NIM A241 (1985) 435.

LAMPF-498 (Jun 1979) Started Jun 1980.

MEASUREMENTS OF LONGITUDINAL CROSS SECTION DIFFERENCE FOR LONGITUDINAL POLARIZED BEAM AND TARGET: $\Delta\sigma_L$ FOR (1) *pp*, (2) *pd*, AND (3) *np*.

ARGONNE – I P Auer (Spokesperson), D Hill, H Spinka, K Toshioka, A Yokosawa
LOS ALAMOS – R E Anderson, E W Hoffman, M W McNaughton
NEW MEXICO STATE U – G R Burleson
CASE WESTERN RESERVE U – H B Willard

Accelerator LAMPF *Detector* Combination

Reactions Polarized beam and target

$p\ p \rightarrow p\ p$	300–800 MeV (T_{lab})
p deut → p deut	425–800 MeV (T_{lab})
$n\ p \rightarrow n\ p$	425, 650, 800 MeV (T_{lab})

Comments Approved for 650 hours.

Papers PR D29 (1984) 2435.

LAMPF-504 (Jun 1979) Started Jun 1980; Completed Nov 1980.

MEASUREMENT OF THE TOTAL CROSS SECTION DIFFERENCE FOR *pp* SCATTERING IN PURE TRANSVERSE INITIAL SPIN STATES IN THE 400–800 MeV REGION

RICE U – S D Baker, M Furic, W Madigan, H E Miettinen, G S Mutchler, G C Phillips (√ Spokesperson), J B Roberts, W V Witsch
HOUSTON U – J C Allred, E V Hungerford, B W Mayes, L S Pinsky, T M Williams
LOS ALAMOS – B E Bonner

Accelerator LAMPF *Detector* Wire chamber

Reactions Polarized beam and target

$p\ p \rightarrow p\ p$	318–800 MeV (T_{lab})

Comments The total-cross-section difference for the protons in pure transverse spin states was measured using precision ion chambers. Data were taken at 12 energies.

Papers PR D31 (1985) 966. No other papers expected.

LAMPF-508 (Jun 1979) Started Jun 1980.

DIBARYON RESONANCES IN PION PRODUCTION

NORTHWESTERN U – S G Iversen, M O Kaletka, H Nann, K K Seth (Spokesperson)
LOS ALAMOS – F H Cverna

Accelerator LAMPF *Detector* LAHRS

Reactions Polarized beam

$p\ p \rightarrow$ deut π^+	400–800 MeV (T_{lab})

Particles studied dibaryon

Comments Measures the polarization asymmetry to determine $^1D_2$ and $^3F_3$ partial waves to investigate possible dibaryon resonances. Approved for 428 hours, with 349 hours run as of October 81.

LAMPF-517 (Jun 1979) Started Jul 1981; Completed Nov 1981.

POLARIZED BEAM AND TARGET EXPERIMENTS IN THE *pp* SYSTEM. PHASE I. A_Y AND A_{YY} FOR THE $d\pi^+$ CHANNEL AND A_{YY} FOR THE ELASTIC CHANNEL FROM 500 TO 800 MeV

LOS ALAMOS – J G J Boissevain, J J Jarmer (Spokesperson), J E Simmons (Spokesperson)
TEXAS A AND M – T S Bhatia, G Glass, J C Hiebert, R A Kenefick, L C Northcliffe (Spokesperson), W B Tippens
WASHINGTON STATE U – G E Tripard
UCLA – D Fitzgerald, J Holt, A Mokhtari

Accelerator LAMPF *Detector* Combination

Reactions Polarized beam and target

$p\,p \rightarrow p\,p$	500, 600, 650, 700, 733, 800 MeV (T_{lab})
$p\,p \rightarrow$ deut π^+	"
$p\,p \rightarrow n\,p\,\pi^+$	"

Particles studied dibaryon

Comments Measures A_{NN}.

Papers PRL 49 (1982) 1135, and PRL 53 (1984) 1984.

LAMPF-518 (Jun 1979) Started May 1982.

POLARIZED BEAM AND TARGET EXPERIMENTS IN THE *pp* SYSTEM: PHASE II. MEASUREMENTS OF A_{ZZ} AND A_{XZ} FOR THE $d\pi^+$ CHANNEL AND FOR THE ELASTIC CHANNEL FROM 500 TO 800 MeV

LOS ALAMOS – E P Chamberlin, J J Jarmer (Spokesperson), J E Simmons (Spokesperson), R L York
TEXAS A AND M – T S Bhatia, G Glass, J C Hiebert, L C Northcliffe (Spokesperson), W B Tippens

Accelerator LAMPF *Detector* Counter

Reactions Polarized beam and target

$p\,p \rightarrow$ deut π^+	500–800 MeV (T_{lab})
$p\,p \rightarrow p\,p$	"

Comments Approved for 150 hours.

Papers PR C31 (1985) 288.

LAMPF-546 (Nov 1979) Started Jan 1980; Completed Oct 1981.

INVESTIGATION OF THE SPIN FORM FACTOR OF ^{3}H AND ^{3}He

UCLA – W J Briscoe (√ Spokesperson), D H Fitzgerald, P F Glodis, B M K Nefkens (√ Spokesperson), M E Sadler, B H Silverman
LOS ALAMOS – R L Boudrie, C L Morris, H A Thiessen

Accelerator LAMPF *Detector* EPICS

Reactions

π^+ trit $\rightarrow \pi^+$ trit	143, 180 MeV (T_{lab})
$\pi^+\,{}^3\mathrm{He} \rightarrow \pi^+\,{}^3\mathrm{He}$	"
π^- trit $\rightarrow \pi^-$ trit	"
$\pi^-\,{}^3\mathrm{He} \rightarrow \pi^-\,{}^3\mathrm{He}$	"

Comments Tests charge symmetry. The analysis is continuing.

Papers PRL 52 (1984) 735.

LAMPF-563 (Jun 1980) Started Jul 1981; Completed Nov 1982.

***pp* ELASTIC SCATTERING AT 800 AND 500 MeV**

TEXAS U – M Barlett, R Fergerson, G W Hoffmann (Spokesperson), B Hoistad, J Marshall, J McGill, E C Milner, L Ray
LOS ALAMOS – J F Amann, B E Bonner, J B McClelland
SOUTH CAROLINA U – G S Blanpied
VIRGINIA TECH – R Arndt

Accelerator LAMPF *Detector* LAHRS

Reactions

$p\,p \rightarrow p\,p$	500, 800 MeV (T_{lab})

Comments Measures the absolute elastic angular distribution and analyzing power to investigate disagreements between data and phase shift analyses and between sets of data. Measures for $8 < \theta_{cm} < 90°$.

Papers PR C27 (1983) 682.

LAMPF-567 (Jun 1980)

A STUDY OF THE $\pi^+ d \rightarrow pp$ REACTION AT PION ENERGIES 5–200 MeV

SOUTH CAROLINA U – G S Blanpied, R D Edge, B M Preedom, B G Ritchie (Spokesperson)
VIRGINIA TECH – M Blecher, K Gotow (Spokesperson), R Ng
VIRGINIA U – J Boswell, J F Davis, R C Minehart (Spokesperson)
MARYLAND U – N S Chant, P G Roos
LOS ALAMOS – R L Burman, M Hynes, M J Leitch
OAK RIDGE – F E Bertrand, E E Gross, F Obenshain
MIT – R P Redwine

Accelerator LAMPF *Detector* Counter

Reactions

π^+ deut $\rightarrow p\,p$	65, 72.5, 80, 95, 110, 125, 140 MeV (T_{lab})
$\pi^+\,p \rightarrow \pi^+\,p$	"

Comments Differential cross section measured for c.m. angles 100 to 168°.

Papers PR C27 (1983) 1685, and PL 125B (1983) 128.

LAMPF-581 Started Feb 1981; Completed Dec 1982.

$\pi^\pm$ ELASTIC SCATTERING FROM DEUTERIUM AT 256 MeV

COLORADO U – J J Kraushaar, D A Lind, T G Masterson (√ Spokesperson), R J Peterson, R S Raymond, R A Ristinen
LOS ALAMOS – R L Boudrie (√ Spokesperson)
CAL STATE, SACRAMENTO – E F Gibson
TRIUMF – D Gill

Accelerator LAMPF *Detector* EPICS

Reactions

π^+ deut $\rightarrow \pi^+$ deut	256 MeV (T_{lab})
π^- deut $\rightarrow \pi^-$ deut	"

Comments Tests charge symmetry to an accuracy of a few percent.

Papers PR C30 (1984) 2010.

LAMPF-585 (Jun 1980) Started Sep 1982; Completed Oct 1981.

MEASUREMENT OF *pp* AND *pd* ELASTIC SCATTERING IN THE COULOMB INTERFERENCE REGION BETWEEN 500 AND 800 MeV

UCLA – B Aas, M Bleszynski, G J Igo, J B McClelland, G Pauletta (Spokesperson), C A Whitten, Jr
MINNESOTA U – M Gazzaly

Accelerator LAMPF *Detector* LAHRS

Reactions Polarized beam

$p\,p \rightarrow p\,p$	650 MeV (T_{lab})
p deut $\rightarrow p$ deut	"

Comments Ran for 106 hours.

LAMPF-589 (Jun 1980) Completed Nov 1985.

FREE-FORWARD *np* ELASTIC-SCATTERING ANALYZING POWER MEASUREMENTS AT 800 MeV

TEXAS A AND M – T S Bhatia, G C Glass (√ Spokesperson), J C Hiebert, R A Kenefick, L C Northcliffe (√ Spokesperson), R W Tippens
LOS ALAMOS – B E Bonner, J E Simmons
TEXAS U – G W Hoffmann, C L Hollas, R D Ransome, P J Riley

Accelerator LAMPF *Detector* Counter

Reactions Polarized beam

$n\ p \rightarrow n\ p$	800 MeV (T_{lab})

Comments Measures the forward-angle neutron analyzing power. Analysis is in progress.

LAMPF-590 (Jun 1980) Completed 1985.

MEASUREMENT OF $D(\theta)$ IN pn AND np SCATTERING AT 800, 650 MeV AND OTHER ENERGIES WITH ASSOCIATED pp MEASUREMENTS

TEXAS A AND M – T S Bhatia, G C Glass, J C Hiebert, R A Kenefick, L C Northcliffe (√ Spokesperson), W B Tippens
LOS ALAMOS – J J Jarmer, J E Simmons (√ Spokesperson)

Accelerator LAMPF *Detector* Counter

Reactions Polarized beam and target

$p\ n \rightarrow p\ n$	600, 800 MeV (T_{lab})
$n\ p \rightarrow n\ p$	"
$p\ p \rightarrow p\ p$	"

Comments Measures the Wolfenstein depolarization parameter $D(\theta)$ over a large angular range for the np ($I = 0$) system using the two reactions for forward and backward angles. $D(\theta)$ for pp scattering is measured to calibrate the polarimeter and verify previous results. Analysis is in progress.

LAMPF-605 (Jun 1980)

A DIBARYON SEARCH AT EPICS

NORTHWESTERN U – D Barlow, M Bosco, S G Iversen, M O Kaletka, A Saha, K K Seth (Spokesperson), D Smith

Accelerator LAMPF *Detector* EPICS

Reactions

π^+ deut $\rightarrow p\ p$	200–300 MeV (T_{lab})

Particles studied dibaryon

Comments A search for dibaryons by the inverse of the usual reaction facilitates an examination of fine structure. Approved for 100 hours.

LAMPF-634 (Nov 1980) Started Feb 1981.

MEASUREMENT OF PARITY VIOLATION IN THE pN TOTAL CROSS SECTIONS AT 800 MeV

LOS ALAMOS – J D Bowman, R Carlini (Spokesperson), R E Mischke, D E Nagle, R L Talaga (Spokesperson)
ILLINOIS U, URBANA – H Frauenfelder, R Harper, V Yuan (Spokesperson)

Accelerator LAMPF *Detector* Counter

Reactions Polarized beam

p nucleon $\rightarrow p$ nucleon	800 MeV (T_{lab})

Comments Measures the difference in total cross sections for positive and negative helicities of polarized protons on unpolarized target. The goal is 10^{-7} in the cross section asymmetry. As of July 82, 515 hours run.

Papers PR D31 (1985) 1151.

LAMPF-635 (Nov 1980) Started Feb 1981; Completed Dec 1982.

SPIN MEASUREMENTS IN pd ELASTIC SCATTERING

LOS ALAMOS – B E Bonner (Spokesperson), O B van Dyck, M W McNaughton, H Ohnuma, S Tsu-hsun
UCLA – B Aas, E Bleszynski, M Bleszynski (Spokesperson), G J Igo (Spokesperson), G S Weston
TEXAS U – D J Cremans, C L Hollas, K H McNaughton, P J Riley, R F Rodebaugh, Shen-Wu Xu
RICE U – S F Turpin

Accelerator LAMPF *Detector* JANUS

Reactions Polarized beam

p deut $\rightarrow p$ deut	496, 647, 800 MeV (T_{lab})

Comments An attempt to obtain double spin-flip parts of the $I = 0$ NN interaction by using Glauber theory on the pd results.

Papers PR C31 (1985) 515.

LAMPF-636 (Nov 1980) Completed Dec 1982.

A MEASUREMENT OF THE WOLFENSTEIN POLARIZATION PARAMETERS D_{LL}, D_{SL}, K_{LL}, AND K_{SL} FOR pp ELASTIC SCATTERING

TEXAS U – C L Hollas (Spokesperson), R D Ransome, P J Riley
LOS ALAMOS – B E Bonner, W D Cornelius, O B van Dyck, E W Hoffman, M W McNaughton, R L York
ARGONNE – K Imai, K Toshioka

Accelerator LAMPF *Detector* JANUS

Reactions Polarized beam

$p\ p \rightarrow p\ p$	650–800 MeV (T_{lab})

Papers PR C30 (1984) 1251.

LAMPF-637 (Nov 1980) Completed Dec 1982.

A MEASUREMENT OF THE VECTOR POLARIZATION OF THE DEUTERON IN THE REACTION $pp \rightarrow d\pi^+$

LOS ALAMOS – B E Bonner (√ Spokesperson), W D Cornelius, O B van Dyck, E W Hoffman, M W McNaughton
RICE U & LOS ALAMOS – J B Roberts
TEXAS U – C L Hollas, R D Ransome, P J Riley
RICE U – S Turpin
TRIUMF – J A Niskanen

Accelerator LAMPF *Detector* JANUS

Reactions Polarized beam

$p\ p \rightarrow$ deut π^+	800 MeV (T_{lab})

Comments Measures the vector polarization and the vector-polarization transfer for the d by measuring the d polarization with unpolarized and polarized proton beams. The d polarization is measured by dissociating it and measuring the polarization of the resultant proton.

LAMPF-645 (Nov 1980)

A SEARCH FOR NEUTRINO OSCILLATIONS AT LAMPF

OHIO STATE U – R Harper, T Y Ling (√ Spokesperson), J Mitchell, T A Romanowski (√ Spokesperson), E Smith, M Timko
ARGONNE – S Freedman, J Garvey, J Napolitano
LOUISIANA STATE U – C Choi, A Fazely, R Imlay, W J Metcalf
CAL TECH – B Fujikawa, R B McKeown
LOS ALAMOS – J Donahue
LBL – K Lesko, E Norman

Accelerator LAMPF *Detector* Combination

Reactions

$\nu_e \rightarrow \nu_e$	0–53 MeV (T_{lab})
$\overline{\nu}_\mu \rightarrow \overline{\nu}_e$	"
$\nu_\mu \rightarrow \nu_\mu$	"
$\overline{\nu}_e\ p \rightarrow e^+\ n$	"

Comments A search for neutrino oscillations in the first three reactions. The fourth reaction is measured to permit background suppression. Taking data (November 86).

LAMPF-647 (Jul 1981)

A NEUTRON OSCILLATION EXPERIMENT AT LAMPF

LOS ALAMOS – R J Ellis (Spokesperson), J D Moses, A Taylor

Accelerator LAMPF *Detector* Combination

Reactions

$n \rightarrow \overline{n}$ < 1 MeV (T_{lab})

Comments It should be possible to put a limit of 6×10^7 s on the $\overline{n}n$ mixing time.

LAMPF-650 (Apr 1981) Started Feb 1981; Completed Apr 1981.

A SEARCH FOR NEUTRINO MIXING VIA NONEXPONENTIAL $\pi \rightarrow \mu\nu$ DECAY

LOS ALAMOS – J D Bowman (√ Spokesperson)
TEL AVIV U & LOS ALAMOS – M A Moinester

Accelerator LAMPF *Detector* Counter

Reactions

$\pi^+ \rightarrow \mu^+ \nu$ 0 MeV/c

LAMPF-651 (Apr 1981)

MEASUREMENT OF A LOWER LIMIT FOR THE SUBTHRESHOLD PRODUCTION OF KAONS WITH 800-MeV PROTONS

LOS ALAMOS – J F Amann, R L Boudrie, T A Carey, N J DiGiacomo, J B McClelland, C L Morris (Spokesperson), J M Moss, S J Seestrom-Morris
TEXAS U – B Hoistad

Accelerator LAMPF *Detector* EPICS

Reactions

$p\ ^{12}C \rightarrow$ kaon X 800 MeV (T_{lab})

Comments To place limits on subthreshold K production. The experiment detects delayed μ's from stopped K's. The process will be used in future to study hypernuclear levels, etc. Approved for 72 hours.

LAMPF-664 (Jun 1981) Completed.

THE MEASUREMENT OF THE POLARIZATION TRANSFER COEFFICIENTS A'_T AND D_T AT 500, 650, AND 800 MeV FOR THE REACTION $d(p,n)2p$

TEXAS A AND M – T S Bhatia, G C Glass (√ Spokesperson), L C Northcliffe
ARGONNE – V S Chalmers, W R Ditzler, T Shima, H Shimizu, H Spinka, R Stanek (√ Spokesperson), D Underwood, R Wagner, A Yokosawa
LOS ALAMOS – J E Simmons
NEW MEXICO STATE U – G R Burleson, C Fontenla

Accelerator LAMPF *Detector* Combination

Reactions Polarized beam

p deut $\rightarrow n\ p\ p$ 500, 650, 800 MeV (T_{lab})

Comments To permit calculation of the neutron polarization produced in $d(p,n)2p$ with polarized protons for future polarized np scattering experiments.

Papers PL 153B (1985) 235.

LAMPF-665 (Jun 1981) Completed Jan 1984.

THE MEASUREMENT OF THE INITIAL-STATE SPIN CORRELATION PARAMETERS C_{LL} AND C_{SL} IN np ELASTIC SCATTERING AT 500, 650, AND 800 MeV

NEW MEXICO STATE U – G R Burleson (√ Spokesperson), C Fontenla, R Garnett
ARGONNE – R Ditzler, D Hill, T Shima, H Shimizu, H Spinka, R Stanek, R Wagner (√ Spokesperson), A Yokosawa
LOS ALAMOS – R Damjanovich, J J Jarmer, J E Simmons
TEXAS A AND M – T S Bahtia, G Glass, J C Hiebert, R A Kenefick, L C Northcliffe
MONTANA U – R Jeppesen
WASHINGTON STATE U – G Trippard

Accelerator LAMPF *Detector* Wide-angle spectrometer

Reactions Polarized beam and target

$n\ p \rightarrow n\ p$ 500, 650, 800 MeV (T_{lab})

LAMPF-683 (Jun 1981)

MEASUREMENT OF $\Delta\sigma_L$ IN FREE np SCATTERING AT 500, 650, AND 800 MeV

ARGONNE – W R Ditzler (Spokesperson), D Hill, K Imai, H Spinka, R Stanek, K Toshioka, R Wagner, A Yokosawa
LOS ALAMOS – J J Jarmer, J E Simmons (Spokesperson)
NEW MEXICO STATE U – G R Burleson, W B Cottingame, S J Greene
TEXAS A AND M – T S Bhatia, G C Glass, J C Hiebert, R A Kenefick, L C Northcliffe

Accelerator LAMPF *Detector* ?

Reactions Polarized beam and target

$n\ p \rightarrow n\ p$ 500, 650, 800 MeV (T_{lab})

Comments Approved for 24 hours.

LAMPF-685 (Jun 1981) Started Jan 1983; Completed Aug 1984.

SPIN CORRELATIONS IN THE REACTION $d(p,p)d$ AT 500 MeV

UCLA – B Aas, A Azizi, E Bleszynski, M Bleszynski (√ Spokesperson), J Geaga, M Hajisaeid, G J Igo (√ Spokesperson), F Irom, G Pauletta, A Rahbar, J Wagner, A T M Wang, G Weston
MINNESOTA U – M M Gazzaly

Accelerator LAMPF *Detector* Counter

Reactions Polarized beam and target

deut $p \rightarrow p$ deut 500 MeV (T_{lab})

LAMPF-689 (Jun 1981) Completed 1983.

(A) NEUTRON COUNTER CALIBRATION USING TAGGED NEUTRONS FROM THE REACTION $\pi^-d \rightarrow nn$, AND (B). FEASIBILITY STUDY: MEASUREMENTS OF THE DIFFERENTIAL CROSS SECTION FOR $\pi^-d \rightarrow nn$ TO TEST CHARGE SYMMETRY AND ISOSPIN INVARIANCE

UCLA – W J Briscoe, A Eichon, D H Fitzgerald (√ Spokesperson), J Holt, A Mokhtari, B M K Nefkens (√ Spokesperson)
ABILENE CHRISTIAN U – M E Sadler

Accelerator LAMPF *Detector* Counter

Reactions

π^- deut $\rightarrow n\ n$ 250 MeV/c

LAMPF-708 (Nov 1981) Approved Jan 1982; Completed Sep 1984.

A MEASUREMENT OF THE DEPOLARIZATION, THE POLARIZATION, AND THE POLARIZATION ROTATION PARAMETERS AND THE ANALYZING POWER FOR THE REACTION $pp \rightarrow p\pi^+n$

TEXAS U – D C Cremans, C L Hollas (Spokesperson), P J Riley
LOS ALAMOS – B E Bonner, O van Dyck, E W Hoffman, M W McNaughton
RUTGERS U – J A McGill

Accelerator LAMPF *Detector* Combination

Reactions Polarized beam

$p\ p \rightarrow p\ \pi^+\ n$ 650, 733, 800 MeV (T_{lab})

LAMPF-726 (Nov 1981) Completed Sep 1985.

SEARCH FOR THE C-NONINVARIANT DECAY $\pi^0 \rightarrow 3\gamma$

TEMPLE U – L B Auerbach, V L Highland (√ Spokesperson), W K McFarlane
LOS ALAMOS – L S Bayliss, R D Bolton, J D Bowman, R D Carlini, M D Cooper, J S Frank, T A Gordon,

C M Hoffman, G Hogan (√ Spokesperson), W W Kinnison, R J Macek, H S Matis, R E Mischke, D E Nagle, V D Sandberg, G H Sanders, R D Werbeck, R A Williams

Accelerator LAMPF *Detector* CRYS-BOX

Reactions

$\pi^0 \rightarrow \gamma\,\gamma\,\gamma$	0 MeV/c

Particles studied π^0

Comments To detect the C-noninvariant process at a branching ratio of 10^{-9}, two orders of magnitude better than before. Analysis is in progress.

LAMPF-758 (Nov 1982) Approved Aug 1982.

TO CATCH A DEMON

NORTHWESTERN U – D Barlow, L Casey, D Kielczewska, A Saha, K K Seth (Spokesperson), J Stuart

Accelerator LAMPF *Detector* LAHRS

Reactions Polarized beam

$p\,p \rightarrow$ demon π^+	800 MeV (T_{lab})

Particles studied demon

Comments A search for a 'demon deuteron', an exotic 6-quark state. Relevant to anomalons. Approved for 100 hours.

LAMPF-764 (Nov 1982) Approved Jan 1983; Started Aug 1984; Completed Jul 1986.

SEARCH FOR NEUTRINO OSCILLATIONS AND MEASUREMENTS OF NUCLEAR CROSS SECTIONS USING A LIQUID SCINTILLATOR DETECTOR IN A ν_μ BEAM AT LAMPF

LOS ALAMOS – T J Bowles, R L Burman, D Clark, S Clearwater, D R F Cochran, T W Dombeck (√ Spokesperson), H Kruse (√ Spokesperson), D Lee, V D Sandberg
NEW MEXICO U – B Bassalleck, B D Dieterle, J Kang, K Leavitt
UCLA – B Aas, G Igo
UC, RIVERSIDE – G Van Dalen, S Y Fung, B Gorn
TEMPLE U – L B Auerbach, S Datta, V L Highland, D Huang
VALPARAISO U – R Fisk, D Koetke, R Manweiller

Accelerator LAMPF *Detector* Counter

Reactions

$\nu_\mu \rightarrow \nu_e$	0–300 MeV/c
$\nu_\mu\ ^{12}C \rightarrow \mu^-$ X	"
ν_μ Al $\rightarrow \mu^-$ X	"
$\nu_\mu\ ^{12}C \rightarrow \mu^-\ ^{12}$Nit	"

Particles studied ν_μ

Comments Neutrino oscillations are first looked for in the appearance mode ($\nu_\mu \rightarrow \nu_e$) and later in the disappearance mode. Expected sensitivity for 80 running days is $\delta m^2 < 0.1$ eV^2 and $\sin^2(2\theta) < 0.001$. The neutrino source is decay of < 400 MeV/c π^+ in flight.

LAMPF-767 (Oct 1982) Approved Jan 1983.

$\pi^\pm d$ ELASTIC SCATTERING AT THREE ENERGIES BETWEEN 30 AND 80 MeV

VIRGINIA TECH – M Blecher, K Gotow (Spokesperson)
OAK RIDGE – F E Bertrand, E E Gross, F E Obenshain, T P Sjoreen
SOUTH CAROLINA U – G S Blanpied, B M Preedom, B G Ritchie, C S Whisnant (Spokesperson)
LOS ALAMOS – R L Burman, M V Hynes, E Piasetzky
MARYLAND U – N S Chant, P G Roos

Accelerator LAMPF *Detector* Spectrometer

Reactions

π^+ deut $\rightarrow \pi^+$ deut	30–80 MeV (T_{lab})
π^- deut $\rightarrow \pi^-$ deut	"

Comments Angular dependence at $< 40°$ and $> 120°$ covers the coulomb interference region. The aim is a critical comparison of experimental results with 3-body calculations of the πd system. Approved for 375 hours. In preparation as of September 84.

LAMPF-770 (Nov 1982) Approved Jan 1983; Completed Dec 1985.

THE MEASUREMENT OF np ELASTIC-SCATTERING SPIN-CORRELATION PARAMETERS WITH L- AND S-TYPE POLARIZED BEAM AND TARGET BETWEEN 500 AND 800 MeV

ARGONNE – W R Ditzler, D Hill, K Johnson, D Lopiano, T Shima, H Shimizu, H Spinka (√ Spokesperson), R Stanek, D Underwood, R Wagner, A Yokosawa
NEW MEXICO STATE U – M Beddo, G R Burleson (√ Spokesperson), J Faucett, R Garnett, G Kyle, M Rawool
LOS ALAMOS – J J Jarmer
TEXAS A AND M – T S Bhatia, G C Glass, J C Hiebert, L C Northcliffe
MONTANA U – R H Jeppesen
WASHINGTON STATE U – G Trippard

Accelerator LAMPF *Detector* Wide-angle spectrometer

Reactions Polarized beam and target

$n\,p \rightarrow n\,p$	500–800 MeV (T_{lab})

Comments Measures the initial-spin correlation parameters C_{SS}, C_{LS}, and C_{LL} from 35 to 172° c.m. Complementary to LAMPF-665.

LAMPF-783 (Nov 1982) Approved Jan 1983; Completed Oct 1983.

PION-INDUCED PION PRODUCTION ON DEUTERONS

LOS ALAMOS – R L Burman, P A M Gram (Spokesperson), E Piasetzky (Spokesperson), H J Ziock
WYOMING U – G A Rebka, Jr (Spokesperson), D Roberts
TEL AVIV U – J Alster, D Ashery, J Lichtenstadt (Spokesperson), M A Moinester
COLORADO COLL – C Bordner
NEW MEXICO U – D A Clark
MIT – S Hoibraten, E R Kinney, J L Matthews, S A Wood

Accelerator LAMPF *Detector* Spectrometer

Reactions

π^- deut $\rightarrow \pi^+$ X	256, 358, 450 MeV (T_{lab})
π^+ deut $\rightarrow \pi^-$ X	"

Comments Measures the double differential cross sections to about 5%. Among anticipated results is evidence concerning $\Delta\Delta$ or quasi-bound $nn\pi^-$ states.

Papers PRL 53 (1984) 540.

LAMPF-790 (Nov 1982) Approved Jan 1983.

$I = 1$ NN INELASTIC CROSS SECTIONS AND FIRST MEASUREMENTS OF T_{20} FOR THE $pp \rightarrow d\pi^+$ REACTION AT 800 AND 650 MeV

UCLA – B Aas, G J Igo, K Jones, G Pauletta (Spokesperson), F Sperisen, C A Whitten, Jr
MINNESOTA U – M M Gazzaly (Spokesperson), N M Hintz
LOS ALAMOS – J F Amann, B E Bonner, J J Jarmer, J B McClelland, N Tanaka (Spokesperson)
TEXAS A AND M – G C Glass
NEW MEXICO STATE U – S J Greene
TEXAS U – B Hostad
ARGONNE – H Spinka

Accelerator LAMPF *Detector* LAHRS

Reactions Polarized beam and target

$p\,p \rightarrow$ deut π^+	650, 800 MeV (T_{lab})

Comments Measures A_{LL}, A_{SL}, A_{SS}, and A_{NN} at forward and backward angles, and A_{SS} at 13° lab. The tensor polarization T_{20} of the deuteron will be deduced. Uses same

polarized target as LAMPF-583 and -709. Approved for 80 hours.

LAMPF-792 (Nov 1982) Approved Jan 1983; Started Aug 1983; Completed Jul 1984.

MEASUREMENT OF PARITY VIOLATION IN THE pp AND pN TOTAL CROSS SECTIONS AT 800 MeV

ILLINOIS U, URBANA – H Frauenfelder, R W Harper, V Yuan (Spokesperson)
LOS ALAMOS – J D Bowman, R D Carlini, D MacArthur, R E Mischke, D E Nagle
MARYLAND U – R L Talaga
PRINCETON U – A B McDonald

Accelerator LAMPF *Detector* Counter

Reactions Polarized beam

$p\,p \rightarrow X$	800 MeV (T_{lab})
$p\,n \rightarrow X$	"

Comments Uses LH_2 and LD_2 targets. A continuation of LAMPF-634. Parity violation in the scattering of polarized protons by an unpolarized target is used to study the weak contribution to the $\Delta S = 0$ hadronic interaction. The experiment is sensitive to a parity-violating signal at about the 10^{-7} level.

LAMPF-795 (Nov 1983) Approved Jan 1983.

A PRECISION TEST OF CHARGE INDEPENDENCE

NORTHWESTERN U – M Artuso, D Barlow, L Casey, C Magno, A Saha, K K Seth (Spokesperson)

Accelerator LAMPF *Detector* LAHRS

Reactions Polarized beam

p deut $\rightarrow$ trit π^+	800 MeV (T_{lab})
p deut $\rightarrow$ ^{3}He π^0	"

Comments Measures the difference in analyzing powers $A_{Y0}(\theta)$ for the two reactions to a precision of ≤ 0.002 or 0.4%. Probes a possible charge-dependent np spin-orbit force. Approved for 200 hours.

LAMPF-804 (Nov 1982) Approved Jan 1983; Started Dec 1983; Completed Aug 1984.

MEASUREMENT OF THE ASYMMETRY PARAMETER IN $\pi^- p \rightarrow \gamma n$ USING A TRANSVERSE POLARIZED TARGET

UCLA – A Eichon, G Kim, A Mokhtari, B M K Nefkens (✓ Spokesperson), J A Wightman
GEORGE WASHINGTON U – W J Briscoe
ABILENE CHRISTIAN U – M E Sadler
CATHOLIC U – D I Sober
LOS ALAMOS – D H Fitzgerald

Accelerator LAMPF *Detector* Combination

Reactions Polarized target

$\pi^- p \rightarrow \gamma n$	247–687 MeV/c
$\pi^- p \rightarrow \pi^0 n$	"

Particles studied $\Delta(1232\,P_{33})^0$, $N^*(\text{unspec})^0$

Comments Adds new information on photoproduction amplitudes. Also tests time-reversal invariance comparing P with A_N. The analysis is continuing.

Papers PRL 56 (1986) 1779.

LAMPF-806 (Nov 1982) Approved Jan 1983.

MEASUREMENT OF SPIN-ROTATION PARAMETERS 'A AND R' IN $\pi^+ p \rightarrow \pi^+ p$ AND $\pi^- p \rightarrow \pi^- p$

UCLA – A Eichon, G Kim, A Mokhtari, B M K Nefkens (✓ Spokesperson), J A Wightman
GEORGE WASHINGTON U – W J Briscoe (✓ Spokesperson)
VIRGINIA TECH – L D Roper
ABILENE CHRISTIAN U – M E Sadler (✓ Spokesperson)

Accelerator LAMPF *Detector* Wide-angle spectrometer

Reactions Polarized target

$\pi^+ p \rightarrow \pi^+ p$	378–625 MeV/c
$\pi^- p \rightarrow \pi^- p$	"

Comments Completes a set of five πN experiments at identical energies designed to provide a complete set of scattering amplitudes. Approved for 1400 hours. Taking data (November 86).

LAMPF-808 (Jan 1983) Approved Jan 1983; Started Nov 1983; Completed Mar 1986.

0° EXCITATION FUNCTION FOR $\pi^- p \rightarrow \pi^0 n$

LOS ALAMOS – H W Baer, J D Bowman, M D Cooper (✓ Spokesperson), D H Fitzgerald (✓ Spokesperson), F Irom, N S P King, M J Leitsch, E Piasetzky
GEORGE WASHINGTON U – W J Briscoe
ABILENE CHRISTIAN U – M E Sadler, K J Smith
ARIZONA STATE U – J N Knudson

Accelerator LAMPF *Detector* Photon spectrometer

Reactions

$\pi^- p \rightarrow \pi^0 n$	100–150 MeV/c

Comments Established the depth of the πN destructive interference minimum between the S and P waves.

Papers PR C34 (1986) 619.

LAMPF-818 (Nov 1983) Approved Jan 1984; Started Dec 1986.

***pd* ELASTIC SCATTERING AT 800 MeV: TWO- AND THREE-SPIN OBSERVABLES**

UCLA – D Adams, E Gulmoz, G J Igo (✓ Spokesperson), A Ling, M Moshe, C A Whitten, Jr
MINNESOTA U – M M Gazzaly
LOS ALAMOS – M McNaughton
TEXAS U – K H McNaughton, P Riley, S Sen

Accelerator LAMPF *Detector* JANUS

Reactions Polarized beam and target

p deut $\rightarrow$ p deut	800 MeV (T_{lab})

Comments Extends results of LAMPF-685 to larger momentum transfers.

LAMPF-825 (Nov 1983) Approved Jan 1984; Started Aug 1984; Completed Sep 1984.

INVESTIGATION OF THE $N\Delta$ INTERACTION VIA $\pi^+ d \rightarrow p\pi^+ n$

RICE U – S D Baker, J A Buchanan, J M Clement, M D Corcoran, I M Duck, J W Kruk, G S Mutchler (✓ Spokesperson), P V Pancella, G C Phillips
HOUSTON U – B W Mayes, L S Pinsky
BONN U – W V Witsch

Accelerator LAMPF *Detector* Spectrometer

Reactions

π^+ deut $\rightarrow$ $p\,\pi^+\,n$	275–600 MeV/c

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

Comments A kinematically complete experiment. The Δ^{++} production excitation is measured for $\theta_{cm} = 55$ and 90° and the angular distribution for 30 to 150° at 350 and 425 MeV/c. A search for the $^1D_2$, $^3F_3$, and $^1G_4$ dibaryons.

LAMPF-828 (Nov 1983) Approved Jan 1984.

TOTAL AND DIFFERENTIAL CROSS SECTIONS FOR $\pi^+ d \rightarrow pp$ BELOW 20 MeV

VIRGINIA TECH – M Blecher, B I Fick, K Gotow (Spokesperson), D Wright
VIRGINIA U – G Das, R C Minehart (Spokesperson)
MARYLAND U – N S Chant, B G Ritchie (Spokesperson), P G Roos
SOUTH CAROLINA U – G S Adams, G S Blanpied, B M Preedom, C S Whisnant

Accelerator LAMPF *Detector* Counter

Reactions

π^+ deut $\rightarrow p\ p$	5, 10, 15 MeV (T_{lab})

Comments The aim is to determine the S-wave π absorption amplitude. The expected errors for the total cross section are about 4%. In preparation as of September 84.

LAMPF-846 (Nov 1983) Approved Jan 1984.

$NN \rightarrow NN\pi$: CROSS SECTIONS AND ANALYZING POWERS FOR THE 800-MeV $pp \rightarrow \pi^+(np)$ AND $pn \rightarrow \pi^-(pp)$ INCLUSIVE REACTIONS

TEXAS A AND M – T S Bhatia (√ Spokesperson), G C Glass (√ Spokesperson), J C Hiebert, R A Kenefick, S Nath, L C Northcliffe
LOS ALAMOS – E Colton, S Greene, R R Silbar
NEW MEXICO STATE U – G Burleson, W Cottingame
RUTGERS U – J A McGill
MONTANA U – R H Jeppesen
WASHINGTON STATE U – G E Tripard
RICE U – G S Mutchler, P Pancella

Accelerator LAMPF *Detector* LAHRS

Reactions Polarized beam

$p\ p \rightarrow \pi^+\ n\ p$	800 MeV (T_{lab})
$p\ n \rightarrow \pi^-\ p\ p$	"

Comments Angular range covered is 20 to 50°. Inclusive measurements are over the entire phase space of the outgoing nucleons. Pion momenta range from about 300 MeV/c to maximum. Approved for 96 hours. The experiment has been put on low priority and is very unlikely to run soon.

LAMPF-849 (Nov 1983) Approved Jan 1984.

A MEASUREMENT OF THE DIFFERENTIAL CROSS SECTION FOR $\pi^-p \rightarrow \pi^0n$ AT 0 AND 180° IN THE MOMENTUM REGION 471–687 MeV/c

LOS ALAMOS – H W Baer, J D Bowman, M D Cooper, D H Fitzgerald (√ Spokesperson), 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
$\pi^-\ p \rightarrow \pi^-\ p$	"
$\pi^+\ p \rightarrow \pi^+\ p$	"

Comments The charge-exchange reaction is measured from 0 to 40° and 150–180°, the elastic scattering reactions at 180°. Approved for 700 hours.

LAMPF-853 (Nov 1983) Approved Jan 1984.

MEASUREMENT OF WOLFENSTEIN PARAMETERS AT 650 AND $d\sigma/d\Omega$ AT 500, 650, AND 800 MeV FOR $pd \rightarrow pd$ ELASTIC SCATTERING

UCLA – B Aas, D Adams, A Azizi, E Bleszynski, M Bleszynski, G J Igo (√ Spokesperson), D Lopiano, F Sperisen, A T M Wang, C A Whitten

Accelerator LAMPF *Detector* LAHRS

Reactions Polarized beam

p deut $\rightarrow p$ deut	500, 650, 800 MeV (T_{lab})

Comments The angular range is 3–36° in the lab. Measures the differential cross section and D_{SS}, D_{SL}, D_{LL}, and A_Y. Approved for 176 hours.

LAMPF-861 (Nov 1983) Approved Jan 1984.

MEASUREMENTS OF THE SPIN-CORRELATION PARAMETER $A_{NN}(\theta)$ FOR np ELASTIC SCATTERING AT 800 MeV

TEXAS A AND M – T S Bhatia, G Glass, J C Hiebert, R A Kenefick, S Nath, L C Northcliffe (√ Spokesperson)
LOS ALAMOS – D Fitzgerald, J J Jarmer
NEW MEXICO STATE U – G Burleson
MONTANA U – R H Jeppesen
WASHINGTON STATE U – G E Tripard

Accelerator LAMPF *Detector* Spectrometer

Reactions Polarized beam and target

$n\ p \rightarrow n\ p$	800 MeV (T_{lab})

Comments Covers 80 to 165° in the c.m. The experiment is deferred, pending availability of an intense polarized ion source.

LAMPF-869 (Nov 1983) Approved Jan 1984.

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

Comments 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%. Approved for 350 hours.

Papers PRL 52 (1984) 914.

LAMPF-876 (May 1984) Approved Aug 1984.

SPIN TRANSFER MEASUREMENTS FOR np ELASTIC SCATTERING

LOS ALAMOS – O van Dyck, D Lee, J McGill, M W McNaughton (√ Spokesperson), R York
TEXAS U – K H McNaughton, P Riley
UCLA – G Igo, C Newsome
RUTGERS U – R D Ransome

Accelerator LAMPF *Detector* ?

Reactions Polarized beam

$n\ p \rightarrow n\ p$	647, 800 MeV (T_{lab})

Comments Measure the spin-transfer parameters K_{NN}, K_{SS}, K_{LL}, and K_{LS} from 50 to 180° c.m. Requires an intense polarized source not yet available.

LAMPF-885 (Jul 1984) Approved Aug 1984; Started Apr 1985; Completed Jul 1985.

MEASUREMENT OF K_{SS} FOR THE $\vec{p}p \rightarrow d\pi^-$ REACTION AT 650 AND 800 MeV

TEXAS U – M Barlett, G W Hoffmann, G Pauletta (Spokesperson)
MINNESOTA U – M Gazzaly (Spokesperson)
LOS ALAMOS – B E Bonner, J McClelland, N Tanaka (Spokesperson)
UCLA – B Aas, G Igo, Y Ohashi, F Sperisen
UPPSALA U – B Hoistad
UDINE U – L Santi, E Waldner

Accelerator LAMPF *Detector* LAHRS

Reactions Polarized beam

$p\ p \rightarrow$ deut π^-	650, 800 MeV (T_{lab})

Comments Measures K_{SS} over a wide angular range. Ran for 157 hours.

LAMPF-888 (Jun 1984) Approved Aug 1984; Started Apr 1985; Completed Dec 1985.

STUDY OF THE DECAYS $\pi^+ \to e^+\nu_e\gamma$ AND $\pi^+ \to e^+e^+e^-\nu_e$

LOS ALAMOS - R Bolton, J D Bowman, M D Cooper, J Frank, A Hallin (√ Spokesperson), P Heusi, C M Hoffman, G Hogan, F Mariam, R E Mischke, D E Nagle, V D Sandberg, G H Sanders, R Werbeck, R A Williams
STANFORD U - R Hofstadter, E B Hughes, M Ritter, S L Wilson
CHICAGO U - D Grosnick, S C Wright
TEMPLE U - V Highland, J McDonough

Accelerator LAMPF *Detector* CRYS-BOX

Reactions

$\pi^+ \to e^+ \nu_e \gamma$	140 MeV/c
$\pi^+ \to e^+ e^+ e^- \nu_e$	"

Particles studied π^+

Comments Measures the ratio of the axial-vector to vector form factors in $\pi^+ \to e^+\nu_e\gamma$. Ran for 494 hours.

Papers PRL 57 (1986) 1402. No other papers expected.

LAMPF-898 (Jul 1984) Approved Aug 1984; Started Apr 1985; Completed Sep 1985.

PION ELASTIC SCATTERING FROM ^{4}He — A TEST OF CHARGE SYMMETRY

LOS ALAMOS - C L Morris (√ Spokesperson)
MINNESOTA U - C L Blilie, D Dehnhard, S K Nanda, S J Seestrom-Morris
TEXAS U - M Bryan, C F Moore

Accelerator LAMPF *Detector* EPICS

Reactions

π^+ He $\to \pi^+$ He	140, 260 MeV (T_{lab})
π^- He $\to \pi^-$ He	"

Comments Tests charge symmetry by estimating the mass splitting between charge states of the $\Delta(1232)$. Ran for 102 hours.

LAMPF-905 (Jul 1984) Approved Aug 1984; Started Apr 1985; Completed Jul 1985.

ELASTIC AND INELASTIC SCATTERING OF π^+ AND π^- ON ^{3}H AND ^{3}He TO TEST CHARGE SYMMETRY, COMPARE FORM FACTORS, AND INVESTIGATE THE REACTION MECHANISM

UCLA - S Adrian, A D Eichon, J M Engelage, G J Kim, A A Mokhtari, B M K Nefkens (√ Spokesperson), J A Wightman, H J Ziock
GEORGE WASHINGTON U - W J Briscoe, C J Seftor, M Taragin
ABILENE CHRISTIAN U - M E Sadler
LOS ALAMOS - R Boudrie, C L Morris

Accelerator LAMPF *Detector* EPICS

Reactions

$\pi^+ {}^3$He $\to \pi^+ {}^3$He	141-296 MeV (T_{lab})
π^+ trit $\to \pi^+$ trit	"
$\pi^- {}^3$He $\to \pi^- {}^3$He	"
π^- trit $\to \pi^-$ trit	"

Comments Tests charge symmetry by measuring $R = [d\sigma(\pi^+ {}^3\mathrm{H})\ d\sigma(\pi^- {}^3\mathrm{H})]/[d\sigma(\pi^+ {}^3\mathrm{He})\ d\sigma(\pi^- {}^3\mathrm{He})]$. Ran for 329 hours. Analysis is in progress.

LAMPF-951 (Nov 1984) Approved Feb 1985.

A SYSTEMATIC SEARCH FOR NARROW DIBARYONS IN THE $\vec{p}d \to pX$ REACTION

NORTHWESTERN U - M Artuso (Spokesperson), G Garino, B Parker, K K Seth (Spokesperson), M Sethi, R Soundra

Accelerator LAMPF *Detector* LAHRS

Reactions Polarized beam

p deut $\to p$ X	800 MeV (T_{lab})

Particles studied dibaryon

Comments Measures $\sigma(\theta)$ and $A_{Y0}(\theta)$ as a function of missing mass to search for dibaryons. Approved for 67 hours.

LAMPF-960 (Jul 1985) Approved Aug 1985.

MEASUREMENT OF $\Delta\sigma_L$ AND $\Delta\sigma_T$ IN FREE np SCATTERING BETWEEN 300 AND 800 MeV

ARGONNE - D Hill, K F Johnson (√ Spokesperson), I Ohashi, T Shima, H Spinka, R Stanek, D Underwood, A Yokosawa
LOS ALAMOS - J J Jarmer
NEW MEXICO STATE U - M Beddo, G R Burleson (√ Spokesperson), J Faucett, G Kyke, M Rawool
TEXAS A AND M - T S Bhatia, G Glass, J C Hiebert, R A Kenefick, L C Northcliffe (√ Spokesperson)
MONTANA U - R Jeppesen
WASHINGTON STATE U - G E Tripard

Accelerator LAMPF *Detector* Counter

Reactions Polarized beam and target

$n\ p \to n\ p$	300-800 MeV (T_{lab})

Comments Measures at seven energies. A new beam buncher allows time-of-flight neutron energy measurements. Approved for 2440 hours. Development runs are in progress (November 86).

LAMPF-961 (Jul 1985) Approved Aug 1985; Completed Oct 1986.

MEASUREMENT OF THE SPIN-CORRELATION PARAMETER $A_{NN}(\theta)$ FOR np ELASTIC SCATTERING AT 800 MeV

TEXAS A AND M - T S Bhatia, G Glass, J C Hiebert, J A Holt, R A Kenefick, S Nath, L C Northcliffe (√ Spokesperson), W B Tippens
LOS ALAMOS - D Fitzgerald, J J Jarmer
NEW MEXICO STATE U - G Burleson
MONTANA U - R H Jeppesen
WASHINGTON STATE U - G E Tripard
ARGONNE - K Johnson, I Ohashi, H Spinka

Accelerator LAMPF *Detector* Wire chamber

Reactions Polarized beam and target

$n\ p \to n\ p$	800 MeV (T_{lab})

Comments Measures A_{NN} from 40 to 165°. Analysis is in progress.

LAMPF-969 (Jul 1985) Approved Aug 1985.

MEGA — SEARCH FOR THE RARE DECAY $\mu^+ \to e^+\gamma$

UCLA - D Barlow, B M K Nefkens, C Pillai
CHICAGO U - S C Wright
HOUSTON U - E V Hungerford, B W Mayes, L Pinsky
LOS ALAMOS - J F Amann, K Black, R D Bolton, S Carius, M D Cooper (√ Spokesperson), W Foreman, C M Hoffman, G E Hogan, K F Johnson, T Kozlowski, R E Mischke, F J Naivar, M A Oothoudt, L E Piilonen, R D Werbeck, C Wilkinson
STANFORD U - E B Hughes, C Jui, J Otis, M W Ritter
TEXAS A AND M - C Gagliardi, R E Tribble
VALPARAISO U - R Fisk, D Koetke
VIRGINIA U - B Tippens, K O H Ziock
WYOMING U - A R Kunselman
YALE U - P S Cooper, R Lauer, J Markey

Accelerator LAMPF *Detector* MEGA

Reactions Polarized beam

$\mu^+ \to e^+ \gamma$	0 MeV/c
$\mu^+ \to e^+ \gamma\ \gamma$	"
$\mu^+ \to e^+ \gamma\ \nu\ \nu$	"

Particles studied μ^+

Comments Also searches for a $V+A$ contribution to radiative decay. Approved for 4000 hours. Looks for $\mu^+ \rightarrow e^+\gamma$ at a level of 9×10^{-14}, a factor of 500 better than the crystal box. Scheduled to begin taking data in 1988.

LAMPF-973 (Jul 1985) Approved Aug 1985; Started Oct 1985; Completed Dec 1985.

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 Coskowski, G Hoffmann, G Pauletta (Spokesperson), M Purcell
UDINE U – R Garfagnini, L Santi
MINNESOTA U – M Gazzaly (Spokesperson), N Hintz, S Nanda, S Seestrom-Morris
LOS ALAMOS – K Jones, C Morris, N Tanaka (Spokesperson)
VIRGINIA U – L C Smith, R Whitney

Accelerator LAMPF *Detector* LAHRS

Reactions Polarized beam

$p\ ^3\mathrm{He} \rightarrow \mathrm{deut}\ X$	370, 630, 730, 800 MeV (T_{lab})
$p\ \mathrm{He} \rightarrow \mathrm{trit}\ X$	"
$p\ \mathrm{He} \rightarrow\ ^3\mathrm{He}\ X$	"
$p\ p \rightarrow \mathrm{deut}\ \pi^+$	"
$p\ p \rightarrow n\ p\ \pi^+$	"

Particles studied dibaryon

Comments Ran for 150 hours.

LAMPF-979 (Nov 1985) Approved Aug 1985; Completed Sep 1985.

A SEARCH FOR $T = 2$ DIBARYON PRODUCTION IN THE $d(\pi^+,\pi^-)X$ REACTION

RUTGERS U – C Glashausser
LOS ALAMOS – K W Jones, J A McGill (✓ Spokesperson), C L Morris (✓ Spokesperson)
TEXAS U – G W Hoffmann, C F Moore, G Pauletta
MINNESOTA U – M Gazzaly, S J Seestrom-Morris

Accelerator LAMPF *Detector* Spectrometer

Reactions

$\pi^+\ \mathrm{deut} \rightarrow \pi^-\ X$	200–300 MeV (T_{lab})

Particles studied dibaryon

Comments Uses the clamshell spectrometer. Ran for 150 hours.

LAMPF-981 (Jul 1985) Approved Aug 1985.

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

$\pi^-\ \mathrm{deut} \rightarrow \pi^+\ n\ n\ \pi^-$	292 MeV (T_{lab})

Particles studied dibaryon

Comments Searches for an $nn\pi^-$ bound state. Approved for 80 hours.

LAMPF-985 (Nov 1985) Approved Feb 1985.

SEARCH FOR MUONIUM-TO-ANTIMUONIUM SPONTANEOUS CONVERSION

HEIDELBERG U, PHYS INST – M Gladisch, G ZuPutlitz
LOS ALAMOS – M Cooper, C Hoffman, G Hogan, F Mariam, R Mischke, L Piilonen, V Sandberg
WILLIAM AND MARY COLL – M Eckhause, P Guss, J Kane (Spokesperson)
YALE U – K P Arnold, F Chmely, V W Hughes (Spokesperson), S Kettell, Y Kuang, J Markey, B Matthias, B Ni, H Orth (Spokesperson), R Schaefer, K Woodle
MISSISSIPPI U – J J Reidy

Accelerator LAMPF *Detector* CRYS-BOX

Reactions

muonium	10 MeV/c

Comments A search at a level of sensitivity of about G_F for the conversion coupling constant (compared to a best so far of less than 42 G_F). Approved for 500 hours.

LAMPF-998 (Nov 1985) Approved Feb 1986; Completed Aug 1986.

THE $^4\mathrm{He}(\pi,\pi p)^3\mathrm{H}$ REACTION — A TEST OF CHARGE SYMMETRY

MINNESOTA U – D Dehnhard (✓ Spokesperson), S K Nanda, S J Seestrom-Morris
LOS ALAMOS – C L Morris (✓ Spokesperson)
TEXAS U – M Bryan, C F Moore
PENN U – J D Zumbro

Accelerator LAMPF *Detector* EPICS, Counter

Reactions

$\pi^+\ \mathrm{He} \rightarrow \mathrm{trit}\ p\ \pi^+$	180 MeV (T_{lab})
$\pi^-\ \mathrm{He} \rightarrow \mathrm{trit}\ p\ \pi^-$	"

Comments A test of charge symmetry by measuring the ratio of the cross sections. Ran for 180 hours.

LAMPF-1015 Approved Feb 1986.

LARGE CHERENKOV DETECTOR

LOS ALAMOS – R Burman, R Carlini, J Donahue, D Fitzgerald, J D He, M Hoehn, D Lee, R Macek, J McGill, V Sandberg, G H Sanders
ARGONNE – S Freedman, J Napolitano
BROOKHAVEN – D H White (✓ Spokesperson)
UC, IRVINE – R C Allen, H H Chen, Wen-Piao Lee, X Lee, K Roemheld
UCLA – G Igo, C Whitten
COLORADO U – R Ristinen, W R Smythe
NEW MEXICO U – B Bassaleck, B B Dieterle, C P Leavitt
PENN U – E Beier, R Van Berg, A Mann
TEMPLE U – L A Auerbach, V L Highland, W K McFarlane

Accelerator LAMPF *Detector* Counter

Reactions Polarized beam and target

$\nu_\mu\ e^- \rightarrow \nu_\mu\ e^-$	0–50 MeV (T_{lab})
$\overline{\nu}_\mu\ e^- \rightarrow \overline{\nu}_\mu\ e^-$	"
$\nu_e\ e^- \rightarrow \nu_e\ e^-$	30 MeV (T_{lab})

Comments Measures $\sin^2(\theta_W)$ to an accuracy of 1%. Uses the proton storage ring.

LENI-SC-021 (1982) Completed.

INELASTIC SCATTERING OF PROTONS WITH ENERGY 1 GeV AND TRANSITION NUCLEAR DENSITIES

LENINGRAD, INP – G D Alkhazov, S L Belostotskii, O A Domchenkov, Yu V Dotsenko, N P Kuropatkin

Accelerator LENI *Detector* Spectrometer

Reactions

p nucleus $\rightarrow$ nucleus X	1 GeV (T_{lab})

Comments Transition parameters determined for low excited states of Si, S, Ca, Ti, Ni, and $J^P = 2^+, 3^-, 4^+$.

Papers YF 41 (1985) 561 = SJNP 41 (1985) 357, and YF 42 (1985) 8 = SJNP 42 (1985) 4.

LENI-SC-029 (1982) Completed 1983.

MULTIPARAMETER STUDY OF THE KINEMATICS IN 1 GeV PROTON INDUCED FISSION USING A DOUBLE-ARM TIME-OF-FLIGHT MASS SPECTROMETER

LENINGRAD, INP – Y A Chestnov, V L Gorshkov, A I Ilyin, B Y Sokolovskiy, G E Solyakin

Accelerator LENI *Detector* Double-arm spectrometer

Reactions

p nucleus → 2frag X	1 GeV (T_{lab})
p nucleus → 3frag X	"

Comments The nuclear targets are ^{184}Wt, ^{197}Au, ^{232}Th, and ^{238}U.

Papers ZETFP 37 (1983) 60 = JETPL 37 (1983) 72, NP A400 (1983) 584, and NP A400 (1983) 589.

LENI-SC-042 (1982)

STUDY OF NUCLEAR MULTIPARTICLE SPALLATION INDUCED BY FAST HADRONS

LENINGRAD, INP – L V Bakanov, K N Ermakov, V D Lebedev, V V Miroshkin, V V Paschuk, M V Stabnikov, M G Tverskoj

Accelerator LENI *Detector* Heavy-liquid b.c.

Reactions

p nucleus → mult[charged] X	1 GeV (T_{lab})

Comments Obtained 3500 stereo-photos, 1500 events.

LENI-SC-052 (1982)

QUASIFREE PROTON SCATTERING AT ENERGY 1 GeV

LENINGRAD, INP – S L Belostotsky, Y V Dotsenko, N P Kuropatkin, O V Miklukho, V N Nikulin, O E Prokofjev, S S Volkov, A A Vorobjev

Accelerator LENI *Detector* Spectrometer

Reactions

p nucleus → nucleus nucleon	1 GeV (T_{lab})

Comments The targets used are deuterium, Li, Be, B, C, O, and Ca.

LENI-SC-056 (1982)

MEASUREMENT OF ENERGY AND ANGULAR DEPENDENCE OF THE POLARIZATION CORRELATION COEFFICIENT C_{NN} IN ELASTIC pp SCATTERING AT ENERGIES 690–950 MeV

LENINGRAD, INP – V A Efimovych, O Y Fedorov, A I Kovalev, V E Popov, A N Prokofjev, A V Shvedchikov, V Y Trautman, V G Vovchenko, A A Zhdanov
DUBNA – N S Borisov, M Y Kazarinov, Y M Kazarinov, Y F Kiselev, B S Neganov

Accelerator LENI *Detector* Spectrometer

Reactions Polarized beam and target

$p\ p \rightarrow 2p$	690–950 MeV (T_{lab})

LENI-SC-062 (1982)

STUDY OF DIFFERENTIAL CROSS SECTIONS FOR $\pi^+ d \rightarrow pp$ IN THE DIBARYON RESONANCES REGION

LENINGRAD, INP – M Y Borkovskiy, V G Gaditskiy, G E Gavrilov, V A Gordeev, Y S Grigorjev, V P Koptev, A G Krishvich, S P Kruglov, L G Kudin, A Y Majorov, Y A Malov, G V Scherbakov, I I Strakovskiy, L N Uvarov

Accelerator LENI *Detector* Spectrometer

Reactions

π^+ deut → $2p$	280–540 MeV (T_{lab})

Particles studied dibaryon

Comments Appreciable contribution of F-wave ($L = 3$).

Papers JPHY G9 (1983) 187.

LENI-SC-063 (1985)

MEASUREMENT OF SPIN ROTATION PARAMETERS R AND A IN ELASTIC πp SCATTERING

LENINGRAD, INP – A V Anufriev, V S Bekrenev, Y A Beloglazov, E P Fedorov-Koval, E A Filimonov, V G Gaditskij, A I Kovalev, I G Kozlenko, S P Kruglov, A A Kulbardis, I V Lopatin, V V Sumachev, I I Tkach, V Y Trautman

Accelerator LENI *Detector* Counter, Wire chamber

Reactions Polarized target

$\pi^- p \rightarrow \pi^- p$	400–600 MeV/c

LENI-SC-066 (1982) Completed.

STUDY OF CUMULATIVE NEUTRON PRODUCTION FROM NUCLEI BY PROTONS WITH ENERGY 1 GeV

LENINGRAD, INP – V N Baturin, M M Makarov, A A Naberezhnov, V V Nelyubin, V V Sulimov, L N Uvarov, V V Vikhrov

Accelerator LENI *Detector* Wide-angle spectrometer

Reactions

p nucleus → nucleon X	1 GeV (T_{lab})

Comments The targets used are Li, Be, C, Al, Cu, Sn, and Pb. Measured at 94, 114, 120, 140, and 148°.

Papers ZETFP 36 (1982) 370 = JETPL 36 (1982) 448.

LENI-SC-067 (1983) Completed.

DEUTERON DISINTEGRATION IN THE REACTION $\pi^- d \rightarrow \pi^- pn$ AT ENERGY 552 MeV

LENINGRAD, INP – L G Dakhno, A V Kravtsov, M M Makarov, V I Medvedev, G Z Obrant, V I Poromov, V V Sarantsev, S G Sherman, G L Sokolov

Accelerator LENI *Detector* DBC-35CM

Reactions

π^- deut → $p\ n\ \pi^-$	552 MeV/c

LENI-SC-067-2 (1985) Completed.

MASSIVE NEUTRINO SEARCH IN THE DECAY $\pi^+ \rightarrow \mu^+ \nu$

LENINGRAD, INP – V P Andreev, M M Makarov, V I Medvedev, G Z Obrant, V I Poromov, V V Sarantsev, S G Sherman, G L Sokolov, A B Sokornov

Accelerator LENI *Detector* Deuterium b.c.

Reactions

$\pi^+ \rightarrow \mu^+ \nu$	—

Particles studied ν

Comments Obtained 3000 identified $\pi^+ \rightarrow \mu^+ \nu$ decays.

LENI-SC-074 (1984)

MANY-PARTICLE CORRELATION INVESTIGATION IN NUCLEAR DEEP SPALLATION REACTIONS

LENINGRAD, INP – M N Andronenko, L K Batist, E A Damaskinskij, V T Gratchev, A A Lobodenko, S K Patrichev, O E Prokofjev, D M Selivestrov, N N Smirnov, L N Uvarov, E N Volnin, A A Vorobyev (Spokesperson)

Accelerator LENI *Detector* Spectrometer

Reactions

p C → pion X	—
p C → p X	—
p C → deut X	—
p C → trit X	—

p Ag → pion X	—
p Ag → p X	—
p Ag → deut X	—
p Ag → trit X	—

LENI-SC-078 (1982) Completed.

EXPERIMENTAL DISCOVERY OF SPATIAL CAPTURE EFFECT BY A MONOCRYSTAL IN THE CHANNELING REGIME

LENINGRAD, INP – V A Andreev, V V Baublis, E A Damaskinskiy, A G Krishvich, L G Kudin, V V Marchenkov, V F Morozov, V V Nelyubin, E M Orischin, G E Petrov, G A Ryabov, L E Samsonov, V M Samsonov, V A Schegelskiy, E M Spiridenkov, V V Sulimov, O I Sumbaev

Accelerator LENI *Detector* ?

Reactions

p crystal	1 GeV/c

Papers ZETFP 36 (1982) 340 = JETPL 36 (1982) 415.

LENI-SC-079 Completed 1982.

CUMULATIVE DEUTERON AND TRITON PRODUCTION IN PROTON NUCLEUS INTERACTIONS AT 1 GeV

LENINGRAD, INP – M N Andronenko, V T Gratchev, A A Lobodenko, N N Smirnov, I I Strakovskij, L N Uvarov, E N Volnin, A A Vorobyev (Spokesperson)

Accelerator LENI *Detector* Spectrometer

Reactions

p nucleus → deut X	1 GeV/c
p nucleus → trit X	"

Comments The nuclear targets are ^{6}Li, ^{7}Li, Be, C, Al, ^{58}Ni Ag, and Pb.

LENI-SC-085 (1982) Completed.

MEASUREMENT OF CUMULATIVE PROTON POLARIZATION

LENINGRAD, INP – S L Belostotsky, Y V Dotsenko, L G Kudin, N P Kuropatkin, A A Lobodenko, O V Miklukho, V N Nikulin, O E Prokofyev, E N Volnin, A A Vorobyev
BUDAPEST, CRIP – Y Ere, Z Fodor, Z Sheresh

Accelerator LENI *Detector* Spectrometer

Reactions

p nucleus → p X	1 GeV/c

Comments The targets used are Be, C, Al, Cu, and Pb. Measured at 59, 109, and 145°.

LENI-SC-086 (1985) Completed.

MEASUREMENT OF THE POLARIZATION TRANSFER PARAMETER K_{NN} IN pp ELASTIC SCATTERING IN THE ENERGY REGION OF 800–1000 MeV

LENINGRAD, INP – V A Efimovych, O Y Fedorov, A I Kovalev, N G Kozlenko, M Y Myakushin, V V Polyakov, A V Shvedchikov, V Y Trautman, V G Vovchenko, A A Zhdanov
DUBNA – N S Borisov, A N Chernikov, Y M Kazarinov, Y F Kiselev

Accelerator LENI *Detector* Counter

Reactions Polarized target

$p\ p$ → $p\ p$	800–1000 MeV (T_{lab})

LENI-SC-087 (1984) Started 1981; Completed 1983.

MEASUREMENT OF THE π^+ LIFETIME

LENINGRAD, INP – N K Abrosimov, V A Eliseev, V A Gordeev, E M Ivanov, V P Koptev, S P Kruglov, Y A Malov, S M Mikirtychants, G A Ryabov, G V Shcherbakov, L N Uvarov, V A Volchenkov

Accelerator LENI *Detector* Spectrometer

Reactions

$\pi^+ \rightarrow \mu^+ \nu_\mu$	0 GeV/c

Particles studied π^+

LENI-SC-088 (1984) Completed 1984.

***pd* AND p ^{4}He SMALL-ANGLE SCATTERING AT PROTON ENERGIES RANGING FROM 700 TO 1000 MeV**

LENINGRAD, INP – A V Dobrovolskij, A V Khanzadeev, G A Korolev, S I Manaenko, N K Terentjev, G N Velichko, A A Vorobyev (Spokesperson)
SACLAY – J Sodinos

Accelerator LENI *Detector* Spectrometer

Reactions

p deut → p deut	700–1000 MeV (T_{lab})
p He → p He	"

LENI-SC-096 (1983) Started 1983.

STUDY OF CORRELATIONS IN REACTIONS WITH CUMULATIVE PROTON EMISSION

LENINGRAD, INP – M N Andronenko, V T Gratchev, A A Lobodenko, M M Nesterov, N N Smirnov, N A Tarasov, L N Uvarov, E N Volnin, A A Vorobyev (Spokesperson)

Accelerator LENI *Detector* Spectrometer

Reactions

p Li → p charged X	1 GeV/c
p C → p charged X	"
p Pb → p charged X	"
p nucleus → p charged X	"

LENI-SC-097 (1982)

SUBTHRESHOLD K^+ MESON PRODUCTION IN PROTON NUCLEUS INTERACTIONS

LENINGRAD, INP – N K Abrosimov, V A Eliseev, A B Gridnev, E M Ivanov, V P Koptev, S P Kruglov, Y A Malov, S M Mikirtychyants, G A Ryabov, G V Scherbakov, V A Volchenkov

Accelerator LENI *Detector* ?

Reactions

p nucleus → K^+ X	0.85–1 GeV/c

Comments The targets used are Be, C, Cu, Sn, and Pb.

Papers ZETFP 36 (1982) 211 = JETPL 36 (1982) 261.

LENI-SC-104 (1984)

ENERGETIC CORRELATION STUDY IN DEEP INELASTIC PROTON INTERACTIONS WITH NUCLEI

LENINGRAD, INP – V N Baturin, E N Komarov, M M Mararov, A A Naberezhnov, V V Nelyubin, V V Sulimov, L N Uvarov, V V Vikhrov

Accelerator LENI *Detector* Spectrometer

Reactions

p Li → p X	1 GeV (T_{lab})
p Cu → p X	"
p nucleus → p X	"

LENI-SC-108 (1982)

STUDY OF BACKWARD PROTON SPECTRA IN THE REACTION $pd \rightarrow ppn$ IN THE ENERGY REGION 500–1000 MeV

LENINGRAD, INP – V P Andreev, A V Kravtsov, M M Makarov, V I Medvedev, G Z Obrant, V I Poromov, V V Sarantsev, S G Sherman, G L Sokolov, A B Sokornov

Accelerator LENI *Detector* Deuterium b.c.

Reactions

p deut $\rightarrow 2p\ n$ 600–880 MeV (T_{lab})

Comments Obtained 40000 stereo-photos.

P-DECAY-FREJUS

NUCLEON DECAY EXPERIMENT WITH A MODULAR FLASH CHAMBER DETECTOR

FREJUS COLLABORATION

AACHEN, TECH HOCHSCH, I PHYS INST – Ch Berger, A Hofmann, F Raupach, P Schleper, G Schmitz, J Tutas, B Voigtlaender
ORSAY, LPNHE – C Arpesella, Y Benadjal, G Deuzet, B Dudelzak, P Eschtruth, S Jullian, D LaLanne, F LaPlanche, C Longuemare, C Paulot, Ph Roy, G Szklarz
ECOLE POLYTECHNIQUE – L Behr, R W Bland, B DeGrange, U Nguyen-Khac, P Serri, S Tisserant, R Tripp
SACLAY – P Bareyre, R Barloutaud (√ Spokesperson), G Chardin, L Di Ciaccio, D L Edmunds, J Ernwein, G Gerbier, M A Jabiol, W Kolton, L Mosca, L Moscoso, B Pietrzyk
WUPPERTAL U – K H Becker, H J Daum, S Demski, R Hinners, W Kohrs, B Kuznik, R Mayer, H Meyer, D Ortmann, J Peters, M Schubnell, J Thierjung, Y Wei, P Wintgen

Accelerator NONE *Detector* Calorimeter

Particles studied p, n

Comments A 900-metric-ton array of 3-mm steel plates separated by layers of 5×5-mm polypropylene flash chambers. There are 115 planes of Geiger tubes for triggering. The detector is 4800 meters of water equivalent underground. For a description of the apparatus, see the LBL-91 supplement on detectors.

Papers PL 174B (1986) 118.

P-DECAY-HOMESTAKE

THE HOMESTAKE GOLD MINE EXPERIMENT

PENN U – M L Cherry, M Deakyne, K Lande (Spokesperson), C K Lee, R I Steinberg
BROOKHAVEN – B Cleveland

Accelerator NONE *Detector* Counter

Particles studied p, n

Comments For a description of the apparatus, see the LBL-91 supplement on detectors.

Papers PRL 47 (1981) 1507.

P-DECAY-HPW

THE HARVARD-PURDUE-WISCONSIN EXPERIMENT

HARVARD U – J Blandino, W A Huffman, A M Lutz, C Rubbia (Spokesperson), D R Winn, W Worstel
PURDUE U – J A Gaidos, G Kullerud, R McHenry, J Negret, T R Palfrey, T Phillips, R B Willmann, C L Wilson
WISCONSIN U – U Camerini, D Cline (Spokesperson), W F Fry, R J Loveless, R March, J Matthews, A More, R Morse, D D Reeder

Accelerator NONE *Detector* Counter

Particles studied p, n

Comments An 800-metric-ton water Cherenkov detector 1500 meters of water equivalent underground. For a description of the apparatus, see the LBL-91 supplement on detectors.

P-DECAY-IMB

THE IRVINE-MICHIGAN-BROOKHAVEN EXPERIMENT

UC, IRVINE – W Gajewski, K Ganezer, T J Haines, W R Kropp, L Price, F Reines (Spokesperson), J Schultz, H W Sobel, C Wuest
MICHIGAN U – D Casper, P Chrysicopoulou, R Claus, H-S Park, S Seidel, D Sinclair, J L Stone, L R Sulak, J C van der Velde (Spokesperson)
MICHIGAN U & UNIVERSITY COLL, LONDON – T W Jones
BROOKHAVEN – M Goldhaber
CAL TECH – G Blewitt, J M Losecco
CLEVELAND STATE U – C B Bratton
HAWAII U – J G Learned, R Svoboda
UC, IRVINE & WARSAW U, IEP – D Kielczewska
FERMILAB – G W Foster
ILLINOIS U, URBANA – S Errede

Accelerator NONE *Detector* Counter

Particles studied p, n

Comments An 8000-metric-ton water Cherenkov detector 1570 meters of water equivalent underground. For a description of the apparatus, see the LBL-91 supplement on detectors.

Papers PRL 51 (1983) 27, PRL 51 (1983) 245, PRL 52 (1984) 720, PRL 52 (1984) 1092, PRL 54 (1985) 22, PRL 54 (1985) 2299, PRL 55 (1985) 2114, and PRL 57 (1986) 1986.

P-DECAY-KAMIOKA (Jul 1983) Completed 1985.

THE KAMIOKA EXPERIMENT

KEK – K Takahashi
NIIGATA U – K Miyano
TOKYO U – K Arisaka, K Hirata, T Kajita, T Kikune, M Koshiba (√ Spokesperson), M Nakahata, Y Oyama, A Sato, N Sato, T Suda, A Suzuki, M Takita, Y Totsuka

Accelerator NONE *Detector* Counter

Particles studied p, n, monopole

Comments A 3000-metric-ton water Cherenkov detector 2700 m water equivalent underground. Also investigates solar and high-energy neutrinos, high-energy muons, etc. For a description of the apparatus, see the LBL-91 supplement on detectors.

Papers NIM 205 (1983) 443, JPSJ 54 (1985) 3213, JPSJ 54 (1985) 4065, JPSJ 55 (1986) 711, JPSJ 55 (1986) 3786, PRL 56 (1986) 991, and PR D34 (1986) 902.

P-DECAY-KAMIOKA-II Started 1986.

THE KAMIOKA-II EXPERIMENT

KEK – K Takahashi
NIIGATA U – K Miyano
TOKYO U – K Arisaka, K Hirata, T Kajita, T Kikune, M Koshiba (√ Spokesperson), M Nakahata, Y Oyama, A Sato, N Sato, T Suda, A Suzuki, M Takita, Y Totsuka
CAL TECH – B G Cortez
PENN U – E W Beier, L Ferdsher, S B Kim, A K Mann, F M Newcommer, R Van Verg, W P Zhang

Accelerator NONE *Detector* Counter

Particles studied p, n, monopole

Comments A 3000-metric-ton water Cherenkov detector 2700 m water equivalent underground. The Kamioka detector upgraded with a 4-π anticounter and TDC added. Also investigates solar and high-energy neutrinos, high-energy muons, etc. For a description of the apparatus, see the LBL-91 supplement on detectors. Taking data (December 86).

P-DECAY-KGF

THE KOLAR GOLD FIELD EXPERIMENT

TATA INST – M R Krishnaswamy, M G K Menon, N K Mondal, V S Narasimham (Spokesperson), B V Sreekantan

OSAKA CITY U – Y Hayashi, N Ito, S Kawakami
TOKYO U, COSMIC RAY LAB – S Miyake

Accelerator NONE *Detector* Calorimeter

Particles studied *p*, *n*

Comments Several candidates for nucleon decay are observed with low background, but no definite conclusion can be reached yet. A 140-ton iron calorimeter with gas proportional tubes 7600 m of water equivalent underground. For a description of the apparatus, see the LBL-91 supplement on detectors.

Papers PL 106B (1981) 339, and PL 115B (1982) 349.

P-DECAY-NUSEX Completed Dec 1986.

THE MONT BLANC EXPERIMENT

MILAN U – E Fiorini (√ Spokesperson)
FRASCATI & MILAN U & TURIN U & CERN – G Battistoni, E Bellotti, G Bologna, P Campana, C Castagnoli, V Chiarella, D Cundy, B D'Ettorre, E Iarocci, G Mannocchi, G P Murtas, P Negri, G Nicoletti, L Periale, P Picchi, M Price, A Pullia, S Ragazzi, M Rollier, O Saavedra, L Trasatti, L Zanotti

Accelerator NONE *Detector* Calorimeter

Particles studied *p*, *n*

Comments One event seen consistent with *p* decay. A 3.5×3.5×3.5-m cube of 136 layers of 1-cm-thick iron plates separated by layers of 1×1-cm plastic streamer tubes. The mass is 150 tons and is 5000 meters of water equivalent underground. For a description of the apparatus, see the LBL-91 supplement on detectors.

Papers NIM 202 (1982) 459, PL 118B (1982) 461, PL 133B (1983) 454, NIM 219 (1984) 300, NC 8C (1985) 76, PL 155B (1985) 465, and NIM A245 (1986) 277.

P-DECAY-SOUDAN-II

THE SOUDAN-II EXPERIMENT

MINNESOTA U – H Courant, K Heller, S Heppelman, T Joyce, M Marshak (Spokesperson), E Peterson, K Ruddick, M Shupe
ARGONNE – D Ayres, K Coover, J Dawson, T Fields, N Hill, D Jankowski, E May, L Price
OXFORD U – W Allison, C Brooks, J Cobb, D Perkins, B Saitta, P Shield
RUTHERFORD – D Cockerill, P Litchfield, R Nicksen, S Yarlar
TUFTS U – T Kafka, A Mann, R Milburn, A Napier, W Oliver

Accelerator NONE *Detector* Calorimeter

Particles studied *p*, *n*

Comments A 1000-ton detector using drift projection tubes arranged in an hexagonal array. The tubes are 16 mm in diameter separated by 1.6 mm of steel. For a description of the apparatus, see the LBL-91 supplement on detectors.

Papers Results from Soudan-I: PRL 50 (1983) 651, PRL 54 (1985) 2079, and PRL 55 (1985) 1965.

SACLAY-010 (Dec 1977) Approved Jan 1979, Mar 1979; Started 1979; Completed Jan 1980.

STUDY OF THE COHERENT PRODUCTION OF π^+ AND π^- BY LIGHT IONS IN THE ENERGY REGION 150–300 MeV/NUCLEON

STRASBOURG – E Aslanides, A M Bergdolt, P Fassnacht, F Hibou (√ Spokesperson)
SACLAY – K Baba, A Boudard, G Bruge, P Couvert, B Nefkens
ORSAY, IPN – Y Le Bornec, P Kitching, B Tatischeff, N Willis (√ Spokesperson)

Accelerator SATURNE-II *Detector* SPES-I

Reactions

deut ^{6}Li → π^- ^{8}Bor	—
deut ^{6}Li → π^- X	—
deut Be → π^- X	—
deut ^{10}Bor → π^- X	—

Papers PL 108B (1982) 91. No other papers expected.

SACLAY-013 (Sep 1979) Approved Oct 1979; Started 1980; Completed 1982.

$\alpha\alpha$ INTERACTIONS

SACLAY – J Banaigs, J Berger, M Boivin, A Codino, J Duflo (Spokesperson), L Goldzahl, D Legrand, J Oostens, F Plouin
ORSAY, IPN – P Berthet, R Frascaria
FRASCATI – F L Fabbri, P Picozza, L Satta
CAEN U – G Bizard, F Lefebures, J C Steckmeyer

Accelerator SATURNE-II *Detector* ?

Reactions

He He → He X	4.3, 5.0 GeV/*c*
He ^{3}He → He X	4.3, 7.0 GeV/*c*
He deut → He X	"
He *p* → He X	"

Comments Elastic scattering is measured up to momentum transfers of about 4 GeV^2. The inelastic spectra are described as an incoherent sum of quasi-elastic scattering on substructures of the targets.

Papers NP A356 (1981) 427, NP A374 (1982) 253, and NP A374 (1982) 297.

SACLAY-017 (Dec 1977) Approved 1980; Started 1980; Completed Nov 1982.

CROSSING JETS

SACLAY – M Garcon (√ Spokesperson), D Legrand, R Lombard, R Maillard, B Mayer, A Nakach, M Rouger, Y Terrien

Accelerator SATURNE-II *Detector* Counter

Reactions

p p → *p p*	1.0–2.0 GeV/*c*

Comments Uses an internal jet target. Measures the energy dependence of the 90° cross section.

Papers NIM 204 (1982) 53, and NP A445 (1985) 669. No other papers expected.

SACLAY-037 (Dec 1978) Approved Jun 1979; Started 1979; Completed 1982.

MEASUREMENT OF *pd* → γ ^{3}He TO TEST DETAILED BALANCE

SACLAY – A Boudard, G Bruge, J Soudinos
UCLA – W Briscoe, D Fitzgerald, B M K Nefkens (√ Spokesperson), M Sadler

Accelerator SATURNE-II *Detector* SPES-I

Reactions

p deut → γ ^{3}He	—

Papers PRL 45 (1980) 168, and PR C32 (1985) 1956.

SACLAY-038-2 (Nov 1984) Approved Mar 1985; Started Jul 1985; Completed Mar 1986.

***dp* ELASTIC SCATTERING AS A SOURCE OF INFORMATION ABOUT THE DEUTERON D-WAVE AND THE SPIN STRUCTURE OF THE *NN* AMPLITUDES**

UCLA – B Aas, D Adams, M Bleszynski, J Bystricky, V Ghazikhanian, G J Igo (√ Spokesperson), C A Whitten, Jr
SACLAY – J Ball, P Chaumette, J Deregel, J Fabre, F Lehar, A de Lesquen, F Perrot, L van Rossum

Accelerator SATURNE-II *Detector* Combination

Reactions Polarized beam and target

deut *p* → deut *p*	1.6 GeV (T_{lab})

Particles studied deut

Comments The original Saclay-038 never ran.

SACLAY-050 (Jan 1980) Approved Mar 1980; Started 1980; Completed Jun 1983.

STUDY OF THE DIBARYONIC COMPONENT ($\Delta^{++}, 2N$) AND EVENTUALLY DIBARYONIC ($T = 1$) IN ^{3}He USING THE TRANSFER REACTIONS ^{3}He(p,t), ^{3}He(p,d)**, AND $p(^3\mathrm{He}, d)$.**

ORSAY, IPN – P Berthet, M P Combes, J P Didelez, R Frascaria, B Tatischeff (√ Spokesperson)
SACLAY – R Beurtey, Y Le Bornec, A Boudard, J M Durand, J L Escudie, L Farvacque, M Garcon, J C Lugol, Y Terrien

Accelerator SATURNE-II *Detector* SPES-I

Reactions

$p\ ^3\mathrm{He} \rightarrow$ trit X	1.4, 1.6 GeV/c
$p\ ^3\mathrm{He} \rightarrow$ deut X	"
$^3\mathrm{He}\ p \rightarrow$ deut X	4.74 GeV/c

Particles studied dibaryon

Comments Narrow isovector structures in 2-baryon invariant masses found.

Papers PRL 52 (1984) 2022, and PL 154B (1985) 107.

SACLAY-051 (1979) Approved Jun 1979; Started 1979; Completed 1980.

***pd* AND $p\ ^3$He ELASTIC SCATTERING BETWEEN 140 AND 180° CM**

ORSAY, IPN – I Brissaud, J P Didelez, R Frascaria (√ Spokesperson), M Morlet, B Tatischeff, A Willis, N Willis
SACLAY – J Banaigs, J Berger, A Boudard, J Duflo, M Garcon, L Goldzahl, D Legrand, F Plouin, Y Terrien

Accelerator SATURNE-II *Detector* SPES-IV

Reactions

p deut $\rightarrow p$ deut	0.6–2.7 GeV (T_{lab})
$p\ ^3\mathrm{He} \rightarrow p\ ^3\mathrm{He}$	0.7–1.7 GeV (T_{lab})

Papers PL 106B (1981) 465, AND JPHY G8 (1982) L111. No other papers expected.

SACLAY-052 (Dec 1977) Approved Jun 1978; Started Nov 1980; Completed Feb 1982.

STUDY OF *NN* SCATTERING AT SATURNE II

SACLAY – J Ball, J Bystricky, P Chaumette, J Deregel, F M Fontaine, J Gosset, T Hasegawa, F Lehar (√ Spokesperson), C Newsom, F Perrot, F Petit, T Siemiarczuk, J Simmons, J Vrzal, C A Whitten
CAEN U – J Yonnet
MONTREAL U – L Vinet, P Winternitz
ANNECY – H Azaiez, A Michalowicz
TRIESTE U – S Dalla-Torre, A Martin, A Penzo, A Villari
GENEVA U – W R Leo, Y Onel

Accelerator SATURNE-II *Detector* Combination

Reactions Polarized beam and target

$p\ p \rightarrow p\ p$	1.0–3.8 GeV/c

Comments Measurements of $\Delta\sigma_{total}$, analyzing powers, and spin correlations.

Papers LNC 40 (1984) 466, NC 82A (1984) 385, LNC 41 (1984) 285, NIM A239 (1985) 131, NP B262 (1985) 715, and NP B262 (1985) 727.

SACLAY-052-2 (Nov 1981) Approved Nov 1981; Started Feb 1982; Completed Feb 1983.

MEASUREMENT OF *pp* ELASTIC SCATTERING IN THE COULOMB-NUCLEAR INTERFERENCE REGION USING THE POLARIZED PROTON BEAM FROM SATURNE II

ANNECY – H Azaiez, K Kuroda, A Michalowicz (√ Spokesperson)
TRIESTE U – R Birsa, F Bradamante, S Dallatorre-Colautti, M Giorgi, L Lanceri, A Martin, A Penzo, P Shiavon, A Villari

Accelerator SATURNE-II *Detector* Combination

Reactions Polarized beam

$p\ p \rightarrow p\ p$	1.3–3.2 GeV/c

Comments Uses a scintillating target.

SACLAY-057 (Sep 1979) Approved Oct 1979; Started 1980; Completed 1983.

SEARCH FOR BARYONIUM STATES NEAR THE $N\bar{N}$ THRESHOLD BY THE DETECTION OF RECOIL NUCLEI WITH SPES-IV

LYON, IPN & ORSAY, IPN & SACLAY – D Bachelier, M Bedjidian, J L Boyard, E Descroix, J Y Grossiord, A Guichard, M Gusakow, T Hennino, J C Jourdain, J R Pizzi, P Radvanyi (Spokesperson), M Roy-Stephan (Spokesperson)

Accelerator SATURNE-II *Detector* SPES-IV

Reactions

p nucleus $\rightarrow$ nucleus nucleon $\overline{\text{nucleon}}$	3.7 GeV/c

Particles studied baryonium

SACLAY-060 (Oct 1979) Approved Oct 1979; Started 1981; Completed 1982.

ANGULAR AND ENERGY DEPENDENCE OF THE CROSS SECTION AND THE ANALYZING POWER OF THE REACTION $pp \rightarrow d\pi^+$ BETWEEN 725 AND 1000 MeV

SACLAY – J Arvieux, S D Baker, R Bertini (√ Spokesperson), P Catillon, H Catz, J M Durand, L Farvacque, G P Gervino, C M Glashausser, D A Hutcheon, J C Lugol, B Mayer (√ Spokesperson), C A Whitten, A I Yavin
KERNFORSCHUNGSZENTRUM, KARLSRUHE & KARLSRUHE U – G Smith

Accelerator SATURNE-II *Detector* SPES-I

Reactions Polarized beam

$p\ p \rightarrow$ deut π^+	< 1.7 GeV/c

Particles studied dibaryon

Papers PL 162B (1985) 77, and NP A437 (1985) 630.

SACLAY-066 (Feb 1980) Approved Jun 1980; Started Nov 1980; Completed.

MEASUREMENT OF THE THE $dd \rightarrow {}^4\mathrm{He}\,\gamma$ REACTION FOR A TEST OF THE MICROSCOPIC REVERSIBILITY PRINCIPLE

SACLAY – A Boudard, G Bruge, P Couvert, L Farvacque, D Legrand
UCLA – W Briscoe, D Fitzgerald, B M K Nefkens (√ Spokesperson), B Silverman

Accelerator SATURNE-II *Detector* SPES-I

Reactions

deut deut $\rightarrow$ He γ	—
deut p	—

Comments A continuation of SACLAY-037.

Papers PR C29 (1984) 35.

SACLAY-068 (Feb 1981) Approved Jun 1980; Started Jun 1981; Completed 1982.

STUDY OF REACTIONS $pd \rightarrow \pi^0\ ^3$He, $pd \rightarrow \gamma\ ^3$He, AND $pd \rightarrow \pi^+\ ^3$H

SACLAY - A Boudard, G Bruge, P Couvert (√ Spokesperson), L Farvacque, D Legrand
UCLA - W J Briscoe, D Fitzgerald, B M K Nefkens (√ Spokesperson), B Silverman

Accelerator SATURNE-II *Detector* SPES-I

Reactions

p deut → trit π^+	1.03 GeV/c
p deut → ^{3}He π^0	"
p deut → ^{3}He γ	"

Papers NP A444 (1985) 621, and PR C32 (1985) 1956.

SACLAY-070 (Apr 1980) Approved Mar 1982; Started 1982; Completed Feb 1983.

SEARCH FOR DIBARYONIC RESONANCES IN pp ELASTIC SCATTERING BETWEEN 600 AND 1000 MeV

SACLAY - R Beurtey, J C Duchazeaubeneix, J C Faivre, M Garcon, B Guillerminet, D Legrand (Spokesperson), M Rouger, J Saudinos, Y Terrien

Accelerator SATURNE-II *Detector* Combination

Reactions Polarized beam

$p\,p \rightarrow p\,p$	1.0–1.7 GeV/c

Particles studied dibaryon

SACLAY-078 (Jan 1981) Approved Jan 1983; Started Feb 1983; Completed.

np ELASTIC SCATTERING AT SMALL ANGLES

SACLAY - J C Lugol, J Saudinos, Y Terrien (√ Spokesperson), F Wellers
LENINGRAD, INP - A V Khanzadeev, G Korolev (√ Spokesperson), N Terentiev, A Vorobyov

Accelerator SATURNE-II *Detector* Wire chamber

Reactions

$n\,p \rightarrow n\,p$	0.95–2.0 GeV/c

Comments Detects the recoil proton using an ionization chamber.

Papers PL 165B (1985) 262.

SACLAY-080 (Apr 1981) Approved Jun 1981; Started Nov 1981; Completed Jun 1982.

STUDY OF ISOSCALAR DIBARYONIC RESONANCES

SACLAY - J Banaigs, J Berger, P Berthet, R Beurtey, M Boivin, Y Le Bornec, A Codino, M P Combes, J Duflo, R Frascaria (√ Spokesperson), D Hutcheon, C F Perdrisat, F Plouin, B Tatischeff (√ Spokesperson), N Willis (√ Spokesperson)
STRASBOURG - E Aslanides, O Bing, F Hibou
FRASCATI - F Fabbri, G Piccozza, L Satta
CAEN U - J Yonnet

Accelerator SATURNE-II *Detector* SPES-IV

Reactions

deut deut → deut X	2.98, 3.39, 3.72 GeV/c

Particles studied dibaryon

Comments No resonance found.

Papers NP A431 (1984) 703, and NP A431 (1984) 713.

SACLAY-085 (Sep 1981) Approved Nov 1981; Started 1982.

THE (^{3}He, t) REACTION AT INTERMEDIATE ENERGIES

LUND U - I Bergquist, A Brockstedt, L Carlen, P Ekstrom, B Jakobsson
COPENHAGEN U - C Ellegaard, C Gaarde (√ Spokesperson), J Syrak-Larsen
INDIANA U - C Goodman
LYON, IPN - M Bedjidian, D Contardo, J Y Grossiord, A Guichard, R Haroutunian, J R Pizzi
ORSAY, IPN - D Bachelier, J L Boyard, T Hennino, M Roy-Stephan
SACLAY - M Boivin, P Radvanyi

Accelerator SATURNE-II *Detector* SPES-IV

Reactions

^{3}He $p \rightarrow \Delta(1232\,P_{33})^{++}$ trit	1.8–4.3 GeV/c
^{3}He nucleus → nucleus trit	"

Comments Studies spin-isospin correlations in nuclei — the low-lying collective states of different multipolarities and the Δ excitations. The $p(^3\mathrm{He}, {}^3\mathrm{H})\Delta^{++}$ reaction is an important test case.

Papers PRL 50 (1983) 17, PL 154B (1985) 110, and PL 168B (1986) 331.

SACLAY-087 (Feb 1982) Approved Mar 1982; Started Jun 1982; Completed Oct 1983.

MEASUREMENT OF THE TOTAL CROSS SECTION DIFFERENCE $\Delta\sigma_L(pp)$ IN THE ENERGY RANGE FROM 0.52 TO 2.8 GeV

SACLAY - M Arignon, J Ball, J Bystricky, P Chaumette, J Deregel, J Fabre, J M Fontaine, J Gosset, T Hasegawa, F Lehar (√ Spokesperson), A de Lesquen, C R Newsom, F Perrot, L van Rossum, J Yonnet
GENEVA U - W R Leo, Y Onel
INFN, TRIESTE - A Penzo
ANNECY - H Azaiez, A Michalowicz

Accelerator SATURNE-II *Detector* Combination

Reactions Polarized beam and target

$p\,p \rightarrow p\,p$	1.12–3.62 GeV/c

Comments Uses a coded transmission detector.

Papers PL 142B (1984) 130, and NIM A235 (1985) 523.

SACLAY-088 (Feb 1982) Approved Mar 1982; Started Jul 1983; Completed Jul 1983.

MEASUREMENT OF A_{ookk} FOR pp ELASTIC SCATTERING FROM 725 TO 1040 MeV

SACLAY - J Ball, J Bystricky, P Chaumette, J Deregel, J Fabre, J M Fontaine, T Hasegawa, F Lehar (√ Spokesperson), A de Lesquen, C R Newsom (√ Spokesperson), F Perrot, L van Rossum
GENEVA U - Y Onel
INFN, TRIESTE - A Penzo
ANNECY - H Azaiez

Accelerator SATURNE-II *Detector* Combination

Reactions Polarized beam and target

$p\,p \rightarrow p\,p$	1.51, 1.56, 1.62, 1.70, 1.81 GeV/c

Comments Ran simultaneously with SACLAY-089.

Papers NP B258 (1985) 483.

SACLAY-089 (Feb 1982) Approved Mar 1982; Started Jul 1983; Completed Jul 1983.

EXPERIMENTAL CONFIRMATION OF THE PHASE-SHIFT ANALYSIS PREDICTIONS IN THE DIBARYON REGION

SACLAY - J Ball, J Bystricky, P Chaumette, J Deregel, J Fabre, J M Fontaine, T Hasegawa, F Lehar (√ Spokesperson), A de Lesquen, C R Newsom, F Perrot, L van Rossum
GENEVA U - Y Onel
INFN, TRIESTE - A Penzo (√ Spokesperson)
ANNECY - H Azaiez

Accelerator SATURNE-II *Detector* Combination

Reactions Polarized beam and target

$p\,p \rightarrow p\,p$	1.51, 1.56, 1.62, 1.70, 1.81 GeV/c

Particles studied dibaryon

Comments Ran simultaneously with SACLAY-088.

Papers NP B258 (1985) 483.

SACLAY-092 (Feb 1982) Approved Mar 1982; Started Oct 1982; Completed Oct 1982.

COHERENT PRODUCTION OF PIONS IN THE REACTION ^{3}He(^{3}He, π^+)^{6}Li AS A FUNCTION OF INCIDENT ENERGY

STRASBOURG – E Aslanides, G Bergdolt, P Fassnacht, C Racca
ORSAY, IPN – L Bimbot (√ Spokesperson), T Hennino, J C Jourdain, F Reide, B Tatischeff, N Willis
SACLAY – A Boudard, G Bruge, J C Lugol
STRASBOURG & SACLAY – F Hibou (√ Spokesperson)
ORSAY, IPN & SACLAY – Y Le Bornec (√ Spokesperson)

Accelerator SATURNE-II *Detector* SPES-I

Reactions

^{3}He ^{3}He → π^+ ^{6}Li	—

Papers PL 113B (1983) 149.

SACLAY-095 (Oct 1982) Approved Dec 1982; Started 1983; Completed.

COHERENT PRODUCTION OF THE η IN THE BACKWARD DIRECTION IN *pd* AND *dd* SYSTEMS

SACLAY – J Banaigs, J Berger, M Boivin, A Codino, J Duflo, L Goldzahl (√ Spokesperson), F Plouin
ORSAY, IPN – P Berthet (√ Spokesperson), J P Didelez, R Frascaria (√ Spokesperson), G Pignault
FRASCATI – F Fabbri, G Picozza, L Satta
WILLIAM AND MARY COLL – M Boivin
WILLIAM AND MARY COLL & ORSAY, IPN – C Perdrisat

Accelerator SATURNE-II *Detector* SPES-IV

Reactions

p deut → ^{3}He η	0.92–2.6 GeV (T_{lab})
p deut → trit π^+	0.6–2.3 GeV (T_{lab})
p deut → ^{3}He π^0	"

Papers NP A443 (1985) 4, and PR C32 (1985) 1448.

SACLAY-099 (Oct 1982) Approved Nov 1983; Completed.

MEASUREMENT OF THE ANGULAR DISTRIBUTION OF THE DIFFERENTIAL CROSS SECTION AND POLARIZATION A_{y0} IN THE REACTION pd → ^{3}H π^+ BETWEEN 900 AND 1450 MeV

SACLAY – R Bertini, A Boudard, J Cameron, H Catz, J M Durand, G P Gervino, J L Lugol, B Mayer (√ Spokesperson)
GRENOBLE U & SACLAY – J Arvieux, G Gaillard

Accelerator SATURNE-II *Detector* Spectrometer

Reactions Polarized beam

p deut → trit π^+	1.58–2.2 GeV/c

SACLAY-101 (Dec 1982) Approved Jun 1983; Started Oct 1983.

NOVEL TECHNIQUE FOR THE BEAM POLARIZATION MEASUREMENT AT HIGH ENERGIES

SACLAY – J Bystricky, J Deregel, J M Fontaine, F Lehar (√ Spokesperson), G Leleux, A de Lesquen, A Nakach (√ Spokesperson), F Perrot, L van Rossum (√ Spokesperson)
INFN, TRIESTE – A Penzo

Accelerator SATURNE-II *Detector* Counter

Reactions Polarized beam

$p\ p$ → $p\ p$	1–3.8 GeV/c

Comments Uses a nucleon-nucleon polarimeter.

Papers NIM A234 (1985) 412.

SACLAY-104 (Feb 1983) Approved Jun 1983; Started Dec 1984; Completed Nov 1985.

MEASUREMENT OF WOLFENSTEIN PARAMETERS IN *pp* SCATTERING BETWEEN 600 MeV AND 3 GeV

SACLAY – J Ball, J Bystricky, P Chaumette, J Deregel, J Fabre, J M Fontaine (√ Spokesperson), F Lehar (√ Spokesperson), A de Lesquen, F Perrot, L van Rossum
ANNECY – H Azaiez
INFN, TRIESTE – A Penzo
GENEVA U – Y Onel

Accelerator SATURNE-II *Detector* Combination

Reactions Polarized beam and target

$p\ p$ → $p\ p$	1.2–3.8 GeV/c

Comments A 'complete' experiment. Measures 11 to 13 independent observables over the angular range 20 to 100° at 11 incident kinetic energies from 840 to 2700 MeV.

SACLAY-105 (Feb 1983) Approved Nov 1983; Started Jan 1984.

TEST OF CHARGE SYMMETRY IN THE REACTION *dd* → ^{4}He π^0

SACLAY – J Banaigs, J Berger, M Boivin, A Boudard, L Goldzahl, C Kerboul, F Plouin (Spokesperson), B Silverman, J Yonnet
FRASCATI – F L Fabbri, L Satta
UCLA – J Carroll, G Igo
ECOLE POLYTECHNIQUE – P Fleury

Accelerator SATURNE-II *Detector* SPES-IV

Reactions

deut deut → He π^0	0.8–1.35 GeV (T_{lab})

Comments Tests charge symmetry violation at the level of 1 pb/sr. Taking data (November 84).

SACLAY-106 (Feb 1983) Approved Mar 1983; Started Jul 1983.

SIMULTANEOUS MEASUREMENT OF THE ASYMMETRIES $\epsilon(pp)$ AND $\epsilon(np)$

SACLAY – J Arvieux, J Ball, J Bystricky, J Deregel, J M Fontaine, T Hasegawa, F Lehar (√ Spokesperson), A de Lesquen, C R Newsom, F Perrot, C Raymond, L van Rossum
ANNECY – H Azaiez, A Michalowicz
INFN, TRIESTE – A Penzo
GENEVA U – Y Onel

Accelerator SATURNE-II *Detector* Counter

Reactions Polarized beam

$p\ p$ → $p\ p$	1.0–2.0 GeV/c
$n\ p$ → $n\ p$	"

Comments Uses a nucleon-nucleon polarimeter with neutron counters.

Papers NP A444 (1985) 597.

SACLAY-107 (Feb 1984) Approved Mar 1984; Started Apr 1984.

ANOMALOUS PION PRODUCTION IN THE PROTON NUCLEUS INTERACTION AT INTERMEDIATE ENERGIES

SACLAY – M Bolore, J-M Hisleur, J Julien (Spokesperson), J Martino, B Pappalardo, L Roussel, B Saghai
ORSAY, IPN – L Bimbot
GRENOBLE U – O Lebrun
MOSCOW, INR – V K Gorbunov, F F Gruber, V A Krasnov, A B Kurepin (Spokesperson), V S Pantuev, A I Reshetin
CRACOW – H Dabrowski

Accelerator SATURNE-II *Detector* Combination

Reactions

p Cu → π^+ X	0.88 GeV/c
p Cu → π^- X	"

SACLAY-108 (Jun 1984) Approved Jun 1984; Completed Jun 1984.

MEASUREMENT OF VECTOR AND TENSOR ANALYZING POWERS FOR THE CONSTRUCTION OF THE DEUTERON POLARIMETER IN THE ENERGY REGION 150–500 MeV

SACLAY – B Bonin, A Boudard (√ Spokesperson), G Bruge, J C Duchazeaubeneix, J M Durand, M Garcon, B Mayer, M Rouger, J Saudinos, D Shepard, B Silverman, F Soga
GRENOBLE U – J Arvieux, G Gaillard, Nguyen
ALBERTA U – J Cameron (√ Spokesperson), G C Neilson, W C Olsen

Accelerator SATURNE-II *Detector* Wire chamber

Reactions Polarized beam

deut $p \rightarrow$ deut p	0.77–1.5 GeV/c

Papers NP A458 (1986) 287.

SACLAY-113 (Feb 1983) Approved Mar 1984; Completed.

SEARCH FOR MULTIBARYONIC RESONANCES BY A STUDY OF MISSING MASS SPECTRA IN THE REACTIONS $pp \rightarrow \pi^- X$ AND $pd \rightarrow \pi^- X$

ORSAY, IPN – M P Combes, R Frascaria, B Tatischeff, N Willis (√ Spokesperson)
SACLAY & ORSAY, IPN – Y Le Bornec
SACLAY & TOKYO U – F Soga
STRASBOURG – E Aslanides, G Bergdolt, O Bing, P Fassnacht (√ Spokesperson), F Hibou, C Kerboul

Accelerator SATURNE-II *Detector* SPES-III

Reactions

$p\ p \rightarrow \pi^-$ X	—
p deut $\rightarrow \pi^-$ X	—

Particles studied dibaryon

Comments Analysis is in progress (December 86).

SACLAY-115 (Jan 1984) Approved Mar 1984; Started Oct 1984.

THE $(d, {}^2\mathrm{He})$ REACTION

LUND U – I Bergquist, A Brockstedt, L Carlen, P Ekstrom
COPENHAGEN U – C Ellegaard, C Gaarde (√ Spokesperson), J Syrak-Larsen
INDIANA U – C Goodman
LYON, IPN – M Bedjidian, D Contardo, J Y Grossiord, A Guichard, R Haroutunian, J R Pizzi
ORSAY, IPN – D Bachelier, J L Boyard, T Hennino, M Roy-Stephan
SACLAY – M Boivin, P Radvanyi

Accelerator SATURNE-II *Detector* SPES-IV

Reactions Polarized beam

deut $p \rightarrow {}^2\mathrm{He}\ n$	1.6–3.6 GeV/c
deut $p \rightarrow {}^2\mathrm{He}\ \Delta(1232\,P_{33})^0$	"
deut nucleus $\rightarrow {}^2\mathrm{He}$ nucleus	"

Comments The $(d, {}^2\mathrm{He})$ reaction is a charge-exchange spin-transfer reaction like the (n, p) reaction. Measures the tensor analyzing power. Taking data.

SACLAY-117 (Nov 1985) Approved Nov 1985; Started 1986.

MEASUREMENT OF T_{20} AT 0 AND 180° AND OF DIFFERENTIAL CROSS SECTIONS FOR THE REACTION $\vec{d}p \rightarrow {}^3\mathrm{He}\ \pi^0$ FROM 700 TO 2200 MeV

SACLAY – L Antonuk, J Arvieux, J Berger, R Bertini, M Boivin, A Boudard (√ Spokesperson), J M Durand, C Kerboul, B Mayer, A Stetz, J Tinsley, J Yonnet
GRENOBLE U – Nguyen Van Sen, Y Yanlin
ALBERTA U – J Cameron, C Lapointe, D M Sheppard
NEUCHATEL U – J F Germond
UNIVERSITY COLL, LONDON – C Wilkin

Accelerator SATURNE-II *Detector* SPES-IV

Reactions Polarized beam

deut $p \rightarrow {}^3\mathrm{He}\ \pi^0$	0.7–2.2 GeV (T_{lab})

Papers PL 181B (1986) 28.

SACLAY-118 (Mar 1984) Approved Mar 1984; Started Apr 1984; Completed.

RESEARCH ON DIBARYON RESONANCES AROUND 350 MeV

SACLAY – B Bonin, A Boudard, J C Duchazeaubeneix, M Garcon, D Legrand, M Rouger, J Saudinos (√ Spokesperson)
GRENOBLE U – J Arvieux, G Gaillard

Accelerator SATURNE-II *Detector* Combination

Reactions

$p\ p \rightarrow$ deut π^+	328, 340, 354, 358 MeV (T_{lab})
$p\ p \rightarrow p\ p$	"

Particles studied dibaryon

SACLAY-121 (Sep 1984) Approved Nov 1984; Started 1985.

SEARCH FOR DIBARYONS OF STRANGENESS $S = -1$ BETWEEN ΛN AND ΣN THRESHOLDS

ORSAY, IPN – J P Didelez (√ Spokesperson), R Frascaria (√ Spokesperson), E Warde
SOUTHERN CALIFORNIA U – G Adams, G Blanpied, G Pignault, B Preedom (√ Spokesperson)
NEUCHATEL U – E Bovet, J P Egger
GRENOBLE U – C Perrin
CAEN U – J Yonnet
SACLAY – M Boivin, B Saghai
BONN U – J Ernst, T Mayer Kuckuck, R Siebert

Accelerator SATURNE-II *Detector* SPES-IV, Counter

Reactions

$p\ p \rightarrow K^+$ X	—

Particles studied dibaryon($S = -1$)

Comments Taking data (November 86).

SACLAY-123 (Oct 1985) Approved Nov 1985; Started 1986; Completed.

STUDY OF NARROW STRUCTURES IN THE INVARIANT MASSES OF TWO BARYONS

SACLAY – J Arvieux, R Beurtey, B Bonin, A Boudard, J C Duchazeaubeneix, J C Faivre, M Garcon, R Rouger, J Saudinos (√ Spokesperson), Y Terrien

Accelerator SATURNE-II *Detector* Combination

Reactions

$p\ p \rightarrow$ deut π^+	336, 344, 350 MeV (T_{lab})

Particles studied dibaryon

Comments A continuation of SACLAY-118.

SACLAY-124 (Nov 1984) Approved Nov 1984; Started Mar 1985.

SEARCH FOR NARROW DIBARYON RESONANCES IN THE REACTION $pp \rightarrow d\pi^+$ AT 90° C.M.

SACLAY – J Arvieux, J Bystricky, J Deregel, F Lehar (√ Spokesperson), A de Lesquen, B Mayer (√ Spokesperson), F Perrot, L Van Rossum
INFN, TRIESTE – A Penzo
GENEVA U – Y Onel

Accelerator SATURNE-II *Detector* Combination

Reactions Polarized beam and target

$p\ p \rightarrow$ deut π^+	328, 340, 354, 368, 510, 525, 560 MeV (T_{lab})

Particles studied dibaryon

Comments Measures spin correlations and analyzing power at 90° c.m.

SACLAY-125 (Oct 1985)

COMPARISON OF COHERENT AND INCOHERENT PRODUCTION OF π^0 AND η ON NUCLEI

INFN, TURIN & TURIN U – G B Bonazzola, E Chiavassa, G Dellacasa, N Demarco, F Ferrero, M Gallio, A Musso, A Piccotti, E Vercellin
INFN, CATANIA – V Bellini, A S Figuera, R Fonte
SACLAY – R Bertini (√ Spokesperson), M Boivin, A Boudard, P Couvert, J M Durand, F Plouin, B Silverman
STRASBOURG – F Brochard, P Fassnacht

Accelerator SATURNE-II *Detector* ?

Comments In preparation and making test runs (December 86).

SACLAY-126 (Feb 1985) Approved May 1985; Started Nov 1985; Completed Nov 1985.

STUDY OF NARROW STRUCTURES BY THE TRANSFER REACTION (p,d) IN THE INVARIANT MASSES OF TWO BARYONS

ORSAY, IPN – Y Le Bornec, M P Comets, B Tatischeff (√ Spokesperson), N Willis
SACLAY – R Beurtey, B Bonin, A Boudard, J M Durand, M Garcon, J C Lugol, B Mayer, Y Terrien
STRASBOURG – P Fassnacht, F Hibou

Accelerator SATURNE-II *Detector* SPES-I

Reactions

$p\ ^3\mathrm{He} \rightarrow$ deut X	0.75 GeV (T_{lab})

Particles studied dibaryon

Comments Finds narrow isovector structures in 2-baryon invariant masses.

SACLAY-129 (Nov 1985) Started 1985.

EXCITATION FUNCTION OF THE REACTION $pp \rightarrow$ DIBARYON(2124) $\rightarrow \pi^0 pp$ AT 0°

ORSAY, IPN – J-P Didelez, R Frascaria (√ Spokesperson), R Siebert, E Warde
SOUTHERN CALIFORNIA U – G Adams, G Blanpied, G Pignault, B Preedom
NEUCHATEL U – E Bovet, J-P Egger (√ Spokesperson)
GRENOBLE U – C Perrin
SACLAY – H Dabrowski, J Julien, B Saghai
KERNFORSCHUNGSANLAGE, JULICH – K Killian
UPPSALA U – J Johanson

Accelerator SATURNE-II *Detector* SPES-0

Reactions

$p\ p \rightarrow p\ p\ \pi^0$	450–590 MeV (T_{lab})

Particles studied dibaryon

Comments Taking data (November 86).

SACLAY-132 (Nov 1985) Approved Nov 1985; Started May 1986.

STUDY OF REACTIONS $pp \rightarrow pn\pi^+$ AND $pp \rightarrow pp\pi^+\pi^-$ WITH POLARIZED PROTONS FROM 800 MeV TO 2.5 GeV

SACLAY – G Audit, R Babinet, G Bruge, J M Durand, Z Fodor, G Fournier, J Gosset (√ Spokesperson), D L'Hote, M C Lemaire, B Mayer, J Poitou, B Saghai (√ Spokesperson), O Valette, J Yonnet
CLERMONT-FERRAND U – J Augerat, J Berthot, P Y Bertin, H Fonvieille
STRASBOURG – F Brochard

Accelerator SATURNE-II *Detector* DIOGENE

Reactions Polarized beam

$p\ p \rightarrow p\ n\ \pi^+$	800, 1500, 2000, 2500 MeV (T_{lab})
$p\ p \rightarrow p\ p\ \pi^+\ \pi^-$	"

SACLAY-133 (Oct 1985) Approved Nov 1985; Started Jun 1986.

DEPENDENCE ON A OF PION PRODUCTION IN THE REACTION p NUCLEUS $\rightarrow \pi X$

STRASBOURG – D Benabdelouahed, G Bergdolt, O Bing, P Fassnacht, F Hibou (√ Spokesperson)
ORSAY, IPN – Y Le Bornec (√ Spokesperson), M P Comets, R Frascaria, B Tatischeff
SACLAY – M Boivin

Accelerator SATURNE-II *Detector* SPES-III

Reactions

p nucleus $\rightarrow$ pion X	2.1, 2.7 GeV (T_{lab})

SACLAY-134 (Oct 1985) Approved Nov 1985; Started Mar 1986.

STUDY OF DEUTERON BREAKUP IN THE REACTION d NUCLEUS $\rightarrow pX$ AT 3.72 GeV/c

ORSAY, IPN – J P Didelez, R Frascaria
SACLAY – R Beurtey, M Boivin, A Boudard, F Plouin, J Yonnet (Spokesperson)
WILLIAM AND MARY COLL – J M Finn, H Funsten, C F Perdrisat (Spokesperson)
VIRGINIA U – P C Gugelot

Accelerator SATURNE-II *Detector* SPES-IV

Reactions Polarized beam

deut nucleus $\rightarrow p$ X	3.72 GeV/c

Comments Targets are H, He, and C. Measures the cross section and analyzing power T_{20} at 0°.

SACLAY-135 (Oct 1985) Approved Nov 1985; Started 1986.

MEASUREMENT OF ISOSCALAR SPIN RESPONSE FUNCTIONS IN NUCLEI BY INELASTIC SCATTERING OF POLARIZED DEUTERONS

RUTGERS U – C Glashausser (√ Spokesperson)
SACLAY – B Bonin (√ Spokesperson)

Accelerator SATURNE-II *Detector* SPES-I

Reactions Polarized beam

deut nucleus	400 MeV (T_{lab})

Comments Measures the differential cross section, the analyzing power, spin correlations. The apparatus includes a deuteron polarimeter.

SACLAY-136 (Oct 1985) Approved Nov 1985, May 1986; Started Jul 1986.

MEASUREMENT OF ANALYZING POWER OF THE REACTION $np \rightarrow d\gamma$ BETWEEN 500 AND 1100 MeV

SACLAY – R Beurtey, B Bonin, A Boudard, G Bruge, P Couvert, J C Duchazeaubeneix, J C Faivre, J C Lugol, B Mayer, M Rouger, J Saudinos, B Silverman (Spokesperson), Y Terrien, F Wellers
GEORGE WASHINGTON U – W Briscoe

Accelerator SATURNE-II *Detector* Combination

Reactions Polarized beam

$n\ p \rightarrow$ deut γ	500–1100 MeV (T_{lab})

SACLAY-137 (Oct 1985) Approved Jun 1986.

FULL CALIBRATION OF THE "AHEAD" (ALBERTA HIGH EFFICIENCY ANALYZER FOR DEUTERONS) POLARIMETER FOR DEUTERONS BETWEEN 100 AND 260 MeV

SACLAY & ALBERTA U – L Antonuk (√ Spokesperson), G Roy
SACLAY – J Arvieux, B Bonin, A Boudard, J M Durand, M Garcon, J Tinsley, Y Yonnet
ORSAY, IPN – D Bachelier
ALBERTA U – E B Cairns, J Cameron (√ Spokesperson), H W Fielding, C Lapointe, W J McDonald, G C Neilson, D M Sheppard, J Soukup, K Starko

Accelerator SATURNE-II *Detector* SPES-I

Reactions	Polarized beam
deut $p \rightarrow$ deut p	100–260 MeV (T_{lab})
deut $p \rightarrow p\ p\ n$	"

SACLAY-138 (Oct 1985) Approved Nov 1985; Started Jul 1986.
TEST OF CHARGE SYMMETRY BY COMPARISON OF ANALYZING POWERS T_{20} IN REACTIONS $dp \rightarrow {}^3\mathrm{He}\ \pi^0$ AND $dp \rightarrow {}^3\mathrm{H}\ \pi^+$

SACLAY – J Banaigs, J Berger (Spokesperson), M Boivin, A Boudard, L Goldzahl (Spokesperson), F Plouin, J Yonnet
ALBERTA U – Roy
FRASCATI – F Fabbri, G Picozza, L Satta
UCLA – V Ghazikhanian, Gordon

Accelerator SATURNE-II *Detector* SPES-IV

Reactions	
deut $p \rightarrow {}^3\mathrm{He}\ \pi^0$	600, 900, 1100 MeV (T_{lab})
deut $p \rightarrow$ trit π^+	"

SACLAY-140 (Oct 1985) Approved Nov 1985; Started Jul 1986.
FIRST MEASUREMENT OF DIFFERENTIAL CROSS SECTIONS AND ANALYZING POWERS FOR THE REACTIONS $np \rightarrow pp\pi^-$ AND $np \rightarrow d\pi^+\pi^-$

SACLAY – R Beurtey, B Bonin, A Boudard, G Bruge, P Couvert, J-C Duchazeaubeneix, J-C Faivre, J-C Lugol, B Mayer, M Rouger, J Saudinos, B Silverman, Y Terrien (√ Spokesperson), F Wellers

Accelerator SATURNE-II *Detector* Combination

Reactions	Polarized beam
$n\ p \rightarrow p\ p\ \pi^-$	650–1000 MeV (T_{lab})
$n\ p \rightarrow$ deut $\pi^+\ \pi^-$	"

SACLAY-144 (Oct 1985) Approved Nov 1985; Started Dec 1985; Completed Jul 1986.
NUCLEON-NUCLEON PROGRAM PART II: np SCATTERING UP TO 1.2 GeV

SACLAY – J Ball, P Chaumette, J Deregel, J Fabre, J M Fontaine, D Legrand, F Lehar (√ Spokesperson), A de Lesquen, F Perrot (√ Spokesperson), L van Rossum
GENEVA U – P Bach, R Hess (√ Spokesperson), P Sormani
UCLA – V Ghazakhanian
ANNECY – A Michalowicz

Accelerator SATURNE-II *Detector* Combination

Reactions	Polarized beam and target
$n\ p \rightarrow n\ p$	1.0–2.0 GeV/c
$p\ p \rightarrow p\ p$	"

Comments Measures $np \rightarrow np$ and $pp \rightarrow pp$ using a polarized deuteron beam, and also $np \rightarrow np$ using a free polarized neutron beam. For the latter, measures $\Delta\sigma_L$, $\Delta\sigma_T$, and correlation parameter. Compares results for free and quasi-free scattering.

SERP-E-045 (1970) Approved 1970; Started Dec 1974; Completed Jun 1981.
STUDY OF MUON CHARACTERISTICS IN NEUTRINO INTERACTIONS

SERPUKHOV – A P Bugorsky, V N Goryachev, L A Klimenko, V I Kochetkov, V A Krendelev, A V Kulikov, V I Kurbakov, A I Mukhin (Spokesperson), V F Perelygin, V G Platonov, V G Rybakov, V N Rychenkov, K E Shestermanov, Y G Stroganov, Y M Sviridov, V Y Uglekov, A A Volkov, A S Vovenko, V A Yarba, V P Zhigunov, Y A Zudin

MOSCOW, ITEP – A E Asratyan, V S Epstein, E A Grigoriev, V S Kaftanov (Spokesperson), N V Kalganov, V D Khovansky, Y G Kornelyuk, M A Kubantsev, I P Maksimov, A N Rozanov, M S Ryabinin, V M Serezhin, V V Shamanov, V G Shevchenko, V A Smotryaev, I S Trostin, A A Zaitsev, A A Zeldovich, V A Zhemanov

Accelerator SERP *Detector* Optical spark chamber

Reactions	
ν_μ Fe $\rightarrow \mu^-$ X	2–30 GeV/c
ν_μ Fe $\rightarrow \mu^-\ \mu^+$ X	"
$\overline{\nu}_\mu$ Fe $\rightarrow \mu^+$ X	"
$\overline{\nu}_\mu$ Fe $\rightarrow \mu^-\ \mu^+$ X	"
ν_μ Al $\rightarrow \mu^-$ X	"
$\overline{\nu}_\mu$ Al $\rightarrow \mu^+$ X	"
$\nu_\mu\ n \rightarrow \mu^-\ p$	"
$\overline{\nu}_\mu\ p \rightarrow \mu^+\ n$	"
$\overline{\nu}_e$ Al $\rightarrow e^+$ X	"
$\nu_\mu\ e^- \rightarrow \nu_\mu\ e^-$	"

Comments Ran for 4000 hours. About 40000 ν_μ and 10000 $\overline{\nu}_\mu$ interactions obtained as of Jan 1979.

Papers PL 71B (1977) 439, PL 76B (1978) 239, YF 28 (1978) 424 = SJNP 28 (1978) 214, YF 29 (1979) 1506 = SJNP 29 (1979) 773, YF 30 (1979) 1014 = SJNP 30 (1979) 528, NIM 146 (1977) 367, JETP 47 (1977) 991, YF 35 (1982) 59 = SJNP 35 (1982) 35, and ZETFP 38 (1983) 547 = JETPL 38 (1983) 661.

SERP-E-100 (May 1974) Approved Jun 1975; Started May 1976; Completed Feb 1984.
STUDY OF LARGE p_t PARTICLE PRODUCTION IN pN COLLISIONS AT 70 GeV

SERPUKHOV – V V Abramov, A V Alekseev, B Y Baldin, S I Bityukov, Y P Dmitrevsky, A S Dyshkant, V N Evdokimov, V Y Glebov, V I Kotov, A N Krinitsin, V I Kryshkin, N Y Kulman, V K Myalitsin, R A Rzaev, R M Sulyaev (Spokesperson), L K Turchanovich, Y N Vrazhnov, V V Zmushko

Accelerator SERP *Detector* FODS

Reactions	
$p\ p \rightarrow \pi^+$ X	70 GeV (E_{lab})
$p\ p \rightarrow \pi^-$ X	"
$p\ p \rightarrow K^+$ X	"
$p\ p \rightarrow K^-$ X	"
$p\ p \rightarrow p$ X	"
$p\ p \rightarrow \overline{p}$ X	"
$p\ p \rightarrow \mu^+$ X	"
$p\ p \rightarrow \mu^-$ X	"
$p\ p \rightarrow e^+$ X	"
$p\ p \rightarrow e^-$ X	"
$p\ p \rightarrow$ 2hadron X	"
$p\ p \rightarrow \mu^+$ hadron X	"
$p\ p \rightarrow \mu^-$ hadron X	"
$p\ p \rightarrow e^+$ hadron X	"
$p\ p \rightarrow e^-$ hadron X	"

p deut $\rightarrow \pi^+$ X	"
p deut $\rightarrow \pi^-$ X	"
p deut $\rightarrow K^+$ X	"
p deut $\rightarrow K^-$ X	"
p deut $\rightarrow p$ X	"
p deut $\rightarrow \bar{p}$ X	"
p deut $\rightarrow \mu^+$ X	"
p deut $\rightarrow \mu^-$ X	"
p deut $\rightarrow e^+$ X	"
p deut $\rightarrow e^-$ X	"
p deut $\rightarrow$ 2hadron X	"
p deut $\rightarrow \mu^+$ hadron X	"
p deut $\rightarrow \mu^-$ hadron X	"
p deut $\rightarrow e^+$ hadron X	"
p deut $\rightarrow e^-$ hadron X	"

Comments The p_t range is 0.3 to 4.5 GeV, and the mass-squared range is 1 to 9 GeV^2.

Papers YF 23 (1976) 1195 = SJNP 23 (1976) 636, PTE 4 (1980) 38, NP B173 (1980) 348, YF 31 (1980) 660 = SJNP 31 (1980) 343, YF 31 (1980) 937 = SJNP 31 (1980) 484, YF 31 (1980) 1483 = SJNP 31 (1980) 770, ZETFP 33 (1981) 304 = JETPL 33 (1981) 289, YF 33 (1981) 715 = SJNP 33 (1981) 371, YF 35 (1982) 1199 = SJNP 35 (1982) 702, ZETFP 38 (1983) 206 = JETPL 38 (1983) 243, NP B245 (1984) 1, ZETFP 39 (1984) 92 = JETPL 39 (1984) 111, YF 40 (1984) 1447 = SJNP 40 (1984) 918, YF 41 (1985) 137 = SJNP 41 (1985) 87, YF 41 (1985) 700 = SJNP 41 (1985) 445, and ZPHY C27 (1985) 497.

SERP-E-102 (1975) Approved Jul 1975; Started May 1978; Completed 1985.

STUDY OF HYPERCHARGE EXCHANGE SCATTERING PROCESSES

SERPUKHOV – S A Akimenko, V I Belousov, A M Blick, V M Kutyin (Spokesperson), Y D Prokoshkin, A I Ronzhin, V I Rykalin, V I Solyanik
DUBNA – Y A Budagov (Spokesperson), V P Dzhelepov, V B Flyagin, Y F Lomakin, V B Vinogradov, A G Volodko
TBILISI STATE U – N S Amaglobeli, R G Salukvadze
YEREVAN PHYS INST – A T Amatuni, E M Matevosyan
KOSICE, IEF – Y Dubinski, L Shandor

Accelerator SERP *Detector* Spectrometer

Reactions

$\pi^+ p \rightarrow K^+ \Sigma^+$	5–20 GeV/c
$\pi^+ p \rightarrow K^+ Y^*(\text{unspec})^+$	"
$\pi^+ n \rightarrow K^0 \Sigma^+$	"
$\pi^+ n \rightarrow K^0 Y^*(\text{unspec})^+$	"
$\pi^+ n \rightarrow K^+ Y^*(\text{unspec})^0$	"
$\pi^+ n \rightarrow K^+ \Lambda$	"
$K^+ n \rightarrow \pi^+ Z^*(\text{unspec})^0$	"
$\pi^+ n \rightarrow K^+ \Lambda(1330\,\text{B})$	"

Particles studied $\Lambda(1330\,\text{B})$, $Z^*(\text{unspec})^0$

Papers YF 38 (1983) 1212 = SJNP 38 (1983) 732, YF 38 (1983) 1472 = SJNP 38 (1983) 896, and YF 39 (1984) 649 = SJNP 39 (1984) 411.

SERP-E-104 (1975) Approved Jan 1975; Started Jun 1978; Completed 1980.

SEARCH FOR CHARM

SERPUKHOV – Y I Salomatin, A S Vovenko
DUBNA – A N Aleev, V A Arefiev, V P Balandin, A M Baldin, S G Basiladze, V K Birulev, A S Chvyrov, G G Eichner, I M Geshkov, V M Gorshkov, N N Govorun, T S Grigalashvili, B N Guskov, I M Ivanchenko, N N Karpenko, D A Kirillov, D Kiss, V G Krivokhizhin, V V Kukhtin, M F Likhachev (Spokesperson), A L Lyubimov, A N Maksimov, I Manno, M N Morozov, H Nowak, A V Poze, I A Savin, A E Senner, L V Silvestrov, V E Simonov, M I Solovyev, G G Takhtamyshev, G Vestergombi
BERLIN, DAW – K F Albrecht, K Hiller, R Leiste, H E Ryseck (Spokesperson)
BUDAPEST, CRIP – E Nagy (Spokesperson), L Sente, L Urban
LEBEDEV INST – A S Belousov, P A Cherenkov, E I Malinovsky, S V Rusakov, P N Shareyko
PRAGUE, INST PHYS – J Hladky, S Nemechek, M Novak, A Prokes, J Schastny, J Votruba
SOFIYA, INST CHEM TECH – V I Zayachki
SOFIYA, INST NUCL RES – V I Genchev, P K Markov (Spokesperson), G G Sultanov, P T Todorov, P K Trayanov
TBILISI STATE U – V P Djordjadze, V D Kekelidze, G I Nikobadze

Accelerator SERP *Detector* Wide-angle spectrometer

Reactions

n C $\rightarrow \Lambda \pi^+$ X	45 GeV/c
n C $\rightarrow \Lambda \pi^+ \pi^-$ X	"
n C $\rightarrow \Lambda \mu^+$ X	"
n C $\rightarrow p K_S$ X	"
n C $\rightarrow K_S \pi^+ \pi^-$ X	"
n C $\rightarrow K_S \pi^+$ X	"
n C $\rightarrow K_S \pi^-$ X	"

Particles studied charm, Λ_c^+

Papers YF 28 (1978) 663 = SJNP 28 (1978) 340, YF 29 (1979) 94 = SJNP 29 (1979) 46, YF 29 (1979) 1516 = SJNP 29 (1979) 778, YF 35 (1982) 1175 = SJNP 35 (1982) 687, YF 37 (1983) 1474 = SJNP 37 (1983) 877, YF 37 (1983) 1479 = SJNP 37 (1983) 880, and ZPHY C26 (1984) 43.

SERP-E-105 (1975) Approved Jan 1976; Started Jun 1978; Completed 1982.

STUDY OF HADRON INTERACTIONS IN THE ENERGY RANGE 20–40 GeV

BERLIN, DAW – Y Ber, G Bom, K Dajters, A Donat, K Fogt, V Fribel, I Galm, I Kharder, U Kundt, R Lyajste, Z Novak, G Peter, R Poze, G Roloff, G Shiller, A Shvind, K Tryuchler, K Ventslav
BUDAPEST, CRIP – T Gemeshi, D Pinter
WARSAW U, IEP – I Gaevski, Z Tsisek, Y Zakzhevski
DUBNA – D Albrekht, E M Andreev, P Glasnek, Y V Grishkevich, V G Ivanov, G M Kadykov, G Khemnits, B A Khomenko, N N Khovansky, Z V Krumshtejn, K Lanius, A Majer, Y P Merekov, B A Muravev, G A Ososkov, V I Petrukhin (Spokesperson), D Poze, K Ryuger, G A Shelkov, K Shpiring, J Shyuler, T A Strizh, V M Suvorov, K Tom, L S Vertogradov
PRAGUE, INST PHYS – Y Bem, V Cherny, Z Korbel, M Pishut, L Rob, Y Sedlak, M Seman, K Shafarik
TBILISI STATE U – D M Kotlyarevsky, T A Lomadze, N N Roinishvili

Accelerator SERP *Detector* Wide-angle spectrometer, Streamer chamber

Reactions

$\pi^- p$	20–40 GeV/c

Comments Studies multiple hadron production without π^0's, and processes with production of at least one particle with $p_t > 1$ GeV/c.

SERP-E-107 Started Feb 1976.

STUDY OF NEUTRINO AND ANTINEUTRINO INTERACTIONS WITH NUCLEI

SERPUKHOV – D S Baranov, A A Ivanilov, B T Konyushko, V M Korablev, V A Korotkov, E P Kuznetsov (Spokesperson), V V Makeev, C N Parshikura, A Y Polarush, Y G Ryabov, Y I Smirnov, A A Sokolov, G G Volkov, V A Yarba
MOSCOW PHYS ENG INST – Y P Nikitin

Accelerator SERP *Detector* HLBC-SKAT

Reactions

ν_μ nucleus → ν_μ X	10–20 GeV/c
ν_μ nucleus → μ^- hadron X	"
$\overline{\nu}_\mu$ nucleus → $\overline{\nu}_\mu$ X	"
$\overline{\nu}_\mu$ nucleus → μ^+ hadron X	"

Particles studied unspec

Comments Study of neutral current processes, neutrino-electron scattering, and dilepton production. Run 1488 hours through 1981.

Papers YF 16 (1972) 546 = SJNP 16 (1972) 304, YF 17 (1973) 805 = SJNP 17 (1973) 420, YF 26 (1977) 110 = SJNP 26 (1977) 57, YF 27 (1978) 1608 = SJNP 27 (1978) 846, YF 29 (1979) 1203 = SJNP 29 (1979) 620, YF 29 (1979) 1206 = SJNP 29 (1979) 622, YF 30 (1979) 146 = SJNP 30 (1979) 75, PL 70B (1977) 269, PL 76B (1978) 336, ZETFP 30 (1979) 390 = JETPL 30 (1979) 362, ZETFP 31 (1980) 772 = JETPL 31 (1980) 728, ZPHY C21 (1984) 189, ZPHY C21 (1984) 197, YF 40 (1984) 1454 = SJNP 40 (1984) 923, YF 41 (1985) 1520 = SJNP 41 (1985) 963, and YF 43 (1986) 1186 = SJNP 43 (1986).

SERP-E-112 (Jan 1976) Approved Jun 1976; Started Apr 1979; Completed 1985.

POLARIZATION MEASUREMENT IN CHARGE-EXCHANGE REACTIONS AT 40 GeV/c

SERPUKHOV – V D Apokin, B N Chuyko, A A Derevschikov, V A Krendelev, Y A Matulenko, A P Meschanin, A I Misnic, E N Monich, S B Nurushev (Spokesperson), L B Parfenov, D B Prikhodko, A N Prokhorov, V G Rigov, V N Rychenkov, V I Rykalin, A I Saraykin, B N Schelekhov, V K Semenov, V V Siksin, E V Smirnov, V L Solovyanov, L F Solovyev, V Y Uglekov, A N Vasilyev, N I Vishnevsky
DUBNA – M Y Kazarinov, Y M Kazarinov (Spokesperson), B A Khachaturov, V S Kiselev, I K Potashnikova

Accelerator SERP *Detector* Combination

Reactions Polarized target

$\pi^- p \to \pi^0 n$	40 GeV/c
$K^- p \to K_L n$	"

Papers YF 35 (1982) 382 = SJNP 35 (1982) 219, YF 36 (1982) 1191 = SJNP 36 (1982) 694, YF 41 (1985) 116 = SJNP 41 (1985) 74, and NP B255 (1985) 253.

SERP-E-115 (Nov 1975) Approved Jan 1976; Started 1982; Completed 1986.

STUDY OF CHARGED PARTICLE RARE DECAYS

SERPUKHOV – B A Arbuzov
MOSCOW, INR – V N Bolotov (Spokesperson), R M Dzhilkibaev, S N Gninenko, V M Lobashov, O M Radchenko, A N Toropin

Accelerator SERP *Detector* Counter

Reactions

$\pi^- \to e^- \overline{\nu}_e \gamma$	—
$K^- \to e^- \overline{\nu}_e \gamma$	—
$K^- \to \pi^- e^- e^+$	—
$K^- \to \pi^- \mu^- \mu^+$	—

Particles studied π^-, K^-

Papers ZETFP 42 (1985) 390 = JETPL 42 (1985) 481.

SERP-E-116 (Feb 1977) Approved Mar 1977; Started Dec 1978; Completed 1980.

STUDY OF CHARGE-EXCHANGE REACTIONS AT SMALL MOMENTUM TRANSFER

SERPUKHOV – G A Akopdzhanov, V A Davidov, S V Donskov, A V Inyakin, V V Isakov, V A Kachanov, D B Kakauridze, R N Krasnokutsky, A A Lebedev, A A Lednev, Y V Mikhailov, V E Postoev, Yu D Prokoshkin (Spokesperson), E A Rasuvaev, S A Sadovsky, R S Shuvalov, A V Starzev, L M Vasiliev
BRUSSELS U, IISN – F Binon, C Bricman, P Duteil, J P Lagnaux, M Lebrun, J P Stroot
ANNECY – J Dufournaud, M Gouanere, J P Peigneux, D Sillou, M Spighel

Accelerator SERP *Detector* GAMS-2000

Reactions

$\pi^- p \to \pi^0 n$	13; 25, 40 GeV/c
$K^- p \to \overline{K}^0 n$	"
$\overline{p} p \to \overline{n} n$	"

Comments Ran for 100 hours.

Papers NIM 174 (1980) 369, NIM 188 (1981) 507, NC 64A (1981) 89, and ZPHY C9 (1981) 109.

SERP-E-119 (Dec 1976) Approved Jul 1977; Started May 1981.

RELATIVISTIC POSITRONIUM PHYSICS

DUBNA – G D Alekseev, V I Ganichev, V V Karpukhin, D M Khazins, A V Kuptsov, L L Nemenov (Spokesperson), Y A Plis
SERPUKHOV – D G Baratav, V I Gridasov, S A Knyasev, Y A Lastochkin, V A Maisheev, V L Rykov, V P Sakharov, A V Samojlov, V V Vasiliev
MOSCOW STATE U – A T Abrosimov, O E Gorchakov, N A Kalinina, V V Kruglov, A V Kulikov

Accelerator SERP *Detector* Combination

Reactions

$p n \to \pi^0$ X	< 70 GeV/c
$\pi^0 \to 3\gamma$	—
$\pi^0 \to 4\gamma$	—

Particles studied π^0

Comments A test of special relativity. Positronium oscillations. To look for $\pi^0 \to \gamma$ + positronium decay. Run 840 hours as of 1982.

Papers YF 40 (1984) 139 = SJNP 40 (1984) 87. For the theory see YF 15 (1972) 1047 = SJNP 15 (1972) 582.

SERP-E-120 (Apr 1977) Approved Jul 1977; Started 1985.

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 SERP *Detector* Wide-angle spectrometer

Reactions

p nucleus → Λ X	70 GeV (E_{lab})
p nucleus → Σ^- X	"
p nucleus → Σ^+ X	"
p nucleus → Σ^0 X	"
p nucleus → Ξ^0 X	"
p nucleus → Ξ^- X	"
p nucleus → Ω^- X	"
$\Lambda p \to$ X	30–60 GeV/c
$\Sigma^- p \to$ X	"
$\Sigma^+ p \to$ X	"
$\Xi^0 p \to$ X	"
$\Xi^- p \to$ X	"
$\Omega^- p \to$ X	"
Λ deut → X	"
Σ^- deut → X	"

Σ^+ deut → X	"
Ξ^0 deut → X	"
Ξ^- deut → X	"
Ω^- deut → X	"
Σ^- p → Σ(unspec)$^-$ p	"
Σ^+ p → Σ(unspec)$^+$ p	"
Ξ^- p → Ξ(unspec)$^-$ p	"
Ξ^0 p → Ξ(unspec)^0 p	"
Ω^- p → Ω^*(unspec)$^-$ p	"
Λ p → Λ(unspec) p	"

Particles studied Ω^-, Σ^-, Σ^+, Ξ^-, Ξ^0, Λ, Σ(unspec)$^+$, Σ(unspec)$^-$, Ξ(unspec)$^-$, Ξ(unspec)^0, Ω^*(unspec)$^-$, Λ(unspec), charm

Comments Studies weak hyperon decays, with searches for second-class currents and charmed hyperons. Measures $\Omega^- \rightarrow \Lambda K^-$, $\Xi^0\pi^-$, $\Xi^-\pi^0$, $\Lambda\pi^-$, $n\pi^-$, and $\Xi^0 e^-\overline{\nu}$. Also $\Xi^- \rightarrow \Lambda e^-\overline{\nu}$ and $\Sigma^-\gamma$. Also $\Sigma^- \rightarrow \Lambda e^-\overline{\nu}$, and $ne^-\overline{\nu}$. Also $\Sigma^+ \rightarrow \Lambda e^+\nu$, $ne^+\nu$, and $p\gamma$. Also $\Xi^0 \rightarrow \Sigma^+ e^-\overline{\nu}$, $\Sigma^- e^+\nu$, $\Lambda\gamma$, $\Lambda\pi^-$, and $\Lambda\pi^0$. Also $\Lambda \rightarrow pe^-\overline{\nu}$.

SERP-E-121 (Dec 1976) Approved Jul 1977; Started Feb 1981; Completed 1982.

SEARCH FOR DECAYS OF PARTICLES WITH MEAN LIFETIMES 10^{-11} TO 10^{-12} s

SERPUKHOV – V N Chepegin, G G Gurov, V L Ushkov
DUBNA – L N Strunov, V A Sviridov, Y A Yatsunenko, L S Zolin (Spokesperson)
MOSCOW, ITEP – I V Chuvilo, A B Kaidalov

Accelerator SERP *Detector* Combination

Reactions

p nucleus → charm X	70 GeV (E_{lab})

Particles studied charm

Comments A search for charmed particle hadronic and semileptonic decay modes.

SERP-E-127 (Feb 1978) Approved Feb 1980; Started Jun 1981; Completed 1982.

STUDY OF HADRON ATOMS AND ELEMENTARY PARTICLE PROPERTIES USING A CRYSTAL-DIFFRACTION SPECTROMETER AT THE SERPUKHOV PROTON SYNCHROTRON

LENINGRAD, INP – A S Denisov, A N Koznov, V M Marushenco, A F Mezentsev, N B Mokhov, A A Petrunin, S G Skornyakov, V M Smirnov (Spokesperson), V M Suvorov, A V Zhelamkov, V M Zheleznyakov

Accelerator SERP *Detector* Spectrometer

Reactions

p nucleus → π^- X	1 GeV/c
p nucleus → K^- X	"
p nucleus → Σ^- X	"
π^- nucleus → γ X	"
K^- nucleus → γ X	"
Σ^- nucleus → γ X	"

Particles studied K^-, Σ^-

Comments Studies strong interactions of π^-, K^-, and Σ^- with nuclei, and transition radiation energies and level widths of $\pi^- Z$, $K^- Z$, $\Sigma^- Z$ atoms.

SERP-E-130 (Dec 1977) Approved Jan 1978; Started Jun 1981; Completed 1981.

LIQUID ARGON DETECTOR FOR HADRONS AND γ's

SERPUKHOV – Y M Antipov, V A Bezzubov, R N Krasnokutsky, E A Razuvaev, V S Serdyuk, R S Shuvalov (Spokesperson)
PISA U – C Cerri, F Manfredi, F Sergiampietri, M Spadoni

Accelerator SERP *Detector* Calorimeter

SERP-E-132 (1978) Approved Apr 1978; Started Apr 1980; Completed 1983.

INVESTIGATION OF POSSIBILITY OF BENDING AND COOLING OF BEAMS BY SINGLE CRYSTALS. DESIGN OF NEW TYPE DETECTORS FOR CHARGED PARTICLES

DUBNA – V M Golovatyuk, Z Guzik, R B Kadyrov, T S Nigmanov, S N Plyashkevich, E N Tsyganov (Spokesperson), A S Vodopianov
SUNY, ALBANY – W M Gibson, I J Kim, C R Sun
FERMILAB – R Carrigan, B Chrisman, T Toohig
MOSCOW, ITEP – I V Chuvilo, L I Kondratiev, D G Koshkarev, Y Y Lapitsky
KHARKOV STATE U – I A Grishaev, E V Inopin, P V Sorokin
TOMSK POLYTECHNIC INST – A N Didenko, V V Kaplin, S A Vorobiev

Accelerator SERP *Detector* Combination

Reactions

charged$^+$	10–40 GeV/c
charged$^-$	"

Comments Ran for 1062 hours.

Papers PL 88B (1979) 387, and ZETFP 30 (1979) 474 = JETPL 30 (1979) 442.

SERP-E-133 (Jan 1978) Approved Apr 1978; Started Apr 1978; Completed 1984.

EXTENSION OF THE 32 GeV/c K^+p EXPERIMENT ON THE MIRABELLE BUBBLE CHAMBER UP TO 1 MILLION PICTURES

SERPUKHOV – I V Azhinenko, Yu A Belokopytov, O G Chikilev, A B Fenjuk, L N Gerdyukov, P A Gorbunov, S V Klimenko, V V Knyazev, S B Lugovsky, B A Manyukov, L P Petrovikh, V N Ryadovikov, A M Rybin, P V Shlyapnikov (Spokesperson), V A Uvarov, A P Vorobyev
MONS U – C Dujardin, F Grard, R Windmolders
BRUSSELS U – M Csejthey-Barth, J J Dumont, M Gijsen, S Tavernier, F Verbeure, E De Wolf

Accelerator SERP *Detector* HBC-MIRA

Reactions

K^+ p	32.1 GeV/c

Papers ZPHY C3 (1980) 285, PL 95B (1980) 451, PL 121B (1983) 183, PL 130B (1983) 432, ZPHY C23 (1984) 307, ZPHY C25 (1984) 103, YF 39 (1984) 1448 = SJNP 39 (1984) 914, YF 41 (1985) 338 = SJNP 41 (1985) 214, YF 41 (1985) 925 = SJNP 41 (1985) 593, YF 41 (1985) 1535 = SJNP 41 (1985) 972, YF 43 (1986) 95 = SJNP 43 (1986) 61, and YF 43 (1986) 1195 = SJNP 43 (1986).

SERP-E-136 (1978) Approved Apr 1978; Started 1985.

NEUTRINO DETECTOR

SERPUKHOV – A A Borisov, A P Bugorsky, Y B Bushnin, S K Chernichenko, A F Dunaitsev, R M Fakhrutdinov, V Y Glebov, V N Goryachev, V I Kochetkov, V A Krendelev, A V Kulikov, V I Kurbakov, A I Mukhin, V I Poletaev, V N Richenkov, R A Rzaev, Y I Salomatin, Y G Stroganov, A A Volkov, A S Vovenko (Spokesperson), V A Yarba, V P Zhigunov, Y A Zudin
DUBNA – L S Barabash, S A Bunyatov (Spokesperson), I A Golutvin, V S Khabarov, Y T Kiryushin, D Kish, E Kish, A Kondor, V A Kopyilov-Sviridov, I Manno, D Vestergombi, A V Vishnevsky, B Z Zalikhanov, A V Zarubin

Accelerator SERP *Detector* Calorimeter

Comments This includes the design and construction of a new neutrino detector.

SERP-E-138 (Jan 1979) Approved Feb 1979; Started 1980.

STUDY OF MULTIPARTICLE $\bar{p}p$ INTERACTIONS AT 32 GeV/c WITH STATISTICS OF 10 EVENTS/μb IN MIRABELLE

SERPUKHOV – G M Aleksandrov, Y I Arestov, V V Babintsev, M Y Bogolyubsky, V A Bumazhnov, E A Kozlovsky, M S Levitsky, V K Malyaev, A A Minaenko, A M Moiseev (Spokesperson), E A Parshin, D I Patalakha, A V Pleskach, G I Selivanov, E A Starchenko, M N Ukhanov, E A Vlasov
MOSCOW STATE U – L I Belzer, P F Ermolov, N A Kruglov, V S Murzin, A S Proskuryakov, L I Sarycheva, L N Smirnova, L A Tosunyan
ALMA ATA, PHYS INST – E G Boos, E S Lukin, A M Mosienko, G K Zaytsev, B O Zhautykov

Accelerator SERP *Detector* HBC-MIRA

Reactions

$\bar{p}\,p$	32 GeV/c

Particles studied exotic-meson, baryonium, $N^*_{5/2}$(unspec), charm

Comments To obtain 500000 pictures. Approved for 2000 hours, with 768 hours run as of 1982. Stage I of this experiment was SERP-E-122.

Papers YF 39 (1984) 1189 = SJNP 39 (1984) 750, YF 39 (1984) 1436 = SJNP 39 (1984) 907, YF 40 (1984) 162 = SJNP 40 (1984) 103, and YF 40 (1984) 927 = SJNP 40 (1984) 590.

SERP-E-139 (Jan 1979) Approved Feb 1979; Started 1979.

STUDY OF $\bar{d}p$ AND $\bar{d}d$ INTERACTIONS IN LUDMILLA

DUBNA – B V Batyunya, I V Boguslavsky, Y P Bushuev, I M Gramenitsky (Spokesperson), Y V Khrenov, B P Kostin, E V Kozubsky, P Lednitski, E M Leykin, A V Pozharsky, V I Rud, V A Rusakov, Y Sedlak, B Shimak, M I Solovyev, L A Tikhonova, V T Tolmachev, E P Ustenko, A Valkarova, N M Viryasov, S Vyskochil, Y D Zernin

Accelerator SERP *Detector* HBC-2M

Reactions

$\overline{\text{deut}}\ p \to p\,\bar{n}\,\bar{p}$ pions	12–13 GeV/c
$\overline{\text{deut}}\ p \to \pi^+$ X	"
$\overline{\text{deut}}\ p \to p\,\bar{n}\,\bar{p}\,2\pi^+\,2\pi^-$	"
$\overline{\text{deut}}$ deut $\to p\,n\,\bar{n}\,\bar{p}$ pions	"
$\overline{\text{deut}}$ deut $\to$ annihil	"
$\overline{\text{deut}}$ deut $\to$ nucleon $2\overline{\text{nucleon}}$ X	"
$\overline{\text{deut}}$ deut $\to$ 2nucleon $\overline{\text{nucleon}}$ X	"

Particles studied $N^*_{5/2}$(unspec), baryonium

Comments To obtain 250000 pictures in $\bar{d}p$ and 500000 in $\bar{d}d$. Approved for 4200 hours, with 1872 hours run as of 1982.

Papers YF 42 (1985) 903 = SJNP 42 (1985) 573.

SERP-E-140 (Dec 1976) Approved Jul 1977; Started Apr 1980.

STUDY OF CHARGE-EXCHANGE REACTIONS AND SEARCH FOR NEW PARTICLES

SERPUKHOV – V A Davidov, S V Donskov, A V Inyakin, V A Kachanov, D B Kakauridze, G V Khaustov, A V Kulik, A A Lednev, Y V Mikhailov, Yu D Prokoshkin (Spokesperson), Y V Rodnov, S A Sadovsky, A V Startsev, V P Sugonyaev
BRUSSELS U, IISN – F Binon, C Bricman, T D Jayanti, J P Lagnaux, R Roosen, J P Stroot
ANNECY – J Dufournaud, M Gouanere, J P Peigneux, D Sillou, M Spiegel

Accelerator SERP *Detector* GAMS-2000

Reactions

$\pi^- p \to \gamma$'s n	38 GeV/c
$\pi^- p \to \pi^0 n$	"
$\pi^- p \to \eta n$	"
$\pi^- p \to b_1(1235)^0 n$	"
$\pi^- p \to f_2(1270) n$	"
$\pi^- p \to \phi n$	"
$\pi^- p \to \omega n$	"
$\pi^- p \to f_4(2030) n$	"
$\omega \to \gamma \pi^0$	—
$\phi \to \gamma \eta$	—
$\phi \to K_L K_S$	—
$\pi^- p \to \chi_1(3510) n$	38 GeV/c
$\pi^- p \to J/\psi\, n$	"
$\pi^- p \to \psi(3685) n$	"
$\pi^- p \to n D^0 \bar{D}^0$	"

Comments Approved for 2500 hours, with 2718 hours run as of 1982.

Papers YF 33 (1981) 1534 = SJNP 33 (1981) 825, LNC 32 (1981) 45, YF 36 (1982) 670 = SJNP 36 (1982) 391, YF 38 (1983) 934 = SJNP 38 (1983) 561, YF 38 (1983) 1199 = SJNP 38 (1983) 723, NC 78A (1983) 313, PL 140B (1984) 264, YF 39 (1984) 640 = SJNP 39 (1984) 405, YF 39 (1984) 831 = SJNP 39 (1984) 526, YF 39 (1984) 1429 = SJNP 39 (1984) 903, LNC 39 (1984) 41, NP B239 (1984) 311, NC 80A (1984) 363, ZPHY C25 (1984) 225, and YF 40 (1984) 1447 = SJNP 40 (1984) 918.

SERP-E-142 (Jan 1980) Approved Feb 1980; Started Feb 1981; Completed 1984.

INVESTIGATIONS OF ELECTROMAGNETIC DECAYS OF MESONS

SERPUKHOV – R I Dzhelyadin, S V Golovkin, V A Kachanov, D V Kakauridze, A S Konstantinov, V F Konstantinov, V P Kubarovsky, A V Kulik, L G Landsberg (Spokesperson), V M Leontiev, V A Mukhin, V F Obraztsov, T I Petrunina, Y D Prokoshkin, V I Solyanik, V A Viktorov, A M Zaitsev

Accelerator SERP *Detector* Spectrometer

Reactions

$\pi^- p \to f_1(1285) n$	33 GeV/c
$\pi^- p \to f'_2(1525) n$	"
$K^- p \to f_1(1285) \Lambda$	"
$K^- p \to f_1(1285) \Sigma^0$	"
$K^- p \to f'_2(1525) \Lambda$	"
$K^- p \to f'_2(1525) \Sigma^0$	"
$f_1(1285) \to \gamma \phi$	—
$f'_2(1525) \to \gamma \phi$	—

Particles studied $f_1(1285)$, $f'_2(1525)$

Comments The modified Lepton-F spectrometer is used. Approved for 1800 hours, with 492 hours run as of 1982.

Papers YF 38 (1983) 1205 = SJNP 38 (1983) 727, PL 144B (1984) 133, ZETFP 39 (1984) 96 = JETPL 39 (1984) 115, YF 39 (1984) 1165 = SJNP 39 (1984) 735.

SERP-E-143 (Jan 1980) Approved Feb 1980; Started Jan 1980; Completed 1981.

STUDY OF THE PION STRUCTURE IN THE RADIATIVE SCATTERING REACTION ON NUCLEI

SERPUKHOV – G A Akopdzhanov, Y M Antipov (Spokesperson), V A Bezzubov, N P Budanov, S P Denisov, Y P Gorin, I V Kotov, A I Petrukhin, S A Polovnikov, D A Stoyanova
TBILISI STATE U – V N Roinishvili
DUBNA – L K Chernenko, L K Litkin, G V Mitselmakher, A G Olshevsky, V I Travkin

Accelerator SERP *Detector* SIGMA

Reactions

π^- nucleus → nucleus π^- γ	40 GeV/c

Comments Ran for 1548 hours.

Papers ZETFP 35 (1982) 302 = JETPL 35 (1982) 375, ZPHY C24 (1984) 39, ZPHY C26 (1985) 495, and ZPHY C27 (1985) 21.

SERP-E-144 (1979) Approved Apr 1978; Started Jan 1979; Completed 1982.

MEASUREMENTS OF THE SLOW ANTIPROTON YIELD IN 70 GeV PROTON INTERACTIONS

SERPUKHOV - A A Derevschikov, V I Kotov, V G Lapshin, Y A Matulenko, A I Misnik, S B Nurushev, V I Ronzhin, V I Rykalin (Spokesperson), R A Rzaev, V P Sakharov, V K Semenov, V V Siksin, V I Solyanik, A N Vasiliev, N K Vishnevsky
NOVOSIBIRSK, IYF - L M Barkov, P K Lebedev, V S Okhapkin, V P Smakhtin, M S Zolotarev

Accelerator SERP *Detector* Single-arm spectrometer

Reactions

p nucleus → $\bar{p}$ X	70 GeV (E_{lab})

Comments Approved for 600 hours, with 360 hours run as of 1982.

Papers YF 35 (1982) 1186 = SJNP 35 (1982) 694.

SERP-E-146 (Dec 1980) Approved Feb 1981; Started 1981; Completed 1986.

SEARCH FOR NARROW BARYON RESONANCES IN HIGH ENERGY NEUTRON DIFFRACTIVE SCATTERING

DUBNA - A N Aleev, V A Arefiev, V P Balandin, V K Birulev, E A Chudakov, A S Chvyrov, T S Grigalashvili, B N Guskov, I M Ivanchenko, N N Karpenko, D A Kirillov, I G Kosarev, V G Krivokhizhin, V V Kukhtin, B A Kulakov, M F Likhachev (Spokesperson), A L Lubimov, A N Maksimov, A N Morozov, K Novak, V D Novak, A E Senner, L V Silvestrov, V E Simonov, L A Slepets, G G Takhtamyshev, P T Todorov, R K Trayanov
BERLIN, DAW - K Hiller, Z Novak, A V Poze, K E Rizek
LEBEDEV INST - A S Belousov, E D Molodtsov, S V Rusakov, P N Shareiko
SOFIYA, INST CHEM TECH - Y Gladki, S Nemechek, M Novak, A Prokesh, V I Zayachki
SOFIYA, INST NUCL RES - D T Burilkov, V I Genchev, I M Geshkov, P K Markov, G G Sultanov
TBILISI STATE U - V P Dzhordzhadze, V D Kekelidze, G I Nikobadze

Accelerator SERP *Detector* BIS-2

Reactions

n nucleus → Λ K^0 X	40–60 GeV/c
n nucleus → Λ K^+ π^- X	"
n nucleus → Λ π^+ π^0 π^- X	"
n nucleus → Λ K^+ K^0 K^- X	"
n nucleus → p $\bar{p}$ Λ K^0 X	"
n nucleus → n Λ $\bar{\Lambda}$ X	"
n nucleus → p π^+ π^- X	"
n nucleus → p K^+ K^- X	"
n nucleus → 2p $\bar{p}$ X	"
n nucleus → p K^0 K^- X	"

Comments Approved for 3300 hours.

Papers ZPHY C23 (1984) 333, and ZPHY C25 (1984) 205.

SERP-E-147 (1982) Approved Mar 1982; Started 1984.

STUDY OF REACTIONS WITH STRANGE PARTICLE PRODUCTION IN THE π^- MESON BEAM OF THE IHEP ACCELERATOR

MOSCOW, ITEP - B V Bolonkin, I A Erofeev, O N Erofeeva, V K Grigoryev, A P Grishin, Y V Katinov, I Y Korolkov, V N Luzin, V N Nozdrachev, Y P Shkurenko, V V Sokolovsky (Spokesperson), A I Sutormin, G D Tikhomirov, V V Vladimirsky

Accelerator SERP *Detector* MIS

Reactions

π^- p → n Λ $\bar{\Lambda}$	40 GeV/c
π^- p → n Λ $\bar{\Lambda}$ π^0	"
π^- p → p Λ $\bar{\Lambda}$ π^-	"
π^- p → n 2K_S	"
π^- p → n 2K_S π^0	"
π^- p → p 2K_S π^-	"
π^- p → p $\bar{p}$ Λ K_S	"
π^- p → p $\bar{p}$ Σ^0 K_S	"
π^- p → n Σ^0 $\bar{\Sigma}^0$	"
π^- p → n Λ $\bar{\Sigma}^0$	"
π^- p → n $\bar{\Lambda}$ Σ^0	"

Particles studied meson, $f_0(975)$, $a_0(980)^0$

Comments Requested 2400–3000 hours.

SERP-E-148 (Feb 1982) Approved Mar 1982; Started 1984; Completed 1986.

STUDY OF EXCLUSIVE RESONANCE PRODUCTION IN RARE PROCESSES IN SIGMA-M

SERPUKHOV - Y M Antipov (Spokesperson), V A Batarin, V A Bezzubov, N P Budanov, S P Denisov, Y P Gorin, I V Kotov, A A Lebedev, Y M Melnik, A I Petrukhin, S A Polovnikov, D A Stoyanova
TBILISI STATE U - R B Pirtskhalava, V N Roinishvili
DUBNA - I A Golutvin, V S Habarov, D M Hazins, V Y Karzhavin, Y T Kiryushin, P A Kulinich, G V Mitselmakher, A A Nozdrin, A G Olshevsky, V A Sviridov, V I Travkin, A V Vishnevsky

Accelerator SERP *Detector* SIGMA

Reactions

π^- p → π^- p	20, 30, 40 GeV/c
K^- p → K^- p	"
$\bar{p}$ p → $\bar{p}$ p	"
π^- nucleus → π^- μ^- μ^+ X	"
π^- Cu → Cu ρ^0 π^-	"
ρ^0 → μ^+ μ^-	—
$a_1(1270)^-$ → π^- μ^- μ^+	—
$\pi_2(1680)^-$ → π^- μ^- μ^+	—
meson$^-$ → π^- μ^- μ^+	—
π^- p → p n $\bar{p}$	20, 30, 40 GeV/c

Particles studied ρ^0, $f_0(1300)$, $f_2(1270)$, $a_1(1270)^-$, $\pi_2(1680)^-$

Comments Requested 1500 hours.

SERP-E-150 (Feb 1982) Approved Mar 1982; Started 1983; Completed 1984.

AN ADDITION TO EXPERIMENT E-138 WITH A PROGRAM OF pp AND pd INVESTIGATIONS AT 32 GeV/c

SERPUKHOV - V V Babintsev, T M Bryuhanova, V A Bumazhnov, S V Chekulayev, A M Moiseev (Spokesperson), M N Ukhanov, O S Zaitseva
MOSCOW STATE U - P F Ermolov, N A Kruglov, V S Murzin, A S Proskuryakov, L I Sarycheva, L N Smirnova
ALMA ATA, PHYS INST - E G Boos, G K Zaytsev, B O Zhautykov

Accelerator SERP *Detector* HBC-MIRA

Reactions

p p	32 GeV/c
p deut	"

$p\ n$	"
$\overline{p}\ p$	"
$\overline{p}$ deut	"
$\overline{p}\ n$	"

Comments Statistics are pp — 400000 pictures, $\overline{p}p$ — 600000, $\overline{p}d$ — 300000. Uses a track-sensitive deuterium target in Mirabelle.

SERP-E-152 (1983) Approved Aug 1982.

NEUTRINO EXPERIMENT USING A TAGGED NEUTRINO BEAM

SERPUKHOV - S P Denisov (Spokesperson), et al.

Accelerator SERP *Detector* Combination

Reactions

$\nu_e\ e^- \rightarrow e^-\ \nu_e$	< 70 GeV (E_{lab})
$\nu_\mu\ e^- \rightarrow e^-\ \nu_\mu$	"
ν_e nucleus $\rightarrow \mu^+\ e^-$ X	"
ν_μ nucleus $\rightarrow \mu^-\ \mu^+$ X	"
charmed-meson $\rightarrow \mu^-\ \mu^+$	—
$\tau^- \rightarrow e^-\ \nu_\tau\ \overline{\nu}_e$	—

Comments Studies $\nu_e\nu_\mu$ universality, $\nu_e \rightarrow \nu_\mu$ oscillations, the ratio of charged to neutral currents, etc.

SERP-E-153 (1983) Approved Dec 1983; Started 1983; Completed 1986.

STUDY OF CUMULATIVE HADRON PRODUCTION IN PROTON-NUCLEUS INTERACTIONS AT ENERGIES FROM 12 TO 70 GeV

DUBNA - L S Zolin (Spokesperson), et al.

Accelerator SERP *Detector* Spectrometer

Reactions

p nucleus $\rightarrow$ hadrons X	12-70 GeV (E_{lab})

Comments It was Tau detector previously, now Cumulative Hadrons Detector.

SERP-E-155 (1983) Approved 1985.

SINGLE AND PAIR HADRON PRODUCTION WITH LARGE MOMENTUM TRANSFER IN PROTON AND π^- MESON BEAMS

SERPUKHOV - A A Abramov, A V Alekseev, B Y Baldin, A F Buzulukov, A S Dyshkant, A O Efimov, V N Evdokimov, N A Galyaev, V Y Glebov, Y P Korneev, V I Kotov, A N Krinitsyn, V I Kryshkin, N Y Kulman, Y M Melnik, M I Mutafyan, V K Myalitsin, V M Podstavkov, A I Ronjin, V I Rykalin, R M Sulyaev (Spokesperson), L K Turchanovich, Y N Vrajnov, V N Zapolsky, V V Zmushko

Accelerator SERP *Detector* FODS

Reactions

$p\ p \rightarrow$ hadron(s) X	70 GeV/c
$p\ p \rightarrow \mu^-\ \mu^+$ X	"
p nucleus $\rightarrow$ hadron(s) X	"
p nucleus $\rightarrow \mu^-\ \mu^+$ X	"
$\pi^-\ p \rightarrow$ hadron(s) X	40 GeV/c
$\pi^-\ p \rightarrow \mu^-\ \mu^+$ X	"
π^- nucleus $\rightarrow$ hadron(s) X	"
π^- nucleus $\rightarrow \mu^-\ \mu^+$ X	"
$\pi^+\ p \rightarrow$ hadron(s) X	"
$\pi^+\ p \rightarrow \mu^-\ \mu^+$ X	"
π^+ nucleus $\rightarrow$ hadron(s) X	"
π^+ nucleus $\rightarrow \mu^-\ \mu^+$ X	"

SERP-E-157 (1983) Approved Mar 1983; Started 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 SERP *Detector* MIS

Reactions

π^- Si $\rightarrow$ 3pion X	40 GeV/c
K^- Si $\rightarrow$ kaon 2pion X	"

Particles studied meson

Comments Modified spectrometer MIS, with additional spark chamber. Looking for new radial excitations of π, A_1, A_2, A_3, K mesons. Requested 4720 hours.

Papers YF 43 (1986) 917 = SJNP 43 (1986) 585.

SERP-E-159 (1983) Approved May 1986.

STUDY OF HADRON PRODUCTION AND PROPERTIES OF CHARMED PARTICLES AND NARROW BARYON RESONANCES WITH THE IHEP ACCELERATOR (CHARM PROJECT)

DUBNA - N N Govorun, T S Grigalashvili, B N Guskov, I M Ivanchenko, I N Kakurin, D A Kirillov, M F Likhachev, A L Lyubimov, A N Maksimov, E I Maltsev, G G Takhtamyshev
LEBEDEV INST - A S Belousov, P A Cherenkov, A A Komar, V V Pavlovskaya, S V Rusakov, L N Shtarkov
PRAGUE, INST PHYS - E D Molodtsov
TBILISI STATE U - N S Amaglobeli, V D Kekelidze, G I Nikobadze
ALMA ATA, PHYS INST - I Y Chasnikov, A A Loktionov
SERPUKHOV - S S Gershteyn, A K Likhoded
MOSCOW, ITEP - A B Kaydalov
MOSCOW STATE U - E I Chudakov
SOFIYA, INST NUCL RES - P K Markov
BERLIN, DAW - E Novak, H Novak
KOSICE U - A Prokesh
BUDAPEST, CRIP - L Sabo, I Veresh

Accelerator SERP *Detector* BIS-2M

Reactions

n nucleus $\rightarrow \Lambda_c^+$ X	< 70 GeV (E_{lab})
n nucleus $\rightarrow \Lambda_c^+\ \overline{D}^0$ X	"
n nucleus $\rightarrow$ glueball X	"
n nucleus $\rightarrow$ baryon X	"
glueball $\rightarrow 2K_S$	—
baryon $\rightarrow n\ \phi$	—

Particles studied baryon, Λ_c^+

SERP-E-161 (1983) Approved 1985.

STUDY OF CHARMED PARTICLE PRODUCTION AT IHEP ACCELERATOR ENERGIES

SERPUKHOV - V V Babintsev, M Y Bogolyubsky, V A Bumajnov, S V Chekulaev, N A Galyaev, A E Kiryunin, A I Kotova, A A Minaenko, G Y Mitrofanov, A M Moiseev (Spokesperson), E A Parshin, A V Pleskach, G I Selivanov, S R Slabospitsky, M N Ukhanov, A A Volkov, Y R Yakubov, V N Zapolsky
MOSCOW STATE U - S G Basiladze, A E Bukley, O Z Eloev, P F Ermolov (Spokesperson), V I Gilev, V A Kramarenko, A N Larichev, V E Ogluzdin, V P Rukovichkin, Y D Schyukin, V V Suvorov, V Y Volkov
DUBNA - B V Batyunya, I V Boguslavsky, I M Gramenitsky (Spokesperson), A I Grigoryev, Y V Khrenov, E I Maltsev, V P Pugachevich, M D Shafranov, V T Tolmachev, Y D Zernin

Accelerator SERP *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 $D^- X$	"

Particles studied D^+, D^-, Λ_c^+, $D^*(2010)$, $\Sigma_c(2450)$

SERP-E-163 (1985) Approved 1985; Started 1985.

STUDY OF EXCLUSIVE GLUEBALL PRODUCTION IN THE CENTRAL REGION OF HADRON COLLISIONS

SERPUKHOV – S A Akimenko, V T Belousov, A M Blick, Y B Bushnin, V S Datsko, S V Donskov, S S Gerstein, A V Inyakin, V A Kachanov, D B Kakauridze, V P Kartashev, G V Khaustov, V N Kolosov, V I Kotov, A V Kulik, V M Kut'in, V G Lapshin, A A Lednev, A K Likhoded, Y M Melnik, V F Obraztsov, A I Pavlinov, Yu D Prokoshkin (Spokesperson), Y V Rodnov, A I Ronjin, V I Rykalin, S A Sadovskij, V D Samojlenko, A I Sarajkin, P M Shagin, A V Shtannikov, A V Singovskij, A S Solov'ev, V P Sugonyaev
LOS ALAMOS – D Aldi, T Lopez, E A Nap, D Potter
TBILISI STATE U – N S Amaglobeli, B G Chiladze, M D Tabidze
MOSCOW STATE U – L G Afanas'ev, O E Gorchakov, A V Kulikov, V P Kurochkin, S V Trusov
NOVOSIBIRSK, IYF – L M Barkov, B I Khazin, P K Lebedev, E P Solodov
BRUSSELS U, IISN & CERN – F Binon, C Bricman, J P Lagnaux, D Mishot, J P Stroot
KURCHATOV INST, MOSCOW – I I Gurevich, Y A Kozlov, V P Martem'yanov, G S Vidyakin, V N Vyrodov
ANNECY & CERN – J Dufournaud, M Gouanere, J P Peigneux, M Spiegel
DUBNA – V V Karpukhin, D M Khazins, V I Komarov, V V Kruglov, A V Kuptsov, L L Nemenov
TBILISI INST PHYS – V N Rojnishvili

Accelerator SERP *Detector* GAMS-2000, Calorimeter

Reactions

p nucleon $\rightarrow p$ nucleon mesons	70 GeV/c
$\bar{p}$ nucleon $\rightarrow \bar{p}$ nucleon mesons	"
π^+ nucleon $\rightarrow$ nucleon π^+ mesons	"
π^- nucleon $\rightarrow$ nucleon π^- mesons	"
K^+ nucleon $\rightarrow$ nucleon K^+ mesons	"
K^- nucleon $\rightarrow$ nucleon K^- mesons	"
p nucleon $\rightarrow p$ nucleon ψ(unspec)	"
p nucleon $\rightarrow p$ nucleon bottomonium	"
$\bar{p}$ nucleon $\rightarrow \bar{p}$ nucleon ψ(unspec)	"
$\bar{p}$ nucleon $\rightarrow \bar{p}$ nucleon bottomonium	"
π^+ nucleon $\rightarrow$ nucleon ψ(unspec) π^+	"
π^+ nucleon $\rightarrow$ nucleon $\Upsilon(9460)$ π^+	"
π^- nucleon $\rightarrow$ nucleon ψ(unspec) π^-	"
π^- nucleon $\rightarrow$ nucleon $\Upsilon(9460)$ π^-	"
K^+ nucleon $\rightarrow$ nucleon ψ(unspec) K^+	"
K^+ nucleon $\rightarrow$ nucleon $\Upsilon(9460)$ K^+	"
K^- nucleon $\rightarrow$ nucleon ψ(unspec) K^-	"
K^- nucleon $\rightarrow$ nucleon $\Upsilon(9460)$ K^-	"
$\pi^- p \rightarrow n \pi^0$	"
$K^- p \rightarrow n \eta$	"
$K^- p \rightarrow n \eta'$	"
$K^- p \rightarrow n \omega$	"
$K^- p \rightarrow n K^0$	"
$\bar{p} p \rightarrow n \bar{n}$	"

Particles studied glueball, charmonium, $\Upsilon(9460)$, $\Upsilon(10023)$, $\Upsilon(10355)$

Comments Looks for glueballs in particular in final states with $\eta\eta$, $\eta\eta'$, and $\eta'\eta'$.

SERP-E-164 (1980) Approved May 1986.

INVESTIGATIONS OF THE $\pi^- p \rightarrow n\pi^+\pi^-\pi^+\pi^-(\gamma$'s) REACTION AT 40 GeV/$c$ ON THE BASE OF THE VERTEX SPECTROMETER

SERPUKHOV – S I Bityukov, G V Borisov, V M Buyanov, R I Dzhelyadin, N A Galyaev, Y P Guz, A N Karyukhin, G A Klyuchnikov, V F Konstantinov, M E Kostrikov, M A Kulagin, V V Lapin, V A Maisheev, V D Matveev, V K Myalitsin, V F Obraztsov, A P Ostankov, V K Semenov, V A Sergeev, N K Vishnevskij, A P Yablokov, A M Zaitsev (Spokesperson)
TBILISI INST PHYS – T A Lomtadze, E G Tskhadadze

Accelerator SERP *Detector* Photon spectrometer, Counter

Reactions

$\pi^- p \rightarrow n\, 2\pi^+\, 2\pi^-$ (γ's)	40 GeV/c
$\pi^- p \rightarrow n$ meson(s)	"

Particles studied ρ, η, η', $X(2220)$, $f_2(1270)$, $f_1(1285)$, $f_4(2030)$, $\rho_3(1690)^0$, glueball

Comments Uses Cerenkov counters together with a γ spectrometer.

SIN-R-71-07 (Apr 1977) Approved Jun 1977; Started Dec 1977; Completed May 1982.

***pp* ELASTIC SCATTERING BETWEEN 400 AND 600 MeV**

GENEVA U – E Aprile-Giboni, D Besset, C Cantale, C Eisenegger, R Hausammann, E Heer, R Hess (Spokesperson), C Lechanoine-Leluc, W R Leo, S Morenzoni, Y Onel, D Rapin
SIN – S Jaccard, S Mango

Accelerator SIN *Detector* Wire chamber

Reactions Polarized beam and target

$p p \rightarrow p p$	0.8–1.2 GeV/c

Comments Complete experiment for determining the *pp* scattering matrix. Ran for 5000 hours.

Papers PRL 46 (1981) 1047, and PRL 47 (1981) 1360.

SIN-R-71-08 (Mar 1979) Approved Apr 1979; Started Nov 1980; Completed Aug 1983.

PRECISION MEASUREMENT OF THE MUON MOMENTUM IN PION DECAY AT REST

SIN – R Abela, M Daum, R Frosch (√ Spokesperson), B Jost, P-R Kettle, E Steiner

Accelerator SIN *Detector* Spectrometer

Reactions

$\pi^+ \rightarrow \mu^+ \nu_\mu$	150 MeV/c

Particles studied ν_μ, π^+

Comments The muon decay momentum is (29.79139±0.00083) MeV/c, and the ν_μ mass is less than 0.25 MeV (90% c.l.).

Papers PL 146B (1984) 431. No other papers expected.

SIN-R-72-02 (Nov 1972) Approved 1973; Started 1976.

EXPERIMENTS WITH NEUTRON BEAMS

FREIBURG U – J Franz, V Grundies, A Klett, P Koncz, M Krauth, R Peschina, E Roessle (√ Spokesperson), C Sauerwein, H Schmitt (√ Spokesperson), L Schmitt

Accelerator SIN *Detector* Spectrometer

Reactions

$n\ p \rightarrow n\ p$	0.6–1.2 GeV/c
$n\ p \rightarrow$ X	"
n deut $\rightarrow n$ deut	"
n deut $\rightarrow$ X	"

Comments Measures energy spectra and differential cross sections.

Papers PL 90B (1980) 367, PL 91B (1980) 214, PL 93B (1980) 384, NIM 192 (1982) 407, PL 141B (1984) 170, ZPHY A316 (1984) 43, PL 153B (1985) 382, and PL 158B (1985) 15.

SIN-R-73-01.2 (Mar 1977) Approved May 1980; Started Jul 1980; Completed 1984.

ENERGY AND ANGLE DEPENDENCE OF THE TENSOR POLARIZATION T_{20} IN πd ELASTIC SCATTERING

ZURICH, ETH – M Bittcher, K Elsener, C Forstner, W Grueebler (Spokesperson), V Koenig, P A Schmelzbach, D Singy, J Ulbricht, B Vuaridel
AUCKLAND U – A Chisholm

Accelerator SIN *Detector* Counter

Reactions

π^+ deut $\rightarrow \pi^+$ deut	220–260 MeV/c
deut ^{3}He $\rightarrow p$ He	"

Particles studied dibaryon

Comments Measures tensor polarization of the recoil deuteron at backward pion scattering angles.

Papers PRL 48 (1982) 311, PRL 49 (1982) 444, and JPHY G9 (1983) L211.

SIN-R-74-05 (May 1977) Approved Jun 1977; Started 1978; Completed 1981.

ELECTRON POLARIZATION IN MUON DECAY

ZURICH, ETH – H Burkard, F Corriveau, W Fetscher (Spokesperson), H J Gerber, K Johnson, H J Mahler
SIN – J Egger, H Kaspar, M Salzmann
MAINZ U, INST PHYS – F Scheck

Accelerator SIN *Detector* Counter

Reactions Polarized beam

$\mu^+ \rightarrow e^+\ \nu_e\ \overline{\nu}_\mu$	125 MeV/c

Particles studied μ^+

Comments The longitudinal polarization of the e^+ is consistent with 1, the transverse polarization components consistent with 0. Ran for 2300 hours.

Papers NP A335 (1980) 91, PR D24 (1981) 2004, PL 150B (1985) 242, and PL 160B (1985) 343.

SIN-R-75-07.2 (May 1975) Approved Sep 1975; Started 1975; Completed 1980.

MEASUREMENT OF THE P PARAMETER IN $\pi^- p$ ELASTIC AND CHARGE EXCHANGE SCATTERING

LAUSANNE U – J C Alder, C Joseph, J P Perroud, M T Tran (√ Spokesperson)
ZURICH, ETH – P Wiederkehr
SIN – G H Eaton, R Frosch, H Hirschmann (√ Spokesperson), S Mango, J McCulloch, P Shrager, P Weymuth
ZURICH U – G Strassner, P Truoel

Accelerator SIN *Detector* Counter

Reactions Polarized target

$\pi^- p \rightarrow \pi^- p$	190–430 MeV/c
$\pi^- p \rightarrow \pi^0 n$	"

Comments Measures the Wolfenstein parameter P in $\pi^- p$ elastic and charge exchange scattering for c.m. scattering angles 45 to 150°. Ran for 2000 hours.

Papers LNC 23 (1978) 381, and PR D27 (1983) 1040.

SIN-R-77-01 (Apr 1977) Approved Jun 1977; Started Jul 1977; Completed Feb 1980.

STUDY OF ANGULAR CORRELATIONS IN THE REACTIONS $^{12}C(\mu^-,\nu)^{12}B$ (G.S.)

LOUVAIN U – L Palffy
LOUVAIN U & ZURICH, ETH – L Grenacs
ZURICH, ETH – H Braendle, L Roesch, V L Telegdi, P Truttmann, A Zehnder (Spokesperson)

Accelerator SIN *Detector* Counter

Reactions

$\mu^-\ ^{12}C \rightarrow \nu_\mu\ ^{12}$Bor	0 MeV/c
^{12}Bor $\rightarrow\ ^{12}C\ e^-\ \overline{\nu}_e$	"

Particles studied ν_μ

Comments The ν_μ helicity is -1.06 ± 0.11. Induced pseudoscalar coupling $g_p/g_a = 9.0\pm1.7$. Ran for 1500 hours.

Papers PRL 46 (1981) 1507, HPA 55 (1982) 74, and AJP 50 (1982) 931.

SIN-R-78-05.4 (Apr 1981) Approved May 1981; Started Aug 1982; Completed Aug 1982.

MEASUREMENT OF THE A_{xz} PARAMETER IN THE REACTION $pp \rightarrow \pi^+ d$

THE NESIKA COLLABORATION
NEUCHATEL U – A Berdoz, B Favier, F Foroughi
KERNFORSCHUNGSZENTRUM, KARLSRUHE & KARLSRUHE U – J Hoftiezer, G Mutchler, Ch Weddigen (Spokesperson)
SIN – J A Konter, S Mango

Accelerator SIN *Detector* Counter

Reactions Polarized beam and target

$p\ p \rightarrow \pi^+$ deut	1.2 GeV/c

Comments Ran for 300 hours. Measures the angular distribution of the parameter A_{xz} at proton lab energies 516, 542, and 582 MeV.

Papers NP A312 (1978) 330, PL 100B (1981) 462, NP A402 (1983) 429, NP A412 (1984) 273, and NP A412 (1984) 286.

SIN-R-78-06 (Feb 1978) Approved Mar 1978; Started May 1978; Completed Aug 1981.

MEASUREMENT OF THE REACTION $\vec{p}\vec{p} \rightarrow \pi^+ d$ AT 580 MeV

GENEVA U – E Aprile-Giboni, D Besset, Q-H Do, B Favier, R Hausammann, E Heer, R Hess (Spokesperson), C Lechanoine-Leluc, W Leo, S Morenzoni, Y Onel, D Rapin
SIN – J Jaccard, S Mango
ALBERTA U & ORSAY, IPN – J M Cameron

Accelerator SIN *Detector* Wire chamber

Reactions Polarized beam and target

$p\ p \rightarrow \pi^+$ deut	1.0–1.2 GeV/c

Comments Measures the spin correlation parameters A_{xx}, A_{yy}, A_{zz}, and A_{xz} at five energies. Ran for 1900 hours.

Papers NP A379 (1982) 369.

SIN-R-78-09 (Aug 1978) Approved Oct 1978; Started Apr 1979; Completed Nov 1980.

SEARCH FOR ANOMALOUS μN INTERACTIONS: PRECISION MEASUREMENTS OF 2P-1S TRANSITIONS IN MUONIC ^{7}Li, ^{12}C, AND ^{13}C

ZURICH, ETH – B Aas, W Beer, I Beltrami, K Bos, G de Chambrier, P F A Goudsmit (√ Spokesperson), H J Leisi (√ Spokesperson), W Ruckstuhl, G Strassner, A Vacchi
FRIBOURG U – F W N De Boer, B Jeckelmann, U Kiebele, R Weber

NIKHEF, AMSTERDAM – J M Van der Velden
WURENLINGEN, INST REAKTORFORSCHUNG – P Baertschi

Accelerator SIN *Detector* Counter

Particles studied μ^-

Comments Gives an indication of a nonzero effect in ^{12}C, and an upper limit in ^{7}Li.

Papers PRL 49 (1982) 859, NP A430 (1984) 685, NP A433 (1985) 634, and NP A444 (1985) 589.

SIN-R-78-13.1 (Sep 1978) Approved Oct 1978; Started Jan 1981; Completed 1984.

STUDY OF THE RADIATIVE DECAY OF THE PION

LAUSANNE U – A Bay, C Joseph, J-F Loude, J-P Perroud (√ Spokesperson), D Ruegger, O Shoeri, D Steiner, M T Tran
ZURICH U – L Van Elmbt, M Lebrun, J M Martoff, P Truoel

Accelerator SIN *Detector* Spectrometer, Calorimeter

Reactions

$\pi^+ \rightarrow e^+ \nu_e \gamma$	0 MeV/c

Particles studied π^+

Comments Measures the absolute ratio of axial to vector weak form factors with an uncertainty better than 10%.

Papers PL 174B (1986) 445.

SIN-R-78-15.1 (Nov 1979) Approved May 1980; Started Mar 1981; Completed Dec 1982.

MEASUREMENT OF THE 2P-2S ENERGY DIFFERENCE IN MUONIC HYDROGEN

ZURICH, ETH – H P von Arb, C Brandes, F Dittus, H R Heeb, H Hofer, F Kottmann (√ Spokesperson), C Luechinger, R Schaeren, D Taqqu, J Unternaehrer
SIN – Ch Tschalaer

Accelerator SIN *Detector* Counter

Reactions

$\pi^- \rightarrow \mu^- \bar{\nu}_\mu$	40 MeV/c
$\mu^- p \rightarrow \mu^- p \gamma$	0 GeV/c

Comments The lifetime of the 2S state of the $\mu^- p$ atom is less than 100 ns at gas pressures above 6 torr. At 0.25 torr, the relative initial population of 2S states is (2.2±0.2)%.

Papers PL 101B (1981) 151, and PL 143B (1984) 65.

SIN-R-78-18 (Dec 1978) Approved Nov 1979; Started Nov 1979; Completed 1983.

DETERMINATION OF THE VECTOR ANALYZING POWER IN πd SCATTERING

KARLSRUHE U – J Bolger, E T Boschitz, E L Mathie, C R Ottermann, G R Smith (Spokesperson)
SIN – J Arvieux, M Daum, J A Konter, S Mango, G Mutchler
ERLANGEN U – M Meyer, F Vogler
BRITISH COLUMBIA U – R R Johnson

Accelerator SIN *Detector* Counter, Spectrometer

Reactions Polarized target

π^+ deut $\rightarrow \pi^+$ deut	117–325 MeV (T_{lab})
π^+ deut $\rightarrow \pi^+ p n$	228 MeV (T_{lab})

Particles studied dibaryon

Comments Measured angular distributions of the vector analyzing power at 12 energies.

Papers PRL 46 (1981) 167, PRL 48 (1982) 1667, PR C28 (1983) 2558, PR C29 (1984) 2206, PL 154B (1985) 28.

SIN-R-79-05 (Aug 1980) Approved Sep 1980; Started 1980.

π^+ AND π^- ABSORPTION IN LIGHT NUCLEI

BASEL U – G Backenstoss (√ Spokesperson), M Izycki, M Steinacher, P Weber, H J Weyer
KERNFORSCHUNGSZENTRUM, KARLSRUHE & KARLSRUHE U – S Cierjacks, H Ullrich (√ Spokesperson)

Accelerator SIN *Detector* Counter

Reactions

$\pi^- {}^3He \rightarrow n n p$	0–220 MeV (T_{lab})
$\pi^- {}^3He \rightarrow n$ deut	"
$\pi^+ {}^3He \rightarrow p p p$	50–220 MeV (T_{lab})

Papers PL 112B (1982) 129, PL 115B (1982) 445, NP A412 (1984) 253, PL 137B (1984) 329, PRL 55 (1985) 2782, NP A445 (1986) 557, and NP A448 (1986) 567.

SIN-R-79-07 (Nov 1979) Approved Sep 1980; Started Oct 1980; Completed May 1984.

THE STUDY OF THE REACTION $\pi^+ d \rightarrow pp$ WITH A VECTOR POLARIZED d TARGET

KARLSRUHE U – E Boschitz, W Gyles, E L Mathie, C R Ottermann, G R Smith (Spokesperson)
SIN – B Van Den Brandt, J A Konter, S Mango
ERLANGEN U – R Olszewski
BRITISH COLUMBIA U – R R Johnson

Accelerator SIN *Detector* Counter

Reactions Polarized target

π^+ deut $\rightarrow p p$	112–294 MeV (T_{lab})

Particles studied dibaryon

Comments Measures the angular distribution of the vector analyzing power.

Papers PR C25 (1982) 3228, and PR C30 (1984) 980.

SIN-R-80-01 (Jan 1980) Approved May 1980; Started Jul 1980; Completed Sep 1980.

MEASUREMENT OF CROSS SECTIONS WITH A BEAM OF POLARIZED PROTONS AND A POLARIZED TARGET

CAEN U – F Perrot, J Yonnet
SACLAY – J Bystricky, J Deregel, J M Fontaine, F Lehar (Spokesperson), J Vrzal
GENEVA U – E Aprile, C Eisenegger, E Heer, R Hess (Spokesperson), W Leo, S Morenzoni, Y Onel, D Rapin
SIN – S Mango

Accelerator SIN *Detector* Counter

Reactions Polarized beam and target

$p p \rightarrow X$	0.8–1.2 GeV/c

Particles studied dibaryon

Comments Measures the difference between total pp cross sections for initial spins parallel and antiparallel, the spins being oriented along the beam. Ran for 400 hours.

SIN-R-80-06 (Nov 1981) Approved Jan 1982; Started 1984.

SEARCH FOR RARE MUON AND PION DECAYS WITH A LARGE SOLID ANGLE MAGNETIC SPECTROMETER (SINDRUM I)

ZURICH, ETH – R Eichler, C Niebuhr, S Playfer, H K Walter (√ Spokesperson)
ZURICH U – S Egli, R Engfer, M Grossmann, E A Hermes, F Muheim, H Pruys, A van der Schaaf, D Vermeulen
SIN – W Bertl, N Lordong
SACLAY – J Martino
AACHEN, TECH HOCHSCH, III PHYS INST – U Bellgardt, G Otter

Accelerator SIN *Detector* SINDRUM

Reactions

$\mu^+ \rightarrow e^+ e^+ e^-$	0.0 MeV/c
$\mu^+ \rightarrow e^+ e^+ e^- \nu_e \bar{\nu}_\mu$	"
$\pi^+ \rightarrow e^+ e^+ e^- \nu_e$	"
$\pi^0 \rightarrow e^+ e^+$	"

Particles studied μ^+, π^+

Papers PL 140B (1984) 299, NP A434 (1985) 409, NP B260 (1985) 1, PL 175B (1986) 97, PL 175B (1986) 101, and ARNPS 36 (1986) 327.

SIN-R-80-10 (Dec 1980) Approved Jan 1981; Started 1981.

MEASUREMENT OF INCLUSIVE SPECTRA FROM REACTIONS INDUCED BY PROTONS AND NEUTRONS

FREIBURG U – J Franz, E Roessle, C Sauerwein, H Schmitt, H L Woolverton
BUDAPEST, CRIP – J Eroe (√ Spokesperson), Z Fodor, J Kecskemeti, P Koncz, Z Kovacs, Z Seres

Accelerator SIN *Detector* Counter

Reactions

n C → pion X	0.8–1.2 GeV/c
n C → p X	"
n C → deut X	"
n C → trit X	"

Comments Measures energy spectra of p, d, t from 51 to 165°.

Papers PL 153B (1985) 382.

SIN-R-80-11 (Dec 1980) Approved Jan 1981; Started Feb 1982.

SEARCH FOR ADMIXTURE OF HEAVY NEUTRINOS IN $\pi^+ \to \mu^+\nu_\mu$ DECAY

VIRGINIA U – R C Minehart (√ Spokesperson), K O H Ziock (√ Spokesperson)
SIN – M Daum, P R Kettle
ZURICH, ETH – B Jost

Accelerator SIN *Detector* Counter

Reactions

$\pi^+ \to \mu^+ \nu_\mu$	90 MeV/c

Particles studied hvy-ν_μ

Comments The muon energy resolution is better than 6 keV FWHM.

Papers PRL 52 (1984) 804.

SIN-R-81-01 (Apr 1981) Approved May 1981; Started Nov 1982; Completed Oct 1984.

EXPERIMENTAL DETERMINATION OF THE STRONG INTERACTION SHIFT IN THE 2P-1S TRANSITION OF PIONIC HYDROGEN AND DEUTERIUM ATOMS USING CRYSTAL DIFFRACTION

NEUCHATEL U – E Bovet (√ Spokesperson), J P Egger
CAL TECH – J Gimlett (√ Spokesperson), H Kwon
SIN – K Gabathuler

Accelerator SIN *Detector* Photon spectrometer, Counter

Reactions

π^- p → γ X	0 MeV/c
π^- deut → γ X	"

Papers PL 153B (1985) 231, and NIM A239 (1985) 635.

SIN-R-81-02 (Aug 1981) Approved Sep 1981.

STUDY OF THE FORMATION OF MUONIC ATOMS IN LOW Z GASEOUS MATERIALS IN A CYCLOTRON TRAP

KERNFORSCHUNGSZENTRUM, KARLSRUHE & KARLSRUHE U – P Bluem, E Borie, D Gotta, H Koch, W Kunold, M Schneider, L M Simons (√ Spokesperson)
SIN – R Abela

Accelerator SIN *Detector* Counter

Reactions

μ^- nucleus	0 MeV/c

Comments Approved for 240 hours.

SIN-R-81-06 (Apr 1983) Approved May 1983; Started Feb 1984; Completed Jan 1985.

IMPROVED DETECTION OF 2-γ EVENTS FROM THE SIN BEAM DUMP AND MEASUREMENT OF THEIR INVARIANT MASS

AACHEN, TECH HOCHSCH, III PHYS INST – H Faissner, W Heinrigs, A Preussger, J Reitz, D Samm, H Tuchscherer
BERLIN, DAW – P Kostka, K Lanius, S Nowak, C Spiering, M Walter
SIN – M Daum, R Dietlicher, A Zehnder (Spokesperson)

Accelerator SIN *Detector* Optical spark chamber

Reactions

p nucleus → axion X	1.2 GeV/c

Particles studied axion

Comments A search for axions produced in the 600-MeV proton beam dump. No signal observed.

SIN-R-81-09 (Dec 1981) Approved Jan 1982; Started Mar 1982; Completed Sep 1983.

SEARCH FOR HEAVY NEUTRINOS IN $\pi \to e\nu$ DECAY

LOUVAIN U – J P Deutsch, M Lebrun, N De Leener-Rosier, O Naviliat-Cuncic, R Prieels (√ Spokesperson)
ZURICH U – C Amsler, L van Elmbt, M Schaad, P Truoel
LAUSANNE U – Cl Joseph, J P Perroud, M T Tran

Accelerator SIN *Detector* Spectrometer

Reactions

$\pi^+ \to e^+ \nu_e$	0 MeV/c

Particles studied hvy-ν_e

Comments Obtains good reduction of the $\mu^+ \to e^+\nu_e\overline{\nu}_\mu$ noise. The best background to signal ($\pi^+ \to e^+\nu_e$) ratio is 1.3. The resolution is 1.3 MeV/c at 70 MeV/c. Upper limits for $|UEI|^2$ are 7×10^{-6} for m_ν =20 MeV, 1.5×10^{-6} for m_ν =70 MeV, etc.

Papers PL 177B (1986) 228.

SIN-R-82-01 (Apr 1982) Approved Jun 1982; Started Aug 1982; Completed 1982.

SEARCH FOR AN ADMIXTURE OF HEAVY NEUTRINOS IN THE DECAY OF PIONS AT REST

SIN – R Abela, M Daum, R Frosch (√ Spokesperson), B Jost, P-R Kettle, E Steiner

Accelerator SIN *Detector* Counter

Reactions

$\pi^+ \to \mu^+ \nu_\mu$	100 MeV/c

Particles studied hvy-ν_μ

Comments No evidence for a heavy ν_μ (heavy ν_μ mass range 5 to 30 MeV). Ran for 200 hours, then terminated in favor of experiment R-80-11.

Papers A result from an early test: PL 105B (1981) 263. No other papers expected.

SIN-R-82-03.1 (Apr 1982) Approved Jun 1982; Started Nov 1982; Completed Aug 1983.

MEASUREMENT OF THE LIFETIME OF THE 2S STATE OF MUONIC HELIUM AT GAS PRESSURES BELOW 5 ATM

ZURICH, ETH – H P von Arb, F Dittus, H R Heeb, H Hofer, F Kottmann (√ Spokesperson), S Niggli, R Schaeren, D Taqqu, J Unternaehrer
BASEL U – P Egelhof

Accelerator SIN *Detector* Counter

Reactions

π^- → μ^- $\overline{\nu}_\mu$	40 MeV/c

μ^- He $\rightarrow$ μ^- He γ 0 MeV/c

Comments The lifetime of the 2S state of muonic helium ions is 1116±96 ns at 50 torr, 39±6 ns at 600 torr, < 150 ns at 6 atm (90% c.l.). The 2S quenching rate is predominantly a quadratic function of pressure with a 3-body rate coefficient $k = (6.24 \pm 0.64) \times 10^{-32}$ cm^6/s.

Papers PL 136B (1984) 232.

SIN-R-82-04 (Apr 1983) Approved May 1983; Started 1985.

PRECISE DETERMINATION OF THE BRANCHING RATIO $R = (\pi \rightarrow e\nu + e\nu\gamma)/(\pi \rightarrow \mu\nu + \mu\nu\gamma)$

BERN U - G Czapek, A Fluckiger, D Frei, B Hahn (√ Spokesperson), M Hess, C Hug, E Hugentobler, W Krebs, J Lauber, U Moser (√ Spokesperson), E Ramseyer, H Scheidiger, P Schlatter, G Stucki
SIN - R Abela, D Renker, E Steiner

Accelerator SIN *Detector* Counter, Calorimeter

Reactions
$\pi^+ \rightarrow e^+ \nu_e$ 85 MeV/c

Particles studied π^+

Comments The detector includes a 4π calorimeter with an average thickness of 18 radiation lengths. The resolution for 100 MeV electrons is 4% FWHM. Taking data (November 86).

SIN-R-82-06 (Jul 1982) Approved Aug 1982; Started Mar 1983; Completed 1984.

SPIN TRANSFER PARAMETERS IN THE pp INELASTIC CHANNELS

GENEVA U - E Aprile, G Cantale, E Heer, R Hess (Spokesperson), C Lechanoine-Leluc, W Leo, Y Onel, D Rapin, P Rascher
SIN - S Mango

Accelerator SIN *Detector* Wire chamber

Reactions Polarized beam
$p\,p \rightarrow \pi^+$ deut 1.2 GeV/c
$p\,p \rightarrow \pi^0\,p\,p$ "

Comments Ran for 2000 hours.

Papers From a similar previous experiment: NP A415 (1984) 365.

SIN-R-82-10 (Dec 1982) Approved Jan 1983; Started Sep 1983.

PRECISION DETERMINATION OF THE MASS OF THE π^- AND SEARCH FOR STRONG πn VAN DER WAALS FORCES

ZURICH, ETH - W Beer, G de Chambrier, O Elsenhans, K L Giovanetti, P F A Goudsmit, L Knecht, H J Leisi (√ Spokesperson), A Ruetschi
FRIBOURG U - B Jeckelmann, T Nakada
WABERN, EIDG AMT MESSWESEN - O Piller, W Schwitz
WILLIAM AND MARY COLL & SIN - M Eckhause

Accelerator SIN *Detector* Counter

Particles studied π^-

Comments The π^-/e^- mass ratio is 273.12677(71), the π^- mass is 139.56871(53) MeV. The measurements concerning the search for strong πn van der Waals forces starts in the second half of 1986.

Papers PRL 56 (1986) 1444, and NP A457 (1986) 709.

SIN-R-82-17 (Jan 1983) Approved Jan 1983; Started Apr 1984; Completed Aug 1984.

COULOMB-NUCLEAR INTERFERENCE IN π^+p AND π^-p ELASTIC SCATTERING AT 55 MeV

KARLSRUHE U - K Goering, J Jaki, U Klein, W Kluge (√ Spokesperson), R Koch, H Matthaey, M Metzler, U Wiedner
SIN - E Pedroni (√ Spokesperson)
ZURICH, ETH - W Fetscher, H-J Gerber

Accelerator SIN *Detector* Wire chamber

Reactions
$\pi^+\,p \rightarrow \pi^+\,p$ 140 MeV/c
$\pi^-\,p \rightarrow \pi^-\,p$ "

Comments The measured angular distributions agree with Karlsruhe-Helsinki phase-shift predictions and so reinforce the value of the σ term, 65±8 MeV, calculated by R. Koch. The discrepancy with the value of 35±5 MeV calculated by Gasser and Leutwyler using chiral perturbation theory of QCD persists.

Papers PRL 58 (1987) 648.

SIN-R-83-20-2 (Nov 1983) Approved Jan 1984; Started Jun 1984.

MEASUREMENT OF THE 2S-2P ENERGY DIFFERENCE IN MUONIC ^{4}He AT LOW GAS DENSITY

ZURICH, ETH - H P von Arb, C Brandes, F Dittus, H R Heeb, H Hofer, F Kottmann (√ Spokesperson), C Luechinger, R Schaeren, D Taqqu, J Unternaehrer
BASEL U - P Egelhof, I Sick

Accelerator SIN *Detector* Counter

Comments 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. Taking data (November 86).

SIN-R-83-29 (Dec 1983) Approved Jan 1984; Started Dec 1985.

MEASUREMENT OF THE ξ PARAMETER IN μ DECAY

ZURICH, ETH - H Burkard, W Fetscher (Spokesperson), H-J Gerber, K F Johnson, E Ungricht
SIN - M Salzmann
MAINZ U, INST KERNPHYS - F Scheck
MUNICH, TECH U - V Zacek

Accelerator SIN *Detector* Wire chamber

Reactions
$\mu^+ \rightarrow e^+ \nu_e \bar{\nu}_\mu$ 150 MeV/c
$\mu^- \rightarrow e^- \bar{\nu}_e \nu_\mu$ "

Particles studied μ^+, μ^-

Comments Approved for 600 hours.

SIN-R-85-10 (Jan 1985) Approved Mar 1985; Started Aug 1984; Completed Aug 1985.

PRECISION MEASUREMENT OF THE $\pi^-\pi^0$ MASS DIFFERENCE

SIN - J F Crawford, M Daum (√ Spokesperson), R Frosch (√ Spokesperson), B Jost, P-R Kettle
VIRGINIA U - R M Marshall, R C Minehart, K O H Ziock

Accelerator SIN *Detector* Counter

Reactions
$\pi^-\,p \rightarrow \pi^0\,n$ 0.0 MeV/c
$\pi^-\,p \rightarrow \gamma\,n$ "

Particles studied π^0

Comments The $\pi^-\,\pi^0$ mass difference is 4.5930±0.0013 MeV. The mean kinetic energy of π^-p atoms at the time of charge exchange in liquid hydrogen is < 12 eV (90% CL).

Papers PRL 56 (1986) 1043.

SIN-R-85-14 (Feb 1985) Approved Mar 1985; Started Oct 1985.

MEASUREMENT OF THE $\pi^0 \rightarrow e^+e^-$ BRANCHING RATIO WITH SINDRUM

ZURICH U – S Egli, R Engfer, M Grossmann-Handschin, E A Hermes, F Muheim, H S Pruys, A van der Schaaf (√ Spokesperson), D Vermeulen
ZURICH, ETH – W Bertl, R Eichler, C Niebuhr (√ Spokesperson), H K Walter
SIN – N Lordong, S M Playfer
SACLAY – A Godin, J Martino
AACHEN, TECH HOCHSCH, III PHYS INST – U Bellgard
BRITISH COLUMBIA U – R Meijerdrees, C E Waltham

Accelerator SIN *Detector* SINDRUM

Reactions

$\pi^- p \to \pi^0 n$	0.0 MeV/c
$\pi^- p \to e^+ e^- n$	"
$\pi^0 \to e^+ e^-$	—
$\pi^0 \to e^+ e^- \gamma$	—

Particles studied π^0

Comments Approved for 1500 hours, ran 1300 hours for tests. Expects to take data in spring 87.

SIN-R-85-16 (Feb 1985) Approved Mar 1985; Started Aug 1985; Completed Oct 1985.

STUDY OF THE DECAY $\pi^+ \to e^+\nu e^+ e^-$ WITH SINDRUM

ZURICH U – S Egli (Spokesperson), R Engfer, C Grab, E A Hermes, A Kersch, N Kraus, H S Pruys, A van der Schaaf, D Vermeulen
ZURICH, ETH – W Bertl, R Eichler, C Niebuhr, H K Walter
SIN – N Lordong
SACLAY – J Martino
AACHEN, TECH HOCHSCH, III PHYS INST – U Bellgard, G Otter

Accelerator SIN *Detector* SINDRUM

Reactions

$\pi^+ \to e^+ e^+ e^- \nu_e$	0.0 MeV/c

Particles studied π^+

Comments First observation of the decay $\pi^+ \to e^+e^+e^-\nu_e$. No evidence for axions.

Papers PL 175B (1986) 97, and PL 175B (1986) 101.

SIN-R-86-02 (Dec 1985) Approved Jan 1986; Started Sep 1986.

STUDY OF THE REACTION $\pi^- p \to \pi^+\pi^- n$ NEAR THRESHOLD

ERLANGEN U – R Baran, M Dillig, W Eyrich, K Fiedler, A Hofmann (√ Spokesperson), Y Kollert, R Mueller, R Olszewski, H-W Ortner (√ Spokesperson), J Orzechowski
KERNFORSCHUNGSZENTRUM, KARLSRUHE – W Kluge, H Matthay, U Wiedner

Accelerator SIN *Detector* Spectrometer

Reactions

$\pi^- p \to \pi^+ \pi^- n$	350–450 MeV/c

Comments Approved for 1300 hours.

SIN-Z-75-02 (May 1975) Approved May 1975; Started 1976; Completed 1985.

PARITY VIOLATION IN pp SCATTERING

ZURICH, ETH – J Lang, T Maier, R Mueller, F Nessi-Tedaldi, T Roser, M Simonius (√ Spokesperson)
SIN – S Jaccard
WISCONSIN U – W Haeberli

Accelerator SIN *Detector* Wire chamber

Reactions Polarized beam

$p p \to p p$	300 MeV/c

Comments The parity-violating longitudinal analyzing power obtained is $A_z = (-1.50\pm0.22)\times10^{-7}$.

Papers PRL 44 (1980) 699, and PR C30 (1984) 1409.

SIN-Z-80-01 (Jul 1980) Approved Sep 1980; Started Jan 1981; Completed 1984.

PARITY VIOLATION IN $p\alpha$ SCATTERING

ZURICH, ETH – J Lang, T Maier, R Mueller, F Nessi-Tedaldi, T Roser, M Simonius (√ Spokesperson)
WISCONSIN U – W Haeberli
SIN – S Jaccard

Accelerator SIN *Detector* Wire chamber

Reactions Polarized beam

p He $\to p$ He	300 MeV/c

Comments The parity-violating longitudinal analyzing power obtained is $A_z = -(3.3\pm0.9)\times10^{-7}$.

Papers PRL 54 (1985) 170, and PR C34 (1986) 1545.

SLAC-BC-072-073 Approved Nov 1979; Completed Mar 1982.

MEASUREMENT OF LIFETIME AND OTHER PROPERTIES OF CHARMED PARTICLES

RUTHERFORD – C Fisher, B Franek, G Gopal, G Kalmus (√ Spokesperson), D Kelsey
IMPERIAL COLL – T Bacon, I Butterworth, J Chima, P Dornan, G Hall, P Rankin, A White
UC, BERKELEY – H Bingham, J Kent, J Shank, G Yost
SLAC – J T Carroll, K C Moffeit (√ Spokesperson)
KEK – M Fukawa, F Ochiai, A Ono, T Sato, R Sugahara, A Suzuki, K Takahashi, Y Yoshimura
NARA U – N Fujiwara, S Noguchi, S Yamashita
TOHOKU U – K Abe, K Hasegawa, T Hayashino, T Kitagaki, K Tamai, S Tanaka, A Yamaguchi, H Yuta
BROWN U & MIT & TUFTS U & DUKE U & FLORIDA STATE U & OAK RIDGE & TENNESSEE U & BIRMINGHAM U & TECHNION & TEL AVIV U & WEIZMANN INST – et al.

Accelerator SLAC *Detector* HBC-40IN-HYB

Reactions

$\gamma p \to$ charm X	20 GeV/c

Particles studied charm

Comments Uses high-resolution optics (about 55 μm) with the bubble diameter resolved and a high bubble density (about 70 bubbles/cm) to detect the paths of charmed particles.

Papers IEEE TNS 27 (1980) 587, NIM 196 (1982) 403, NIM 203 (1982) 159, NIM 203 (1982) 223, PRL 48 (1982) 1526, PRL 51 (1983) 156, NIM 221 (1984) 330, PR D29 (1984) 1877, PRL 53 (1984) 751, PR D30 (1984) 1, PR D32 (1985) 2288, PR D32 (1985) 2869, and PR D33 (1986) 1. No other papers expected.

SLAC-BC-075 (1982) Approved Nov 1982; Completed Dec 1983.

AN IMPROVED CHARM PHOTOPRODUCTION STUDY AT THE SLAC HYBRID FACILITY

RUTHERFORD – G Kalmus, et al.
SLAC – K C Moffeit (√ Spokesperson), et al.
IMPERIAL COLL & BIRMINGHAM U & UC, BERKELEY & TOHOKU U & TECHNION & TEL AVIV U & WEIZMANN INST & MIT & BROWN U & OAK RIDGE & TENNESSEE U & TUFTS U – et al.

Accelerator SLAC *Detector* HBC-40IN-HYB

Reactions

$\gamma p \to$ charm X	20 GeV/c

Particles studied charm, D^0, D^-, D_s^+, D_s^-, Λ_c^+

Comments An improvement of SLAC-BC-072/073.

Papers See also SLAC-BC-072/073. PR D33 (1986) 1.

SLAC-BC-076 (Oct 1983) Approved Nov 1983; Completed Nov 1983.

AN EXPERIMENT TO STUDY Λ_c^+ DECAY MODES IN 10.5 GeV PHOTOPRODUCTION, WHERE A THRESHOLD ENHANCEMENT IS PREDICTED

BIRMINGHAM U – B Franek, et al.
TENNESSEE U – J Brau (Spokesperson), et al.
IMPERIAL COLL & MIT & RUTHERFORD & SLAC & UC; BERKELEY – et al.

Accelerator SLAC *Detector* HBC-40IN-HYB

Reactions

$\gamma p \to \overline{D}^0 \Lambda_c^+$	10.5 GeV/c

Particles studied Λ_c^+

Comments A test run found no evidence for the hoped-for threshold enhancement for charm production, so the experiment was scrapped.

Papers PR D30 (1984) 694.

SLAC-E-130 (Dec 1976, May 1977) Approved May 1977; Completed Apr 1980.

PRECISE MEASUREMENTS OF ASYMMETRIES IN DEEP INELASTIC SCATTERING OF POLARIZED ELECTRONS BY POLARIZED PROTONS AND BY POLARIZED DEUTERONS

YALE U – M R Bergstrom, J E Clendenin, S Dhawan, R Fong-Tom, V W Hughes (Spokesperson), M S Lubell, U Moser, R F Oppenheim, D A Palmer, L Panda, N Sasao, K P Schuler, P A Souder, H Venkataramania, M E Zeller
SLAC – S J St Lorant, R H Miller
BIELEFELD U – G Baum, W Raith
TSUKUBA U – K Kondo, S Miyashita, I Nakano, K Takikawa
KEK – K Morimoto

Accelerator SLAC *Detector* Single-arm spectrometer

Reactions Polarized beam and target

$e^- p \to e^- X$	6.4, 16.2, 22.6 GeV/c
e^- deut $\to e^- X$	"

Comments Increases by an order of magnitude the amount of data taken in SLAC-E-080, and adds data on deuterium.

Papers PRL 51 (1983) 1135.

SLAC-E-135 Approved Nov 1979; Completed May 1982.

COMPARISON OF K^-p AND K^+p INTERACTIONS, AND A PROGRAMMATIC STUDY OF STRANGE QUARK SPECTROSCOPY

SLAC – V Ashford, D Aston (Spokesperson), W Dunwoodie, W Johnson, P Kunz, D W G S Leith, L Levinson, A Miyamoto, B Ratcliff (Spokesperson), S Shapiro, T Shimomura, P K Sinervo, G Tarnopolsky, A Waite, S Williams
NAGOYA U – N Awaji, K Fujii, H Hayashii, S Iwata, R Kajikawa, T Matsui, H Ozaki, C Pak, A Sugiyama, S Suzuki, T Tauchi
TOKYO U – K Ukai
CINCINNATI U – J D'Amore, R Endorf, B Meadows, M Nussbaum

Accelerator SLAC *Detector* LASS

Reactions

$K^- p \to$ charged X	11 GeV/c
$K^+ p \to$ charged X	"

Particles studied K^*(unspec), $\phi(1680)$, Ξ^*(unspec), Ω^*(unspec)

Comments Sensitivities are 4 evts/nb for K^-, 1 evt/nb for K^+. For a description of the apparatus, see the LBL-91 supplement on detectors.

Papers NP B247 (1984) 261, PL 149B (1984) 258, PR D32 (1985) 2255, PR D32 (1985) 2270, and PL 180B (1986) 308.

SLAC-E-136 (Jul 1980) Approved May 1981; Completed Apr 1984.

ELASTIC *ep* CROSS SECTIONS AT LARGE MOMENTUM TRANSFER

AMERICAN U – R G Arnold (Spokesperson), P Bosted, S Rock, Z M Szalata
BONN U – B A Mecking
SLAC – D J Sherden

Accelerator SLAC *Detector* SSF

Reactions

$e^- p \to e^- p$	14.0, 21.0, 28.5 GeV/c

Comments Measures the scattering cross section for Q^2 = 12.1, 23.6, and 37.3 GeV^2 using the 8 and 20 GeV spectrometers in coincidence.

SLAC-E-137 (Jul 1980) Approved Sep 1980, Dec 1980; Completed Dec 1982.

SEARCH FOR LOW MASS, METASTABLE NEUTRAL PARTICLES AT SLAC

FERMILAB – J D Bjorken
VIRGINIA TECH – A Abashian, L W Mo (Spokesperson)
SLAC – S Ecklund, W R Nelson, Y S Tsai

Accelerator SLAC *Detector* Calorimeter

Reactions

e^- nucleus	20 GeV/c

Particles studied axion

Comments A beam-dump experiment to search for low-mass (< 100 MeV) metastable and neutral particles produced by a highly collimated mechanism. Took 29.9 coulombs of 20 GeV electrons. Analysis is in progress.

SLAC-E-140 (1984) Approved Dec 1984; Completed Jan 1986.

MEASUREMENT OF THE x, Q^2, AND NUCLEAR DEPENDENCE OF $R = \sigma_L/\sigma_T$

AMERICAN U – R Arnold, D Benton, P Bosted, G de Chambrier, L Clogher, A Lung, S Rock (√ Spokesperson), Z Szalata
CAL TECH – B Filippone, J Jourdan, R McKeown, R Milner, D Potterveld, R Walker
FERMILAB – A Para
LIVERMORE – K Van Bibber, F Dietrich
MASSACHUSETTS U, AMHERST – B Debebe, R Hicks, J Shafer
ROCHESTER U – P de Barbaro, A Bodek (√ Spokesperson), S Dasu, H Harada, M W Krasny, K Lang, E Riordan
TEL AVIV U – J Alster
SLAC – R Gearhart
STANFORD U – L Whitlow

Accelerator SLAC *Detector* ?

Reactions

$e^- p$	3–21 GeV/c
e^- deut	"
e^- Fe	"
e^- Au	"

Comments Measures the ratio $R = \sigma_L/\sigma_T$ in the range $0.1 < x < 0.5$ and $1 < Q^2 < 12.5$ (GeV/c)^2. Compares R with the QCD prediction, and studies the nuclear dependence of the ratio of the W_1 and W_2 structure functions for various nuclear targets (EMC effect).

SLAC-PEP-002 (Nov 1976) Approved Jan 1978; Completed 1983.

SEARCH FOR HIGHLY IONIZING PARTICLES AT PEP

SLAC – D Fryberger (√ Spokesperson)
UC, BERKELEY – P B Price (√ Spokesperson)

Accelerator SLAC-PEP *Detector* Plastic

Reactions
$e^+ e^-$ 29 GeV (Ecm)

Particles studied monopole

Comments The detector is a C-shaped retractable cylinder of lexan and CR-39. Detects highly charged particles as well as monopoles.

Papers PRL 48 (1982) 77, and PR D29 (1984) 1524. No other papers expected.

SLAC-PEP-004-009 (Dec 1976) Approved Jan 1977.

THE TIME PROJECTION CHAMBER AND 2-GAMMA DETECTOR AT PEP

LBL – M Alston-Garnjost, R E Avery, A Barbaro-Galtieri, A Barnes, A Bay, T S Bolognese, A Bross, A R Clark, G D Cowan, O Dahl, K A Derby, J J Eastman, P Eberhard, T K Edberg, J W Gary, W Hofmann, J E Huth, H S Kaye, R W Kenney, L T Kerth, D Lambert, S C Loken, G Lynch, R Madaras, J Marx, L G Mathis, W Moses, D R Nygren, P Oddone (√ Spokesperson), M Pripstein, M Ronan, R Ross, F R Rouse, G Shapiro, M D Shapiro, M Stevenson, R van Tyen, E M Wang, W Wenzel, Z R Wolf, H Yamamoto
UC, BERKELEY – H Bingham, J Lys, G P Yost
UC, DAVIS – W Ko, R Lander, K Maeshima, R R McNeil, D Pellett, J R Smith, W Wagner, M C S Williams, C Zeitlin
UC, BERKELEY & STANFORD U – A M Eisner, B D Magnuson, M K Sullivan
UC, SAN DIEGO – D L Bintinger, K H Kees, G Masek, E Miller, J R Thompson, W Vernon, J T White
UC, SANTA BARBARA – A R Barker, D A Bauer, D Caldwell, A Lu, K A Schwitkis, R Stephens, Y X Wang, S Yellin
UCLA – H U Bengtsson, C D Buchanan, R I Koda, D A Park, W E Slater, J S Steinman, D H Stork, M G Strauss, M R Wayne, R F van Daalen Wetters
UC, RIVERSIDE – G J Van Dalen, W Gorn, K K Kwong, W G J Langeveld, J Layter, T T Lin, C S Lindsey, S O Melnikoff, B Shen
CARNEGIE MELLON U – G J Bobbink
AMES LAB – J M Hauptman, S K Park
JOHNS HOPKINS U – B A Barnett, D A Crane, J Hylen, X-Q Lu, J A J Matthews, W-M Zhang
MASSACHUSETTS U, AMHERST – R R Kofler, S J Maxfield, S Toutounchi
NEW YORK U – P Nemethy
NIKHEF, AMSTERDAM – A Buijs, F Erne, F L Linde, H Paar, J C Sens, B van Uitert
SLAC – E Bloom, A Fridman, G Godfrey, K Kiess, G Zapalac
TOKYO U – H Aihara, R Enomoto, T Fujii, T Kamae, T Takahashi, N Toge

Accelerator SLAC-PEP *Detector* TPC, 2-GAMMA

Reactions
$e^+ e^-$ 29 GeV (Ecm)

Comments For a description of the apparatus, see the LBL-91 supplement on detectors.

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, PRL 58 (1987) 97, and PL B (to be published).

SLAC-PEP-005 (Dec 1976) Approved Jan 1977.

THE MARK-II DETECTOR AT PEP

SLAC – A Boyarski, P R Burchat, D Burke, J Dorfan, G Feldman, L Gladney, G Hanson, K Hayes, R Hollebeek, W Innes, J Jaros, D Karlen, A Lankford, R R Larsen, B Leclaire, N Lockyer (Spokesperson), V Luth, C Matteuzzi, R Ong, M Perl, B Richter, K Riles, M Ross, J Yelton, C Zaiser
LBL – G S Abrams, D Amidei, A Baden, J Boyer, F Butler, G Gidal, M Gold, G Goldhaber, L Golding, J Haggerty, D Herrup, I Juricic, J A Kadyk, M Nelson, P Rowson, H Schellman, W B Schmidke, P Sheldon, G H Trilling, C de la Vaissiere, D R Wood
HARVARD U – M Levi, T Schaad

Accelerator SLAC-PEP *Detector* MARK-II

Reactions
$e^+ e^-$ 29 GeV (Ecm)

Particles studied charm, bottom, τ

Comments Studies jet properties and evolution, charm and bottom lifetimes and fragmentation, etc. For a description of the apparatus, see the LBL-91 supplement on detectors.

Papers PRL 48 (1982) 66, PRL 49 (1982) 430, PRL 49 (1982) 517, PRL 49 (1982) 521, PRL 49 (1982) 1232, PRL 49 (1982) 1369, PL 122B (1983) 90, PL 129B (1983) 141, PRL 50 (1983) 1542, PRL 51 (1983) 955, PRL 51 (1983) 1316, PRL 51 (1983) 2253, PRL 52 (1984) 1869, PRL 52 (1984) 2019, PR D30 (1984) 851, PL 160B (1985) 188, PR D31 (1985) 3013, PR D32 (1985) 800, PR D32 (1985) 2859, PRL 54 (1985) 2071, PRL 54 (1985) 2289, PRL 54 (1985) 2580, PRL 54 (1985) 2489, PRL 55 (1985) 1954, PRL 56 (1986) 207, PRL 56 (1986) 812, PRL 57 (1986) 527, PRL 57 (1986) 1398, PR D34 (1986) 2601, PR D34 (1986) 3321, PR D35 (1987) 27, and PRL 58 (1987) 644.

SLAC-PEP-006 (Dec 1976) Approved Jan 1977; Completed Mar 1986.

THE MAC DETECTOR AT PEP

COLORADO U – E Fernandez, W Ford, N Qi, A L Read, Jr , J Smith
FRASCATI – T Camporesi, R DeSangro, A Marini, I Peruzzi, M Piccolo, F Ronga
HOUSTON U – H T Blume, R B Hurst, K Lau, J P Venuti, H B Wald, R Weinstein
WISCONSIN U – M C Delfino, B K Heltsley, J R Johnson, T L Lavine, T Maruyama, R Prepost
NORTHEASTERN U – H R Band, M W Gettner, G P Goderre, E Von Goeler, O A Meyer, J Moromisato, R Polvado, D Sanders, D Shambroom, J C Sleeman
SLAC – W Ash, E D Bloom, G Chadwick, S H Clearwater, R W Coombes, G Godfrey, H S Kaye, R E Leedy, H L Lynch, R L Messner, L T Moss, F Muller, D Ritson, D E Wiser, R W Zdarko
UTAH U – H Lee, P Verdini
CORNELL U – B Heltsley
STANFORD U – H Nelson, L Rosenberg
LBL – D Groom (√ Spokesperson)

Accelerator SLAC-PEP *Detector* MAC

Reactions

$e^+ e^- \to \mu^+ \mu^-$	29 GeV (Ecm)
$e^+ e^- \to \tau^+ \tau^-$	"
$e^+ e^- \to e^+ e^-$	"
$e^+ e^- \to \mu^+ \mu^- \gamma$(s)	"
$e^+ e^- \to e^+ e^- \mu^+ \mu^-$	"
$e^+ e^- \to \gamma \gamma$	"
$e^+ e^- \to e^+ e^-$ hadrons	"
$e^+ e^- \to$ jets	"

Particles studied τ, $B(5270)$

Comments For a description of the apparatus, see the LBL-91 supplement on detectors.

Papers PRL 49 (1982) 106, PRL 50 (1983) 1238, PRL 50 (1983) 2054, PRL 51 (1983) 257, PRL 51 (1983) 1022, PR D28 (1983) 2721, PRL 52 (1984) 22, PR D31 (1985) 1537, PR D31 (1985) 2724, PRL 54 (1985) 95, PRL 54 (1985) 1118, PRL 54 (1985) 1620, PRL 54 (1985) 1624, PRL 54 (1985) 2477, PRL 55 (1985) 1831, PRL 55 (1985) 2118, PR

D33 (1986) 3472, PR D35 (1987) 1, PR D35 (1987) 10, PR D35 (1987) 374, PR D35 (1987) 408, and PRL 58 (1987) 640.

SLAC-PEP-012 (Oct 1977) Approved Jan 1978; Completed Mar 1986.

THE HIGH RESOLUTION SPECTROMETER AT PEP

ARGONNE - M Derrick, P Kooijman, B Musgrave, L Price, J Repond, K Sugano
INDIANA U - D Blockus, B Brabson, J-M Brom, H Ogren, H W Paik, D Rust
MICHIGAN U - C Akerlof, J Chapman, D Errede, M T Ken, D Meyer, D Nitz, R Thun, R Tschirhart
PURDUE U - S Abachi, P Baringer, R De Bonte, B G Bylsma, D Koltick, F Loeffler, E H Low, R McIlwain, D H Miller (√ Spokesperson), C R Ng, E Shibata
LBL - B Cork

Accelerator SLAC-PEP *Detector* HRS

Reactions

$e^+ e^-$	29 GeV (Ecm)

Particles studied τ, ν_τ, D^+, D^0, $D^*(2010)$, D_s^+

Comments Obtained a final data sample of 300/pb integrated luminosity. Published on all aspects of lepton and hadron production, such as charmed meson studies, rare τ decays and limit on the ν mass, electroweak tests, searches for new leptons, and detailed quark fragmentation studies. For a description of the apparatus, see the LBL-91 supplement on detectors.

Papers NIM 169 (1980) 413, NIM 186 (1981) 513, NIM 203 (1982) 119, PR D30 (1984) 515, PRL 53 (1984) 1971, PL 146B (1984) 261, PL 149B (1984) 519, PR D31 (1985) 1, PL 153B (1985) 116, PR D31 (1985) 2352, PRL 54 (1985) 1775, PRL 54 (1985) 2568, PRL 55 (1985) 570, PL 156B (1985) 271, PL 158B (1985) 519, PL 161B (1985) 412, PL 164B (1985) 199, PL 165B (1985) 449, PL 166B (1986) 463, PL 166B (1986) 468, PL 168B (1986) 299, NIM A249 (1986) 185, PRL 56 (1986) 1039, PRL 56 (1986) 1346, PRL 56 (1986) 1775, PR D34 (1986) 3286, PR D34 (1986) 3304, PRL 57 (1986) 1990, PL 181B (1986) 403, PL 182B (1986) 101, and PL 183B (1987) 232.

SLAC-PEP-014 Approved Jan 1978; Completed Jun 1981.

A SEARCH FOR FREE QUARKS AT PEP

LBL - D Chew, R Ely, T Pun, V Vuillemin
NORTHWESTERN U - R Fries, B Gobbi, W Guryn, D H Miller, M Ross
STANFORD U - D Besset, S Freedman, A Litke (Spokesperson), J Napolitano, T-C Wang
HAWAII U - F Harris, I Karliner, S Parker, D Yount
FRASCATI - A Marini, I Peruzzi, M Piccolo, F Ronga

Accelerator SLAC-PEP *Detector* Combination

Reactions

$e^+ e^- \rightarrow$ quark(1/3) $\overline{\text{quark}}$(1/3)	29 GeV (Ecm)
$e^+ e^- \rightarrow$ quark(1/3) X	"
$e^+ e^- \rightarrow$ quark(2/3) $\overline{\text{quark}}$(2/3)	"
$e^+ e^- \rightarrow$ quark(2/3) X	"

Particles studied quark(1/3), quark(2/3), tachyon

Comments Also looked for fractionally charged particles, tachyons, and massive particles in cosmic rays.

Papers PR D25 (1982) 2837, PRL 48 (1982) 1649, PR D26 (1982) 1777, PL 118B (1982) 199, and PL 139B (1984) 313.

SLAC-PEP-020 (Jun 1978) Approved Sep 1978.

DELCO AT PEP

CAL TECH - B Barish, S-C Gao, Y-Z Huang, D Koop, J Ludwig, G Mills, T Pal, L Rivkin, W Ruckstuhl, M Sakuda, S Sherman, E Siskind, R Stroynowski, H Yamamoto
SLAC - W Atwood, P Baillon, A Courau, H DeStaebler, R Dubois, E Elsen, R Johnson, H Kichimi, D Klem, A Ogawa, D Perret-Gallix, R Pitthan, C Prescott, L Rochester, R Taylor, S-Q Wang, C Young
STANFORD U - G Bonneaud, G Donaldson, M Duro, G Irwin, J Kirkby (Spokesperson), D Pollard, S Wojcicki, W-G Yan

Accelerator SLAC-PEP *Detector* DELCO

Reactions

$e^+ e^- \rightarrow e^+$ X	29 GeV (Ecm)
$e^+ e^- \rightarrow e^-$ X	"
$e^+ e^- \rightarrow e^+(s)\ e^-(s)$ X	"
$e^+ e^- \rightarrow$ hadrons	"
$e^+ e^- \rightarrow \tau^+ \tau^-$	"

Particles studied charm, bottom, τ

Comments Studies emphasize inclusive single and multiple electron production, jets using heavy flavor tagging, flavor production in quark and gluon jets, heavy particle lifetimes, and 2-γ interactions. For a description of the apparatus, see the LBL-91 supplement on detectors.

Papers PRL 52 (1984) 970, PRL 52 (1984) 1944, PRL 53 (1984) 1873, PL 147B (1984) 227, PRL 54 (1985) 522, PRL 54 (1985) 624, PR D32 (1985) 2901, PL 152B (1985) 399, PRL 56 (1986) 2132, PL 177B (1986) 109, and PR D33 (1986) 2708.

SLAC-PEP-021 (Mar 1983) Approved May 1983; Completed Jan 1986.

A SEARCH FOR $e^+e^- \rightarrow$ UNSEEN STATES USING PHOTON TAGGING

CERN - C Matteuzzi
BOSTON U - A Johnson, S Whitaker
SLAC - G Bartha, D Burke (√ Spokesperson), C Hawkins, M Jonker, L Keller, N Roe, T Steele, R Wilson
WASHINGTON U, SEATTLE - C Hearty, J Rothberg, K Young
FERMILAB - P Garbincius
PENN U - R Hollebeek (√ Spokesperson)
GENEVA U - P Extermann

Accelerator SLAC-PEP *Detector* Calorimeter

Reactions

$e^+ e^- \rightarrow \gamma$ X	29 GeV (Ecm)

Particles studied photino, s-electron, nuino, ν

Comments A search in particular for light particles predicted by supersymmetric theories. The photon is detected in a calorimeter of lead-glass blocks. No anomalous signal seen. Limit of $N_\nu < 7.5$ (90% CL) placed on number of neutrino generations with masses less than a few GeV.

Papers PRL 56 (1986) 685, and PRL (submitted).

SLAC-SLC-SLD (1983) Approved May 1984.

THE SLD DETECTOR FOR THE SLC

BRITISH COLUMBIA U - D Axen
INFN, BOLOGNA - A Benvenuti
BOSTON U - A Johnson, J S Whitaker, R Wilson
CAL TECH - F DeJongh, G Eigen, D Hitlin, C Matthews, A Mincer, W Wisniewski
UC, SANTA BARBARA - D Bauer, D O Caldwell, A Lu, R Morrison, R Stephens, M Witherell, S Yellin
UC, SANTA CRUZ - M Cavalli-Sforza, P Coyle, D Coyne, T Schalk, N Spencer
CINCINNATI U - R Endorf, R Johnson, B Meadows, M Nussbaum
COLORADO U - G Baranko, C Bogart, J Carr, L Cremaldi, M Gyure, U Nauenberg
COLUMBIA U - C Baltay (√ Spokesperson), L Camilleri, E Hyatt, S Manly, S Rabinowitz, P Rowson, M Shaevitz, S Smith, R Steiner
FERRARA U & INFN, BOLOGNA - G Callegari, L Piemontese

FRASCATI – A Calcaterra, R DeSangro, I Peruzzi, M Piccolo
ILLINOIS U, URBANA – J S Brown, G Gladding, L Pregernig, J J Thaler
MIT – W Busza, R Cowan, J Friedman, S Fuess, A Johnson, H Kendall, L S Osborne, A P T Palounek, L Rosenson, F Taylor, R Verdier, R K Yamamoto
MASSACHUSETTS U – S Hertzbach, R Kofler
PADUA U & INFN, PADUA – D Bisello, M Loreti
PERUGIA U & INFN, PERUGIA – B Alpat, R Battiston, G Bilei, P Cenci, G Mantovani, M Pauluzi, L Servoli
INFN, PISA – R Castaldi, C Vannini, P Verdini
RUTHERFORD – C Damerell, A Gillman, F Wickens
SAN FRANCISCO STATE U – C Hodges
SLAC – I Abt, W W Ash, V Ashford, D Aston, W Atwood, T Bienz, F Bird, M Breidenbach (√ Spokesperson), G Chadwick, W M Dunwoodie, S Ecklund, D Fryberger, R Gearhart, G Hallewell, T Hansl-Kozanecki, P F Kunz, D W G S Leith, H L Lynch, R L Messner, B Nielsen, C Y Prescott, B N Ratcliff, P Reutens, L Rochester, A Rothenberg, J Russell, R Schindler, D Schultz, S L Shapiro, D Sherden, R Stiening, N Toge, J Va'Vra, D E Wiser, C Young
TENNESSEE U – J Brau, W Bugg, A Weidemann
TRIUMF – G Ludgate, A Olin, C Oram
VANDERBILT U – A V Barnes, S E Csorna, R S Panvini, D Prindle, T Reeves
VICTORIA U – A Astbury, G A Beer, R Dubois, A Honma, R Keeler, G R Mason, L P Robertson, A Waite, E Young
WASHINGTON U, SEATTLE – V Cook, R J Davisson, P M Mockett, J Rothberg, J Rutherfoord, E Vella, R W Williams, K Young
WISCONSIN U – H Band, J R Johnson, T Maruyama, R Prepost

Accelerator SLAC-SLC *Detector* SLD

Reactions

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

Particles studied Z^0, higgs, top

Comments Follows the first-run work of the MARK-II at the SLC with a detector of greater capabilities. 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, including τ polarization, (3) investigation of particles with t quarks, (4) search for Higgs particles, (5) tests of QCD in multi-jets, and (6) search for new phenomena. For a description of the apparatus, see the LBL-91 supplement on detectors.

Papers NIM A238 (1985) 489, IEEE TNS 33 (1986) 46, IEEE TNS 33 (1986) 51, 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, and IEEE TNS 33 (1986) 261.

SLAC-SLC-6 (Apr 1983) Approved May 1983.

MARK II AT THE SLC

CAL TECH – B Barish, C Hawkes, K Kamemoto, B Millikan, C Peck, F Porter, F Soderstrom, R Stroynowski, A Weir, E Wicklund, R Wolf, D Wu
COLORADO U – W Ford, D Hinshaw, J Smith, S Wagner, P Weber, S White
HAWAII U – A Breakstone, R Cence, F Harris, S Parker
INDIANA U – D Blockus, B Brabson, J Brom, H Ogren, D Rust, A Snyder
JOHNS HOPKINS U – B Barnett, P Dauncey, B Harral, J Hylen, J Matthews, D Stoker
LBL – G Abrams, J Boyer, F Butler, P Drell, G Gidal, G Goldhaber (√ Spokesperson), R Harr, D Herrup, M Jaffre, I Juricic, J Kadyk, G Lynch, P Sheldon, G Trilling, D Wood
MICHIGAN U – G Bonvicini, J Chapman, R Frey, E Gero, W Koska, D Meyer, D Nitz, M Petradza, R Thun
UC, SANTA CRUZ – C Adolphsen, D Bannon, P Burchat, D Dorfan, C Heusch, J Kent, A Litke, H Sadrozinski, T Schalk, A Schwarz, A Seiden, S Watson, A Weinstein
SLAC – J Alexander, J Ballam, T Barklow, J Bartelt, A Boyarski, F Bulos, D Burke, D Cords, D Coupal, H DeStaebler, J Dorfan (√ Spokesperson), G Feldman (√ Spokesperson), D Fernandes, R Field, C Fordham, D Fujino, K K Gann, T Glanzman, P Grosse-Wiesmann, G Hanson, K Hayes, T Himel, D Hutchinson, W Innes, J Jaros, C-K Jung, D Karlen, S Klein, S Komamiya, R Van Kooten, W Kozanecki, A Lankford, R R Larsen, M Levi, V Luth, T Mattison, K Moffeit, J Nash, K O'Shaughnessy, T Ohama, R Ong, M Perl, F Perrier, A Petersen, R Pitthan, P Rankin, K Riles, P Voruganti, A Weigend

Accelerator SLAC-SLC *Detector* MARK-II

Reactions

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

Particles studied Z^0, higgs, top, τ

Comments 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, including τ polarization, (3) investigation of particles with t quarks, (4) search for Higgs particles, (5) tests of QCD in multi-jets, and (6) search for new phenomena. Scheduled to start May 87 and end June 89. For a description of the apparatus, see the LBL-91 supplement on detectors.

SLAC-SP-030 (Jun 1979) Approved Jul 1979; Completed 1981.

A LARGE SOLID ANGLE NEUTRAL DETECTOR FOR SPEAR II (THE CRYSTAL BALL)

SLAC – E D Bloom (Spokesperson), F Bulos, R Chestnut, G Godfrey, W Lockman, M Oreglia, D Scharre
STANFORD U – R Hofstadter, I Kirkbride, K Koenigsmann, J Tompkins
CAL TECH – C Peck, F Porter
HARVARD U – D Antreasyan, Y Gu, K Strauch, K Wacker, A Weinstein
PRINCETON U – D Aschman, M Cavalli-Sforza, D Coyne, H Sadrozinski

Accelerator SLAC-SPEAR *Detector* CRYS-BALL

Reactions

$e^+ e^- \rightarrow \gamma(s)$ X	3.0–8.4 GeV (E_{cm})
$e^+ e^- \rightarrow \pi^0$ X	"
$e^+ e^- \rightarrow \eta$ X	"

Particles studied $\eta_c(2980)$, J/ψ, $\psi(3685)$, $\eta(1440)$, $f_2(1720)$, $\eta_c(3590)$, χ(unspec)

Comments This is a continuation of SLAC-SP-024. The detector then went to DESY (see DESY-DORIS-CRYSTAL-BALL). For a description of the apparatus, see the LBL-91 supplement on detectors.

Papers Results from the crystal ball's career at SPEAR are summarized in ARNPS 33 (1983) 143. PRL 44 (1980) 712, PRL 45 (1980) 959, PRL 45 (1980) 1150, PRL 47 (1981) 760, PRL 48 (1982) 70, PRL 48 (1982) 458, PR D25 (1982) 2259, PL 110B (1982) 82, PR D25 (1982) 3065, PRL 48 (1982) 903, PRL 49 (1982) 259, PR D28 (1983) 2896, and PR D34 (1986) 711.

SLAC-SP-031 (1980) Approved Sep 1980; Completed Mar 1982.

CHECKOUT OF MARK III DETECTOR AT SPEAR

CAL TECH – R Baltrusaitis, J Hauser, D Hitlin (√ Spokesperson), J Richman
SLAC – K Bunnell, D Coward, K Einsweiler, D Hutchinson, R Mozley, A Odian, J Roehrig, W Toki, Y Unno, F Villa
UC, SANTA CRUZ – H Bledsoe, D Dorfan, R Fabrizio, F Grancagnolo, C Heusch, T Schalk, A Seiden, D Smith
ILLINOIS U, URBANA – J Becker, R Cassell, H Cui, B Eisenstein, G Gladding, J Kohlmeier, S Plaetzer, A Spadafora, J Thaler, A Wattenberg, W Wisniewski
WASHINGTON U, SEATTLE – T Burnett, V Cook, H Lubatti, H Moriyasu, C del Papa, J Rothberg, J Sleeman, H Willutski, D Wisinski

Accelerator SLAC-SPEAR *Detector* MARK-III

Reactions
$e^+ e^-$ —

Comments The actual experiment is SP-032. For a description of the apparatus, see the LBL-91 supplement on detectors.

SLAC-SP-032 (May 1981) Approved May 1981; Started Apr 1982.

MARK-III AT SPEAR

CAL TECH – G Dubois, G Eigen, D G Hitlin, C Matthews, A Mincer, W Wisniewski, Y Zhu
SLAC – T Bolton, J C Brient, K Bunnell, R E Cassell, D Coward, C Grab, U Mallik, R Mozley, A Odian, J Parker, D Pitman, R Schindler (√ Spokesperson), W Stockhausen, W Toki (√ Spokesperson), F Villa, S Wasserbaech, D E Wisinski
UC, SANTA CRUZ – M Burchell, G Corrado, D Dorfan, C Heusch, W Lockman, H Sadrozinski, M Scarlatella, T Schalk, A Seiden, A Weinstein, R C Xu
ILLINOIS U, URBANA – B Eisenstein, T Freese, G Gladding, J Izen, C Simopoulos, E Stockdale, B Tripsas, A Wattenberg
WASHINGTON U, SEATTLE – T Burnett, V Cook, A D Li, R Mir, P Mockett, B Nemati, L Parrish

Accelerator SLAC-SPEAR *Detector* MARK-III

Reactions
$e^+ e^-$ 3.097, 3.686, 3.770, 4–5 GeV (E_{cm})

Particles studied D^0, D^+, D^-, D_s^+, $\psi(3770)$, J/ψ, $\psi(3685)$, $\eta_c(2980)$, $X(2220)$

Comments For a description of the apparatus, see the LBL-91 supplement on detectors.

Papers PRL 52 (1984) 2126, PRL 54 (1985) 1976, PR D31 (1985) 2192, 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, and PRL 56 (1986) 2140.

TRIUMF-009 (Sep 1972) Approved Sep 1972; Completed 1982.

PION RADIATIVE CAPTURE AND CHARGE EXCHANGE IN FLIGHT

TRIUMF – J-M Poutissou, M Salomon
BRITISH COLUMBIA U – K Aniol, A Bagheri, F Entezami, M Hasinoff, D F Measday (√ Spokesperson), B Robertson, C Virtue

Accelerator TRIUMF *Detector* Photon spectrometer

Reactions
$\pi^- p \to n \gamma$ 77–220 MeV/c
$\pi^- p \to \pi^0 n$ "

Papers NP A414 (1984) 493, and CZJP B32 (1982) 138.

TRIUMF-052 (Nov 1976) Completed 1981.

A NEW MEASUREMENT OF THE $\pi \to e\nu$ BRANCHING RATIO — A TEST OF THE STANDARD MODEL

NATIONAL RESEARCH COUNCIL, OTTAWA – M S Dixit
TRIUMF & VICTORIA U – D A Bryman (Spokesperson), R Dubois, T Numao, B Olaniyi, A Olin
TRIUMF & BRITISH COLUMBIA U – D Berghofer, J-M Poutissou
TRIUMF – J A Macdonald
QUEENS U, KINGSTON – B C Robertson

Accelerator TRIUMF *Detector* Counter

Reactions
$\pi^+ \to e^+ \nu_e$ 0 GeV/c
$\pi^+ \to \mu^+ \nu_\mu$ "

Particles studied π^+

Comments The experiment continues as TRIUMF-248.

Papers PRL 50 (1983) 7, PRL 50 (1983) 1546, and PR D33 (1986) 1211.

TRIUMF-104 (Nov 1978) Approved Nov 1978; Completed 1986.

SEARCH FOR MUON-ELECTRON CONVERSION AT TRIUMF

TRIUMF & VICTORIA U – D A Bryman (Spokesperson), M Leitch, I Navon, T Numao
LOS ALAMOS – H L Anderson
MONTREAL U – G Azuelos, P Depommier, J P Martin, R Poutissou
VIRGINIA TECH – M Blecher, K Gotow
NATIONAL RESEARCH COUNCIL, OTTAWA – C K Hargrove, H Mes
BRITISH COLUMBIA U – R A Burnham, M Hasinoff, J M Poutissou
TRIUMF – J A Macdonald, J Spuller
CHICAGO U – C S Wright

Accelerator TRIUMF *Detector* TPC

Reactions
μ^- nucleus $\to e^-$ nucleus 0 GeV/c

Papers NIM 219 (1984) 461, NIM 234 (1985) 42, and PRL 55 (1985) 445.

TRIUMF-121 (Jun 1979)

TEST OF CHARGE SYMMETRY IN np SCATTERING

MANITOBA U – J Birchall, C A Davis, N E Davison, H P Gubler, W P Lee, W T H van Oers (√ Spokesperson), P R Poffenberger, J P Svenne, Y P Zhang
BASEL U – G R Plattner
TRIUMF – R Abegg, P P J Delheij, D C Healey, C A Miller, G D Wait
ALBERTA U – E B Cairns, G H Coombes, P W Green, L G Greeniaus, W J McDonald, G A Moss, G Roy, J Soukup, R Tkachuk

Accelerator TRIUMF *Detector* Wire chamber, Counter

Reactions Polarized beam and target
$n\,p \to n\,p$ 480 MeV (T_{lab})

Comments Studies the isospin-mixing, charge-symmetry-breaking component of the np interaction by measuring the difference between the neutron and proton analyzing powers. Polarized (unpolarized) neutrons are scattered from an unpolarized (polarized) proton target.

Papers NIM A234 (1985) 11, NIM A234 (1985) 20, and PRL 56 (1986) 2571.

TRIUMF-132-192 (Jun 1981) Approved Jun 1981; Completed 1983.

MEASUREMENT OF THE PION PRODUCTION ASYMMETRIES AND CROSS SECTIONS FROM REACTION $pp \to d\pi^+$ WITH A POLARIZED PROTON BEAM AT ENERGIES 350–500 MeV

TRIUMF – D Ottewell, P Walden (Spokesperson)
MANITOBA U – W Falk
BRITISH COLUMBIA U – E G Auld, G Giles, G Jones, G Lolos, B McParland, W Ziegler

Accelerator TRIUMF *Detector* Counter, Wire chamber

Reactions Polarized beam
$p\,p \to$ deut π^+ 350–500 MeV (T_{lab})
$p\,p \to p\,p$ "

Papers PR C28 (1983) 2551, and NP A412 (1984) 189.

TRIUMF-134 (1980) Approved Jun 1980.

MEASUREMENT OF THE PARAMETER η IN MUON DECAY

LBL – J A Bistirlich, R R Bossingham, A D Chacon, C W Clawson, K M Crowe (Spokesperson), T J Humanic, C J Martoff, C A Meyer, J Miller
SIN – J A Jansen
BRITISH COLUMBIA U – J H Brewer, R Keitel, M Salomon
ZURICH U – U Straumann

Accelerator TRIUMF *Detector* Spectrometer

Reactions Polarized beam
$\mu^+ \rightarrow e^+ \nu \bar{\nu}$ 0 GeV/c

Particles studied μ^+

TRIUMF-137 (Nov 1978) Approved Nov 1978.

LIFETIME OF THE POSITIVE MUON

WILLIAM AND MARY COLL – W Dey, M Eckhause (√ Spokesperson), K Giovanetti, R D Hart, R Hartmann, D Hertzog, J R Kane, W Orance, W Phillips, R Siegel, W Vulcan, R E Welsh, R G Winter

Accelerator TRIUMF *Detector* Counter

Reactions
$\mu^+ \rightarrow e^+ \nu \bar{\nu}$ 0 GeV/c

Particles studied μ^+

Papers PR D29 (1984) 343.

TRIUMF-168 (1980) Approved Nov 1980.

2S MUONIUM PRODUCTION FROM THIN FOILS

BRITISH COLUMBIA U – J H Brewer, A Fry, R Kiefl, G Marshall, C Oram (Spokesperson), J B Warren

Accelerator TRIUMF *Detector* ?

Reactions
$\mu^+ e^- \rightarrow \mu^+ e^- \gamma$ —

Comments Measurement of Lamb shift in 2S muonium.

Papers JPHY B14 (1981) L789, and PRL 52 (1984) 910.

TRIUMF-171 (Nov 1980) Approved Nov 1980; Completed 1982.

TEST OF T-INVARIANCE IN pp SCATTERING

TRIUMF – D P Gurd, D A Hutcheon (Spokesperson), C A Miller
MANITOBA U – R Abegg
ALBERTA U – J M Cameron, G Greeniaus, R Liljestrand, G A Moss, G Roy, H Wilson

Accelerator TRIUMF *Detector* Counter

Reactions Polarized beam
$p\,p \rightarrow p\,p$ 200 MeV (T_{lab})

Comments Measures P-A.

Papers PR C33 (1986) 1196.

TRIUMF-174 (Nov 1980) Approved Nov 1980.

SPIN DEPENDENCE OF THE $pp \rightarrow pn\pi^+$ REACTION

BRITISH COLUMBIA U – D A Axen (Spokesperson), M Comyn, R Dubois, C Waltham
QUEEN MARY COLL – D V Bugg, J A Edgington
SURREY U – A S Clough
TRIUMF – G Ludgate
UCLA – J R Richardson
VICTORIA U – L P Robertson
BEDFORD COLL – N M Stewart

Accelerator TRIUMF *Detector* Wire chamber

Reactions Polarized beam and target
$p\,p \rightarrow p\,n\,\pi^+$ 380, 425, 470, 515 MeV (T_{lab})

Comments Measures cross sections in spin states C_{NN}, C_{SS}, C_{LL}, and C_{LS}.

TRIUMF-182

MEASUREMENT OF THE np SPIN CORRECLATION PARAMETER A_{nn}

TRIUMF – R Abegg, L G Greeniaus, C A Miller
MANITOBA U – J Birchall, N E Davison, H P Gubler (Spokesperson), W P Lee, W T H van Oers (Spokesperson), P R Poffenberger
ALBERTA U – P W Green, G A Moss, G Roy, G M Stinson, J Wesick

Accelerator TRIUMF *Detector* ?

Reactions Polarized beam and target
$n\,p \rightarrow n\,p$ 237, 343, 445, 515 MeV (T_{lab})

TRIUMF-185 (Jun 1980) Started 1981.

PRECISE MEASUREMENT OF THE POLARIZATION PARAMETER ξ: A SEARCH FOR THE EFFECTS OF A RIGHT-HANDED GAUGE BOSON IN μ^+ DECAY

UC, BERKELEY & LBL – B Balke, J Carr, G Gidal, A Jodidio, K Shinsky, H M Steiner, D P Stoker, M Strovink (√ Spokesperson), R D Tripp
TRIUMF – C Oram
NORTHWESTERN U – B Gobbi

Accelerator TRIUMF *Detector* Counter

Reactions
$\mu^+ \rightarrow e^+ \nu \bar{\nu}$ 30 MeV/c

Particles studied μ^+

Papers PRL 51 (1983) 627, PRL 54 (1985) 1887, and PR D34 (1986) 1967.

TRIUMF-190 (Jun 1981) Approved Jun 1981.

RADIATIVE POLARIZED NEUTRON CAPTURE ON PROTONS

ALBERTA U – J M Cameron (√ Spokesperson), I J Van Heerden, P Kitching, W J McDonald, J Soukup, H Wilson
MANITOBA U – R Abegg
TRIUMF – D A Hutcheon, C A Miller
OREGON STATE U – A W Stetz

Accelerator TRIUMF *Detector* Counter

Reactions Polarized beam
$n\,p \rightarrow \text{deut}\,\gamma$ 180–500 MeV (T_{lab})

Comments Measures cross section and analyzing power.

Papers PL 137B (1984) 315.

TRIUMF-205 (Nov 1981) Approved Jul 1982; Completed.

TENSOR ANALYZING POWER IN πd SCATTERING

SASKATCHEWAN U – L Dallin, K Itoh, Y M Shin (√ Spokesperson)
BRITISH COLUMBIA U – K Aniol, K L Erdman, W Gyles, R R Johnson, G Lolos, R Tacik
TRIUMF – E W Blackmore, D Gill, J S Vincent
TORONTO U – T E Drake
MCGILL U – S K Mark
KERNFORSCHUNGSANLAGE, JULICH – S Martin

Accelerator TRIUMF *Detector* Counter

Reactions
$\pi^+ \text{deut} \rightarrow \pi^+ \text{deut}$ 80–250 MeV (T_{lab})

Comments Measures the polarization of the final-state deuteron.

Papers PRL 55 (1985) 2672.

TRIUMF-208 (Jul 1982) Approved Dec 1982.

PROTON-PROTON BREMSSTRAHLUNG

ALBERTA U – R Abegg, E B Cairns, J M Cameron, H C Coombes, C A Davis, G Gaillard, P W Green,

L G Greeniaus, M Hugi, D A Hutcheon, P Kitching (√ Spokesperson), K Michaelian, C A Miller, G C Neilson, W C Olsen, D M Sheppard, J Soukup, J Uegaki, J Wesick
TRIUMF – H W Fearing
BRITISH COLUMBIA U – R Workman

Accelerator TRIUMF *Detector* Counter

Reactions Polarized beam

$p\ p \rightarrow p\ p\ \gamma$	775 MeV/c

Comments Measures differential cross section and analyzing power. Data taking at 775 MeV/c completed July 85. Runs at higher momenta are planned for 1987/88.

Papers PRL 57 (1986) 2363.

TRIUMF-217 (Jul 1982) Approved Jul 1982.

LOW ENERGY, ELECTROMAGNETIC PION FORM FACTORS

TRIUMF – J-M Poutissou (√ Spokesperson)
OREGON STATE U – P Gumplinger, A W Stetz
BRITISH COLUMBIA U – M D Hasinoff, C Virtue, C Waltham
QUEENS U, KINGSTON – B C Robertson
LBL – T Mulera, V Perez-Mendez, A F Shor
OXFORD U – S H Chew
BIRMINGHAM U – J Lowe

Accelerator TRIUMF *Detector* Counter

Reactions

$\pi^-\ p \rightarrow \pi^0\ n$	0 GeV/c
$\pi^0 \rightarrow e^+\ e^-\ \gamma$	—

Particles studied π^0

Comments A measurement of the slope parameter of the electromagnetic form factor of the π^0 at very low momentum transfers based on the shape and rate of the invariant mass distribution of e^+e^- pairs. Analysis in progress (October 86).

TRIUMF-247 (Jul 1983) Approved Jul 1983; Started Jan 1984; Completed Feb 1984.

PRECISE MEASUREMENT OF MUON DECAY ASYMMETRY PARAMETER δ

LBL – J Carr (Spokesperson), G Gidal
UC, BERKELEY & LBL – B Balke, A Jodidio, K A Shinsky, H M Steiner, D Stoker, M Strovink, R D Tripp
NORTHWESTERN U – B Gobbi
TRIUMF – C J Oram

Accelerator TRIUMF *Detector* ?

Reactions

$\mu^+ \rightarrow e^+\ \nu_e\ \bar{\nu}_\mu$	0 MeV/c

Particles studied μ^+

TRIUMF-248 (Jul 1983) Approved Jul 1983; Started Oct 1983.

A STUDY OF THE $\pi^+ \rightarrow e^+\nu_e$ DECAY

VICTORIA U – D Britton, D A Bryman, E T H Clifford, A Olin
NATIONAL RESEARCH COUNCIL, OTTAWA – M S Dixit
TRIUMF – S Ahmad, Y Kuno, J A Macdonald, T Numao (Spokesperson)
BRITISH COLUMBIA U – J M Poutissou
ALBERTA U – P Kitching
IFE U – B Olaniyi

Accelerator TRIUMF *Detector* Photon spectrometer

Reactions

$\pi^+ \rightarrow e^+\ \nu_e$	70 MeV/c
$\pi^+ \rightarrow \mu^+\ \nu_\mu$	"
$\mu^+ \rightarrow e^+\ \bar{\nu}\ \nu$	52 MeV/c

Particles studied π^+

Comments A measurement of branching ratios to test universality in weak interactions, and a search for secondary peaks.

Papers PRL 56 (1986) 2241.

TRIUMF-249 (Jul 1983)

RADIATIVE MUON CAPTURE ON HYDROGEN

TRIUMF – S Ahmad, G Azuelos (Spokesperson), J A MacDonald, J M Poutissou
VIRGINIA TECH – M Blecher, D Wright
BRITISH COLUMBIA U – D Armstrong, A Burnham, T Gorringe, M K Hasinoff, A Larabee, C Waltham
MONTREAL U – P Depommier, R Poutissou
QUEENS U, KINGSTON – B Robertson
VICTORIA U – E T C Clifford
BEIJING, IHEP – W S Zhang

Accelerator TRIUMF *Detector* Wire chamber

Reactions

$\mu^-\ p \rightarrow n\ \nu_\mu\ \gamma$	—

Comments In preparation (November 86).

TRIUMF-277 (Jul 1984) Approved Jul 1984.

THE BRANCHING RATIO OF THE RARE DECAY $\pi^0 \rightarrow e^+e^-$

MONTREAL U – G Azuelos, P Depommier, H Jeremie, R Poutissou
VIRGINIA TECH – M Blecher
TRIUMF & VICTORIA U – D A Bryman, E Clifford, T Numao
NATIONAL RESEARCH COUNCIL, OTTAWA – C K Hargrove, H Mes
TRIUMF & BRITISH COLUMBIA U – M D Hasinoff, J-M Poutissou, C E Waltham (Spokesperson)
LBL – T A Mulera, V Perez-Mendez
QUEENS U, KINGSTON – B Robertson
OREGON STATE U – A W Stetz

Accelerator TRIUMF *Detector* TPC

Reactions

$\pi^0 \rightarrow e^+\ e^-$	—

Particles studied π^0

Comments A test of the feasibility of measuring the rare decay mode.

TRIUMF-287 (Oct 1984) Approved Dec 1984.

MEASUREMENT OF PARITY VIOLATION IN $\vec{p}p$ SCATTERING

TRIUMF – D A Dohan, D C Healey, C A Miller, P W Schmor
MANITOBA U – J Birchall (√ Spokesperson), C A Davis, N E Davison, W T H van Oers, S A Page, W D Ramsay
LOS ALAMOS – J D Bowman
ALBERTA U – G H Combes, W J McDonald, G Roy (√ Spokesperson), J Soukup, G M Stinson
UC, IRVINE – W P Lee
WASHINGTON U, SEATTLE – E G Adelberger

Accelerator TRIUMF *Detector* Wire chamber

Reactions Polarized beam

$p\ p \rightarrow p\ p$	230 MeV (T_{lab})

Comments Measures the analyzing power angular distribution.

TRIUMF-297

ENERGETIC NEUTRON SPECTRA FROM μ^- CAPTURE IN DEUTERON

JOHNS HOPKINS U – T J Hallman, Y K Lee (√ Spokesperson), L Madansky, E K McIntyre, Jr
VICTORIA U – G R Mason

Accelerator TRIUMF *Detector* Counter

Reactions
μ^- deut $\rightarrow n\ n$ 0 MeV/c

Comments Taking data (November 86).

Papers PL B (submitted).

TRIUMF-298 (Dec 1984) Approved Dec 1984.

RESONANT STRUCTURE IN Cu$(p,\pi^+)X$: A POSSIBLE DIBARYON SIGNAL

TRIUMF - D Gill, D Ottewell, S Yen (✓ Spokesperson)
TRIUMF & SIMON FRASER U - K Hicks, K P Jackson
TRIUMF & ALBERTA U - R Abegg, G Gaillard, C A Miller
TRIUMF & BRITISH COLUMBIA U - P Walden
TORONTO U - R Schubank
MELBOURNE U - R Henderson
BRITISH COLUMBIA U - E Auld, P Trelle
REGINA U - G Huber

Accelerator TRIUMF *Detector* Spectrometer

Reactions
p Cu $\rightarrow \pi^+$ X 325–385 MeV (T_{lab})

Particles studied dibaryon

Comments Last data taken August 85. More to come.

TRIUMF-300 (Oct 1984)

SPIN TRANSFER K_{SS} IN THE REACTION $pp \rightarrow d\pi^+$

ALBERTA U & TRIUMF - R Abegg, L G Greeniaus, D A Hutcheon (Spokesperson)
ALBERTA U - L Antonuk, J M Cameron, J Collot, G Gaillard, G A Moss, W C Olsen, G Roy, R Sawafta, D M Sheppard
BRITISH COLUMBIA U - G R Smith
INDIANA U - B Blankleider

Accelerator TRIUMF *Detector* Spectrometer

Reactions Polarized beam
$p\ p \rightarrow$ deut π^+ 510 MeV (T_{lab})

Comments In progress.

TRIUMF-301 (Oct 1984) Completed Sep 1986.

THE REACTION $pp \rightarrow pp\pi^0$ NEAR THRESHOLD

BRITISH COLUMBIA U - D F Measday (✓ Spokesperson), A J Noble, S Stanislaus
BUDAPEST, CRIP - D Horvath
TRIUMF - M Salomon

Accelerator TRIUMF *Detector* Photon spectrometer

Reactions
$p\ p \rightarrow p\ p\ \pi^0$ 280, 500 MeV (T_{lab})

Comments Measures the π^0 asymmetry and differential and total cross sections.

TRIUMF-303

TENSOR ANALYZING POWERS IN πd ABSORPTION

REGINA U - L G Greenberg, G Huber, G J Lolos, E L Mathie (Spokesperson), S I H Naovi, V Pafilis, Z Papandreou
BRITISH COLUMBIA U - R R Johnson, G Jones
TRIUMF - P Delheig, D Healey, D Ottewell, G R Smith, P Trelle, G Wait, P Walden

Accelerator TRIUMF *Detector* Counter, Wire chamber

Reactions Polarized target
π^+ deut $\rightarrow p\ p$ —

TRIUMF-304 (Oct 1984) Approved Dec 1984; Started Jul 1985.

MUONIUM-ANTIMUONIUM CONVERSION

VICTORIA U - G A Beer, G M Marshall, G R Mason, A Olin (✓ Spokesperson)
BRITISH COLUMBIA U - J B Warren
ARIZONA U - T Bowen, P Halverson, A E Pifer
WYOMING U - T Huber, A R Kunselman
TRIUMF - K Kendall

Accelerator TRIUMF *Detector* Wire chamber, Counter

Reactions
$\mu^+\ e^- \rightarrow \mu^-\ e^+$ 20–29 MeV/c

Papers PRL 57 (1986) 611.

TRIUMF-326 (Dec 1984) Approved Dec 1984.

DETERMINATION OF THE ν_μ MASS

CALGARY U - C Kim (✓ Spokesperson)
TRIUMF - D Garner, R Keitel
SASKATCHEWAN U - Y M Shin

Accelerator TRIUMF *Detector* Emulsion

Reactions
μ^- ^{6}Li $\rightarrow$ trit trit ν_μ 0 MeV/c

Particles studied ν_μ

Comments Expected to run in 1987.

TRIUMF-332 (Oct 1984)

D_t/R_t

MANITOBA U - J Birchall, N E Davison, W T H van Oers, P R Poffenberger, D Ramsey
MANITOBA U & TRIUMF - C A Davis (Spokesperson)
ALBERTA U - G Moss, G Roy
ALBERTA U & TRIUMF - G Greeniaus

Accelerator TRIUMF *Detector* ?

Reactions Polarized beam
p deut $\rightarrow n\ p\ p$ 220, 325, 425, 495 MeV (T_{lab})

Comments Measures the ratio of the Wolfenstein parameters D_t and R_t for the np system.

TRIUMF-337 (Dec 1984) Approved Dec 1984; Completed Dec 1986.

MEASUREMENT OF TENSOR OBSERVABLES IN THE $\pi^+ \vec{d}$ ELASTIC SCATTERING REACTION

TRIUMF - P Delheij, D Gill, D Healey, D Ottewell, G R Smith (Spokesperson), G Wait, P Walden
REGINA U - G Lolos, E L Mathie
BRITISH COLUMBIA U - A Altman, R R Johnson, G Jones, F Teruisidis, P Trelle

Accelerator TRIUMF *Detector* Counter

Reactions Polarized target
π^+ deut $\rightarrow \pi^+$ deut 100–294 MeV (T_{lab})

Papers PRL 57 (1986) 803.

TRIUMF-360 (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})

TRIUMF-368 Approved Dec 1985.

CHARGE SYMMETRY BREAKING IN $p(n,d)\pi^0$ AT 477 MeV

TRIUMF - R Abegg, P W Green, L G Greeniaus (✓ Spokesperson), D A Hutcheon, C A Miller, G M Stinson

ALBERTA U - J M Cameron, C Lapointe, G A Moss, G C Neilson, W C Olsen, D M Sheppard
MANITOBA U & TRIUMF - C A Davis
MANITOBA U - W T H van Oers

Accelerator TRIUMF *Detector* Spectrometer

Reactions

$n\ p \rightarrow$ deut π^0	477 MeV (T_{lab})
$p\ p \rightarrow$ deut π^+	"

Comments Measures the forward-backward asymmetry in $p(n,d)\pi^0$. Systematic errors are corrected by comparison with the charge symmetric reaction $p(p,d)\pi^+$. The result is sensitive to π-η mixing and the η-nucleon coupling constant. In preparation (November 86).

TRIUMF-369 (Dec 1985) Approved Dec 1985.

CHARGE SYMMETRY BREAKING IN *np* ELASTIC SCATTERING AT 350 MeV

TRIUMF - R Abegg, P W Green, L G Greeniaus (√ Spokesperson), C A Miller
MANITOBA U - J Birchall, C Davis, W T H van Oers (√ Spokesperson), W D Ramsay
ALBERTA U - C Lapointe, W J McDonald, G A Moss, R Tkachuk (√ Spokesperson)

Accelerator TRIUMF *Detector* Counter, Wire chamber

Reactions Polarized beam and target

$n\ p \rightarrow n\ p$	350 MeV (T_{lab})

Comments Measures analyzing power differences.

TRIUMF-372 Approved Dec 1985.

SINGLE PION PRODUCTION IN *np* SCATTERING

MANITOBA U - J Birchall, C A Davis, N E Davison (√ Spokesperson), W R Falk, W T H van Oers, S A Page, W D Ramsay
TRIUMF - P W Green, D A Hutcheon, C A Miller, P L Walden
DAWSON COLLEGE - M Suec
TEXAS U - P J Riley
HOUSTON U - B W Mayes, L Pinsky
RICE U - G W Mutchler, G C Phillips
CAL STATE, L A - D J Margaziotis

Accelerator TRIUMF *Detector* Wire chamber, Counter

Reactions Polarized beam

$n\ p \rightarrow p\ p\ \pi^-$	450 MeV (T_{lab})

TRIUMF-375

FEW BODY PHYSICS VIA THE PION-DEUTERON BREAKUP REACTION

REGINA U - G Huber, G J Lolos, E L Mathie (Spokesperson), S I H Naqui, V Palitis, Z Papandreou
BRITISH COLUMBIA U - G Jones, M 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 $\rightarrow$ pion $p\ n$	—

TRIUMF-377 Approved Dec 1985; Completed Aug 1986.

TEST OF CHARGE SYMMETRY IN πd ELASTIC SCATTERING

TRIUMF - D Gill, D F Ottewell, G R Smith (Spokesperson), P L Walden
BRITISH COLUMBIA U - A Altman, R R Johnson, G Jones, F Tervisidis, P Trelle
COLORADO U - J J Kraushar, R J Peterson, R A Ristinen, J L Ullmann

Accelerator TRIUMF *Detector* Counter

Reactions

π^+ deut $\rightarrow \pi^+$ deut	143-256 MeV (T_{lab})
π^- deut $\rightarrow \pi^-$ deut	"

Comments Measures differential cross sections and A_π.

TRIUMF-387 (Nov 1985) Approved Dec 1985.

MEASURE OF BIRKS FACTOR IN TMP

VICTORIA U - A Astbury (Spokesperson), M Fincke-Keeler, R Keeler, G Mason, L Robertson
CERN - D Schinzel
ANNECY - A Gonidec
TRIUMF - C J Oram

Accelerator TRIUMF *Detector* ?

Reactions

π^+	50-400 MeV/c
μ^+	"
e^+	"
p	"
deut	"
trit	"
^{3}He	"

TRIUMF-394 (Jul 1986) Approved Jul 1986; Completed 1986.

$\pi^\pm p$ DIFFERENTIAL CROSS SECTIONS FROM 20 TO 65 MeV KINETIC ENERGY

COLORADO U - J T Brack, J J Kraushaar, R A Loveman, R J Peterson, R A Ristinen (√ Spokesperson), J L Ullmann
TRIUMF - D R Gill (√ Spokesperson)
BRITISH COLUMBIA U - R R Johnson, R Olszewski, M Sevior, G R Smith, R P Trelle
REGINA U - E L Mathie

Accelerator TRIUMF *Detector* Counter

Reactions

$\pi^+\ p \rightarrow \pi^+\ p$	20-65 MeV (T_{lab})
$\pi^-\ p \rightarrow \pi^-\ p$	"

Comments Approval was for a test of the technique, which works. Further beam time will be requested.

TRIUMF-249 (Jul 1983)

RADIATIVE MUON CAPTURE ON HYDROGEN

TRIUMF - S Ahmad, G Azuelos (Spokesperson), J A MacDonald, J M Poutissou
VIRGINIA TECH - M Blecher, D Wright
BRITISH COLUMBIA U - D Armstrong, A Burnham, T Gorringe, M K Hasinoff, A Larabee, C Waltham
MONTREAL U - P Depommier, R Poutissou
QUEENS U, KINGSTON - B Robertson
VICTORIA U - E T C Clifford
BEIJING, IHEP - W S Zhang

Accelerator TRIUMF *Detector* Wire chamber

Reactions

$\mu^-\ p \rightarrow n\ \nu_\mu\ \gamma$	—

Comments In preparation (November 86).

TRIUMF-277 (Jul 1984) Approved Jul 1984.

THE BRANCHING RATIO OF THE RARE DECAY $\pi^0 \rightarrow e^+e^-$

MONTREAL U - G Azuelos, P Depommier, H Jeremie, R Poutissou
VIRGINIA TECH - M Blecher
TRIUMF & VICTORIA U - D A Bryman, E Clifford, T Numao
NATIONAL RESEARCH COUNCIL, OTTAWA - C K Hargrove, H Mes
TRIUMF & BRITISH COLUMBIA U - M D Hasinoff, J-M Poutissou, C E Waltham (Spokesperson)

LBL – T A Mulera, V Perez-Mendez
QUEENS U, KINGSTON – B Robertson
OREGON STATE U – A W Stetz

Accelerator TRIUMF *Detector* TPC

Reactions
$\pi^0 \rightarrow e^+ e^-$ —

Particles studied π^0

Comments A test of the feasibility of measuring the rare decay mode.

TRIUMF-287 (Oct 1984) Approved Dec 1984.

MEASUREMENT OF PARITY VIOLATION IN $\vec{p}p$ SCATTERING

TRIUMF – D A Dohan, D C Healey, C A Miller, P W Schmor
MANITOBA U – J Birchall (√ Spokesperson), C A Davis, N E Davison, W T H van Oers, S A Page, W D Ramsay
LOS ALAMOS – J D Bowman
ALBERTA U – G H Combes, W J McDonald, G Roy (√ Spokesperson), J Soukup, G M Stinson
UC, IRVINE – W P Lee
WASHINGTON U, SEATTLE – E G Adelberger

Accelerator TRIUMF *Detector* Wire chamber

Reactions Polarized beam
$p\ p \rightarrow p\ p$ 230 MeV (T_{lab})

Comments Measures the analyzing power angular distribution.

TRIUMF-297

ENERGETIC NEUTRON SPECTRA FROM μ^- CAPTURE IN DEUTERON

JOHNS HOPKINS U – T J Hallman, Y K Lee (√ Spokesperson), L Madansky, E K McIntyre, Jr
VICTORIA U – G R Mason

Accelerator TRIUMF *Detector* Counter

Reactions
μ^- deut $\rightarrow n\ n$ 0 MeV/c

Comments Taking data (November 86).

Papers PL B (submitted).

TRIUMF-298 (Dec 1984) Approved Dec 1984.

RESONANT STRUCTURE IN Cu$(p,\pi^+)X$: A POSSIBLE DIBARYON SIGNAL

TRIUMF – D Gill, D Ottewell, S Yen (√ Spokesperson)
TRIUMF & SIMON FRASER U – K Hicks, K P Jackson
TRIUMF & ALBERTA U – R Abegg, G Gaillard, C A Miller
TRIUMF & BRITISH COLUMBIA U – P Walden
TORONTO U – R Schubank
MELBOURNE U – R Henderson
BRITISH COLUMBIA U – E Auld, P Trelle
REGINA U – G Huber

Accelerator TRIUMF *Detector* Spectrometer

Reactions
p Cu $\rightarrow \pi^+$ X 325–385 MeV (T_{lab})

Particles studied dibaryon

Comments Last data taken August 85. More to come.

TRIUMF-300 (Oct 1984)

SPIN TRANSFER K_{SS} IN THE REACTION $pp \rightarrow d\pi^+$

ALBERTA U & TRIUMF – R Abegg, L G Greeniaus, D A Hutcheon (Spokesperson)
ALBERTA U – L Antonuk, J M Cameron, J Collot, G Gaillard, G A Moss, W C Olsen, G Roy, R Sawafta, D M Sheppard
BRITISH COLUMBIA U – G R Smith
INDIANA U – B Blankleider

Accelerator TRIUMF *Detector* Spectrometer

Reactions Polarized beam
$p\ p \rightarrow$ deut π^+ 510 MeV (T_{lab})

Comments In progress.

TRIUMF-301 (Oct 1984) Completed Sep 1986.

THE REACTION $pp \rightarrow pp\pi^0$ NEAR THRESHOLD

BRITISH COLUMBIA U – D F Measday (√ Spokesperson), A J Noble, S Stanislaus
BUDAPEST, CRIP – D Horvath
TRIUMF – M Salomon

Accelerator TRIUMF *Detector* Photon spectrometer

Reactions
$p\ p \rightarrow p\ p\ \pi^0$ 280, 500 MeV (T_{lab})

Comments Measures the π^0 asymmetry and differential and total cross sections.

TRIUMF-303

TENSOR ANALYZING POWERS IN πd ABSORPTION

REGINA U – L G Greenberg, G Huber, G J Lolos, E L Mathie (Spokesperson), S I H Naovi, V Pafilis, Z Papandreou
BRITISH COLUMBIA U – R R Johnson, G Jones
TRIUMF – P Delheig, D Healey, D Ottewell, G R Smith, P Trelle, G Wait, P Walden

Accelerator TRIUMF *Detector* Counter, Wire chamber

Reactions Polarized target
π^+ deut $\rightarrow p\ p$ —

TRIUMF-304 (Oct 1984) Approved Dec 1984; Started Jul 1985.

MUONIUM-ANTIMUONIUM CONVERSION

VICTORIA U – G A Beer, G M Marshall, G R Mason, A Olin (√ Spokesperson)
BRITISH COLUMBIA U – J B Warren
ARIZONA U – T Bowen, P Halverson, A E Pifer
WYOMING U – T Huber, A R Kunselman
TRIUMF – K Kendall

Accelerator TRIUMF *Detector* Wire chamber, Counter

Reactions
$\mu^+ e^- \rightarrow \mu^- e^+$ 20–29 MeV/c

Papers PRL 57 (1986) 611.

TRIUMF-326 (Dec 1984) Approved Dec 1984.

DETERMINATION OF THE ν_μ MASS

CALGARY U – C Kim (√ Spokesperson)
TRIUMF – D Garner, R Keitel
SASKATCHEWAN U – Y M Shin

Accelerator TRIUMF *Detector* Emulsion

Reactions
μ^- ^{6}Li $\rightarrow$ trit trit ν_μ 0 MeV/c

Particles studied ν_μ

Comments Expected to run in 1987.

TRIUMF-332 (Oct 1984)

D_t/R_t

MANITOBA U – J Birchall, N E Davison, W T H van Oers, P R Poffenberger, D Ramsey
MANITOBA U & TRIUMF – C A Davis (Spokesperson)
ALBERTA U – G Moss, G Roy
ALBERTA U & TRIUMF – G Greeniaus

Accelerator TRIUMF *Detector* ?

Reactions Polarized beam

p deut $\rightarrow n\ p\ p$	220, 325, 425, 495 MeV (T_{lab})

Comments Measures the ratio of the Wolfenstein parameters D_t and R_t for the np system.

TRIUMF-337 (Dec 1984) Approved Dec 1984; Completed Dec 1986.

MEASUREMENT OF TENSOR OBSERVABLES IN THE $\pi^+\vec{d}$ ELASTIC SCATTERING REACTION

TRIUMF – P Delheij, D Gill, D Healey, D Ottewell, G R Smith (Spokesperson), G Wait, P Walden
REGINA U – G Lolos, E L Mathie
BRITISH COLUMBIA U – A Altman, R R Johnson, G Jones, F Teruisidis, P Trelle

Accelerator TRIUMF *Detector* Counter

Reactions Polarized target

π^+ deut $\rightarrow \pi^+$ deut	100–294 MeV (T_{lab})

Papers PRL 57 (1986) 803.

TRIUMF-360 (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})

TRIUMF-368 Approved Dec 1985.

CHARGE SYMMETRY BREAKING IN $p(n,d)\pi^0$ AT 477 MeV

TRIUMF – R Abegg, P W Green, L G Greeniaus (√ Spokesperson), D A Hutcheon, C A Miller, G M Stinson
ALBERTA U – J M Cameron, C Lapointe, G A Moss, G C Neilson, W C Olsen, D M Sheppard
MANITOBA U & TRIUMF – C A Davis
MANITOBA U – W T H van Oers

Accelerator TRIUMF *Detector* Spectrometer

Reactions

$n\ p \rightarrow$ deut π^0	477 MeV (T_{lab})
$p\ p \rightarrow$ deut π^+	"

Comments Measures the forward-backward asymmetry in $p(n,d)\pi^0$. Systematic errors are corrected by comparison with the charge symmetric reaction $p(p,d)\pi^+$. The result is sensitive to π-η mixing and the η-nucleon coupling constant. In preparation (November 86).

TRIUMF-369 (Dec 1985) Approved Dec 1985.

CHARGE SYMMETRY BREAKING IN np ELASTIC SCATTERING AT 350 MeV

TRIUMF – R Abegg, P W Green, L G Greeniaus (√ Spokesperson), C A Miller
MANITOBA U – J Birchall, C Davis, W T H van Oers (√ Spokesperson), W D Ramsay
ALBERTA U – C Lapointe, W J McDonald, G A Moss, R Tkachuk (√ Spokesperson)

Accelerator TRIUMF *Detector* Counter, Wire chamber

Reactions Polarized beam and target

$n\ p \rightarrow n\ p$	350 MeV (T_{lab})

Comments Measures analyzing power differences.

TRIUMF-372 Approved Dec 1985.

SINGLE PION PRODUCTION IN np SCATTERING

MANITOBA U – J Birchall, C A Davis, N E Davison (√ Spokesperson), W R Falk, W T H van Oers, S A Page, W D Ramsay
TRIUMF – P W Green, D A Hutcheon, C A Miller, P L Walden
DAWSON COLLEGE – M Suec
TEXAS U – P J Riley
HOUSTON U – B W Mayes, L Pinsky
RICE U – G W Mutchler, G C Phillips
CAL STATE, L A – D J Margaziotis

Accelerator TRIUMF *Detector* Wire chamber, Counter

Reactions Polarized beam

$n\ p \rightarrow p\ p\ \pi^-$	450 MeV (T_{lab})

TRIUMF-375

FEW BODY PHYSICS VIA THE PION-DEUTERON BREAKUP REACTION

REGINA U – G Huber, G J Lolos, E L Mathie (Spokesperson), S I H Naqui, V Palitis, Z Papandreou
BRITISH COLUMBIA U – G Jones, M 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 $\rightarrow$ pion $p\ n$	—

TRIUMF-377 Approved Dec 1985; Completed Aug 1986.

TEST OF CHARGE SYMMETRY IN πd ELASTIC SCATTERING

TRIUMF – D Gill, D F Ottewell, G R Smith (Spokesperson), P L Walden
BRITISH COLUMBIA U – A Altman, R R Johnson, G Jones, F Tervisidis, P Trelle
COLORADO U – J J Kraushar, R J Peterson, R A Ristinen, J L Ullmann

Accelerator TRIUMF *Detector* Counter

Reactions

π^+ deut $\rightarrow \pi^+$ deut	143–256 MeV (T_{lab})
π^- deut $\rightarrow \pi^-$ deut	"

Comments Measures differential cross sections and A_π.

TRIUMF-387 (Nov 1985) Approved Dec 1985.

MEASURE OF BIRKS FACTOR IN TMP

VICTORIA U – A Astbury (Spokesperson), M Fincke-Keeler, R Keeler, G Mason, L Robertson
CERN – D Schinzel
ANNECY – A Gonidec
TRIUMF – C J Oram

Accelerator TRIUMF *Detector* ?

Reactions

π^+	50–400 MeV/c
μ^+	"
e^+	"
p	"
deut	"
trit	"
^{3}He	"

TRIUMF-394 (Jul 1986) Approved Jul 1986; Completed 1986.

$\pi^\pm p$ DIFFERENTIAL CROSS SECTIONS FROM 20 TO 65 MeV KINETIC ENERGY

COLORADO U – J T Brack, J J Kraushaar, R A Loveman, R J Peterson, R A Ristinen (√ Spokesperson), J L Ullmann
TRIUMF – D R Gill (√ Spokesperson)
BRITISH COLUMBIA U – R R Johnson, R Olszewski, M Sevior, G R Smith, R P Trelle

REGINA U - E L Mathie

Accelerator TRIUMF *Detector* Counter

Reactions

$\pi^+ p \rightarrow \pi^+ p$	20–65 MeV (T_{lab})
$\pi^- p \rightarrow \pi^- p$	"

Comments Approval was for a test of the technique, which works. Further beam time will be requested.

BROOKHAVEN AGS BEAMS (Source: G. Bunce, BNL)

Up to 10^{13} protons per pulse are accelerated typically to 28.5 GeV kinetic energy (31 GeV has been obtained). At 28.5 GeV, the period is 2.4 sec for slow extraction (with a 1-sec flattop), or 1.4 sec for fast extraction (used for neutrino beams). Counting rates may be estimated using the nominal beam spill time of 1 sec. The beam lines with 0° production angles can be used for polarized protons and/or for heavy ion beams.

	Beam	Momentum range (GeV/c)	$\pm\Delta p/p$ (%)	Production angle (°)	Solid angle (msr)	Beam length (m)	Particles	Flux in thousands per 10^{12} protons on target	$\rightarrow$ at (GeV/c)	Comments
Separated	B2, B4	1.5–6 1.5–9	3	3	0.3	81	K^+/K^- $\overline{p}$ π^+/π^-	270/120 100 $4\times10^4/3\times10^4$	4	Usually 2×10^{12} *ppp* on target; $\pi/K\sim3$ in K beam; $\pi/\overline{p}\sim3/4$
Separated	C2, C4	≤ 1.1	2	10.5	2.6	15	K^+/K^- $\overline{p}$ π^+/π^-	40/12 2 8×10^4	0.75	Usually 2×10^{12} *ppp*; $\pi/K\sim10$ in K beam
Separated	C6, C8	≤ 0.8	2.5	5	15	15	K^+/K^- $\overline{p}$ π^+/π^-	200/60 14 6×10^5	0.75	Usually 2×10^{12} *ppp*; $\pi/K\sim20$
Unseparated	A1	5–24	1.5	0	0.2	130	π^-	1000	22	To multiparticle spectrometer; 10^{12} *ppp*; 25 cm Be target
Unseparated	B1	5–28	3	0	0.3	75	K^+/K^- $p/\overline{p}$ π^+/π^-	2000/400 $5\times10^4/130$ $4\times10^4/3\times10^4$	10	Usually 2×10^{12} *ppp*
Unseparated	C1	1–24	3	0	0.8	61	K^+/K^- $p/\overline{p}$ π^+/π^-	6000/700 $2\times10^5/140$ $7\times10^4/5\times10^4$	13	Usually 2×10^{12} *ppp*; $\mu/\pi\sim3\%$ in π beam
Unseparated	D2, D4	0.1–0.3(π) 0.05–0.15(μ)	9(π)	55(π)	50(π)	9	μ^-	2000	0.10	Muon channel; flux in 100 cm^2 with $\Delta p/p=\pm2\%$
Unseparated	D6	0–6	8	2	0.5	32	K^+/K^- p π^+/π^-	$2\times10^4/7\times10^3$ 2×10^5 $2\times10^5/10^5$	6	
Neutral	A3	1–28		0	0.045	8	K_L n	10^5 3×10^6	1–28	Typically 10^{12} *ppp*; alternates with A1
Neutral	B5	1–28		1–4.5	0.1	2.6	n K_L	1.5×10^6 5×10^4	9–28	Typically 10^{10} *ppp* (based on E791 estimate)
Neutral	U	$\langle E_\nu\rangle=1.4$ (wide band) $\langle E_\nu\rangle=1.3$ (narrow band)					$\nu/\overline{\nu}$ ν	$2\times10^6/1.4\times10^6$ per m^2 10^5 per m^2		Typically 1.2×10^{13} *ppp*; flux averaged over 1.5 m radius

CERN PS BEAMS [Source: *Experiments at CERN in 1986* (M. Ferro-Luzzi, editor)]

East area — The primary beam.

Beam	Momentum (GeV/c)	Particles	Flux/cycle	Comments
e_{17}	8–24	p	2×10^{11} (for test beams)	Slow ejection; splits into two branches

East area — These are counter beams fed by branches of the e_{17} beam above. The fluxes are for $\Delta p/p = \pm 1\%$ and 10^{11} 24-GeV/c protons on the external target; they assume 30% target efficiency (fluxes also depend on the external target used).

Beam	Momentum (GeV/c)	Particles	Flux/cycle	Production angle (°)	Beam height (m)	Comments
t_7	1–10	p, π^+, e^+ or π^-, e^-		0	1.28	e^+ is 7% of + beam at 5 GeV/c, 50% at 2 GeV/c
t_9	$\leq$ 10	π^-	$\gtrsim 10^5$ at 10 GeV/c	0	2.28	The e^- percentage in the negative beam depends on the external target used.
		e^-	$\approx$ 1–3%			
		positives	$\approx 4 \times 10^5$			
t_{10}	≤ 5	π^-	$\approx 3 \times 10^5$ at 5 GeV/c	3.53	2.5	The e^- percentage in the negative beam depends on the external target used.
		e^-	$\approx$ 10%			
		positives	$\approx 6 \times 10^5$			
t_{11}	≤ 3.5	π^-	$\approx 2 \times 10^5$ at 3.5 GeV/c	8.55	2.5	The e^- percentage in the negative beam depends on the external target used.
		e^-	$<$ 10%			
		positives	$\approx 4 \times 10^5$			

South area (LEAR) — Design values. The $\overline{p}$ beam splits into three branches (six experimental areas).

Beam	Momentum range (GeV/c)	Flux (per sec)	Comments
External $\overline{p}$ beam, with ultra-slow ejection ($\approx$ 1 hr)	0.2–1.5	$\leq 10^6$	A long spill of $\leq 3 \times 10^9$ $\overline{p}$
	0.1–2.0		Under development

CERN SPS BEAMS [Source: *Experiments at CERN in 1986* (M. Ferro-Luzzi, editor)]

North area beams (NA experiments)

Beam	Maximum momentum (GeV/c)	Intensity for 10^{12} protons at 450 GeV/c	Beam type
H2	450	9×10^7 π^+ at 200 GeV/c 3×10^7 π^- " " " 4×10^6 $e^\pm$ at 150 "	High energy hadrons or electrons (also used as a test beam)
		$\approx 10^5$ ^{16}O at 200/60 GeV/A	Heavy ion beam
K4	450	$\approx 10^5$ $K_L^0/10^{11}$ incident p $\approx 10^2$ $K_S^0/10^7$ " "	Alternate K_L^0/K_S^0 beam
H6	250	1×10^8 π^+ at 150 GeV/c 4×10^7 π^- " " "	Medium energy hadrons (also used as a test beam)
H8	450	$\sim 10^6$ p at 450 GeV/c 2×10^8 π^+ at 200 " 7×10^7 π^- " " "	Attenuated primary protons or high energy hadron (e) beam
		$\approx 10^6$ ^{16}O at 200/60 GeV/A	Heavy ion beam
M2	280	2.5×10^7 μ^+ at 200 GeV/c 8×10^6 μ^- " " "	High intensity muons
P0	450	$\sim 10^{13}$ p at 450 GeV/c	High intensity primary protons for production of E12; or transport of hadrons or heavy ions to H10
H10	450	$\approx 1 \times 10^7$ π^+ at 200 GeV/c $\approx 3 \times 10^6$ π^- " " "	High energy hadrons or protons (via P0)
		$\approx 10^8$ ^{16}O at 200/60 GeV/A	Heavy ion beam
E12	300	1.5×10^8 e^- total with energy > 100 GeV	Broad-band electrons/ photons

West area beams (WA experiments)

Beam	Maximum momentum (GeV/c)	Intensity for 10^{12} protons at 450 GeV/c	Beam type
H1	450	4×10^6 π^- at 350 GeV/c 2×10^8 π^+ at 200 " 1.5×10^6 e " " "	Hadrons, electrons, or attenuated protons
H3	450	3.6×10^6 π^- at 350 GeV/c 1.8×10^8 π^+ at 200 " 1.2×10^6 e " " "	Hadrons, electrons, or attenuated protons
		$\sim 10^6$ ^{16}O at 200/60 GeV/A	Heavy ion beam
X1	70	10^2–10^4 tertiaries/10^7 incident particles from H3	Test beam; tertiary electrons and hadrons
X3	50	10^2–10^4 tertiaries/10^7 incident particles from H3	Test beam; tertiary electrons and hadrons
X5'	100	10^2–10^4 tertiaries/10^7 incident particles from H3	Test beam; tertiary electrons and hadrons
X7	100	10^2–10^4 tertiaries/10^7 incident particles from H3	Test beam; tertiary electrons and hadrons

West area neutrino beams (WA experiments)

Beam	Parent momentum (GeV/c)	Particle	Intensity or event rate for 10^{13} incident protons*	$\langle E_\nu \rangle$ (GeV)	Beam type
N1	450 protons	ν	1.3×10^{10}/m^2 (~ 0.13 ev/ton)	~ 24	Wide-band spectrum up to 450 GeV
		$\overline{\nu}$	0.7×10^{10}/m^2 (~ 0.03 ev/ton)	~ 20	

*Inside a 1.75 m radius at 870 m from the target.

FERMILAB BEAMS (Source: H.B. White, Jr., FNAL, revised by R. Coleman, FNAL)

Currently, protons are accelerated to an operational momentum of 800 GeV/c. The maximum intensity is 2×10^{13} protons per pulse, the current repetition rate is 0.017/sec, and the beam spill time is 20 sec. Maximum design momentum is 1000 GeV/c.

Beam	Momentum range (GeV/c)	$\pm\Delta p/p$ (%)	Production angle (mr)	Solid angle (μsr)	Particles	**Flux per sec per 10^{12} protons on target	$\rightarrow$ at (GeV/c)	Comments
PW	300 (peak)				π^-	2×10^6	300	High intensity pion beam
		5	1.5		$\bar{p}$	10^4	300	P-west secondary beam
*PB	600 (peak)	15		4	e^-	10^7	600	Wide band charged and neutral beam
					γ	8×10^6	> 200	Also capable of K_L^0, p, and π^-
					n	6×10^8	~ 750	
PE	300 (peak)	2.3	0–2	1.2	e^-	10^7	200	Also provides tagged photons
	300 (peak)		0	0.04	n	4×10^6	> 100	Also tagged photons
	300		0–2		π^-	2×10^8 (peak)	300	
PC	1000		0–3.5		p	2.5×10^9–5×10^{10}	1000	Primary protons
ME	1000 (peak)	1.0			p	$\sim 2 \times 10^{11}$	1000	Primary protons
*MP	200	5.0	0 ± 1.0		p	3×10^5	200	Polarized protons from 1000 GeV primary
					$\bar{p}$	3×10^4	200	Antiprotons from 1000 GeV primary
MC	50–150		1–6		K_L^0	2×10^5	variable	Neutral beam with 1000 GeV primary
					n	7×10^5	variable	
MB	20–200	5.0	2.5		π, K	1.5×10^5	75–100	Low intensity wide-angle test beam
					$e^\pm$	9	100	
*MT	80–245				hadrons	$\sim 10^4$	245	Test beam (intensity limited)
					$e^\pm$	$\sim 10^2$		Muons also available
*MW	1000 (peak)	10	0 ± 0.7		p	1.5×10^8	600	Beam transport to new multiparticle spectrometer; assumes 1000 GeV on target
					π^+	3×10^7	600	
					K^+	4×10^6	600	
					π^-	8×10^6	600	
					K^-	2×10^5	600	
					$\bar{p}$	2×10^4	600	
NW	10–150	2	0–1	4–16	μ^-			Currently a test beam, intensity limited
					π^-	4×10^6	~ 100	
					e^-	6×10^4	~ 100	
*NC-D	750 (peak)	10	0	0.6	$\nu/\bar{\nu}$	4.5×10^6 ν/m^2***	500	Narrow band, sign-selected neutrino beam
*NC-T	1000 (peak)	100	0	6.0	$\nu/\bar{\nu}$	1.4×10^8 ν/m^2***	0–800	Broad band, quadrupole focus
NE	900	3.3	0	0.3	p	5×10^7	900	To hybrid spectrometer system and Lab G and D
	25–700				π^-	10^5	650	
NT	450		3		hadrons	$\sim 10^5$	450	Test beam to Lab E neutrino detector and Lab F
NH	435		3		hadrons	$\sim 10^5$	435	Test beam to Lab C neutrino detector and Lab F
								Muons and electrons also available at lower intensities
*NM	275–750	20			$\mu^\pm$	$\sim 10^4$	750	Tevatron muon beam
NM	2.5–200	10	0		hadrons	$\sim 10^3$		Test beams to muon spectrometer
(test modes)	5–200	20	0		electrons	~ 500		

*These beams will be commissioned as part of the Tevatron II project. Design characteristics are shown; detailed characteristics will be determined in operation. These beams will also replace present beams in most cases.

**For 800 GeV protons incident unless otherwise noted.

***Flux per 10^{12} protons on target, beam spill times variable ($\sim$ 1 ms to 20 s).

KEK PS BEAMS (Source: H. Hirabayashi, KEK)

Protons are accelerated to a maximum momentum of 13 GeV/c. The maximum intensity is 4.0×10^{12} protons per pulse. The repetition rate is 0.4/sec.

Beam	Momentum range (GeV/c)	$\pm\Delta p/p$ (%)	Production angle (°)	Solid angle (msr)	Beam length (m)	Particles	Typical flux in particles per pulse →	at (GeV/c)	Comments
EP1	4–13					p	5×10^{10}		Fast extraction
EP2	4–13					p	2×10^{12}		Slow extraction; branches feed the K2, K3/K4, π-μ, K0, and P1 beams
π2	2–4.3	1	10	0.594	31.3	$p/\bar{p}$	$10^5/10^2$	3	Internal target beam; fluxes for 10^{11} ppp
						π^+/π^-	$2 \times 10^5/1 \times 10^5$		
T1	0.5–2.3	2	23	0.16	18.8	π^+/π^-	$5 \times 10^4/4 \times 10^3$	1	Internal target test beam; fluxes for 10^{11} ppp
K2	1–2	3	0	1.02	27.9	K^+/K^-	$1.5 \times 10^5/5.7 \times 10^4$	2	
						$p/\bar{p}$	$2 \times 10^7/1.2 \times 10^4$		
						π^+/π^-	$1.7 \times 10^7/1.4 \times 10^7$		
K3-S	0.5–1.0	2	0	7.3	14.4	K^+/K^-	$4.2 \times 10^4/1.0 \times 10^4$	0.6	Fluxes are for the S (short) mode of operation
(K3-L)	"	"	"	(3.0)	(16.5)	$p/\bar{p}$	$7 \times 10^7/3.5 \times 10^2$	0.8	
						π^+/π^-	$5 \times 10^7/5 \times 10^7$	0.8	
K4	0.4–0.8	3	0	7.3	28.5	$\bar{p}$	700	0.6	Branch of K3
π-μ	0.1–0.45		87	20		$\pi^\pm$	10^6	0.15	
						$\mu^\pm$	10^4		
K0	2–8		0	0.31	10	K^0	10^7	2–8	Neutral beam line
						n	10^9	0–8	
P1	3–13	0.3			57	$\vec{p}$	2×10^8	3-13	Polarized beam, under construction

LAMPF PARTICLE PHYSICS BEAMS (Source: D. Dodder, Los Alamos)

The primary 800 MeV H^+ beam normally runs with an average current up to 1 mA, but 1.2 mA has been achieved. The macro duty factor is up to 10.5%, with a macrostructure of 120 pps. Each macropulse consists of a 0.25 ns burst every 5 ns. This beam is used to generate the meson and neutrino beams described below, as well as additional beams for other purposes. Simultaneously with the H^+ beam a low current (5 μA unpolarized; up to 25 nA polarized) H^- beam is accelerated to a desired energy between 212 and 800 MeV.

	Beam	Momentum (MeV/c)	$\pm\Delta p/p$ (%)	Solid angle (msr)	Particle	Flux in particles/sec or current	$\rightarrow$ at (MeV/c)	Comments
	A	1460	0.1		p	1 mA	1460	Main beam; 1.2 mA has been achieved
Area A	LEP	77–415	0.05–2.8	0–17	π^+	9×10^8	195	Low energy pion beam; achromatic; flux at $\Delta p/p = 2.8\%$
					π^-	$\sim 2 \times 10^8$		
	EPICS	156–415	2.0	3.4	π^+	1.9×10^8	300	Energetic pion channel and spectrometer
					π^-	4.2×10^7		
	P^3	100–750	5.0	7.0	π^+	2×10^9	470	High energy pions; achromatic
		"			π^-	3×10^8	470	
		28			μ^+	1.9×10^6	28	
		100			μ^-	1.0×10^6	100	μ^- flux is without degrader
	Stopped muon	25–250			μ^+	1.8×10^8	130	
					μ^-	3.6×10^7		
Area B		665–1460			p	6 μA	1460	Current reduced to 1/3 for < 1460 MeV/c
		"			$\vec{p}$	25 nA		Polarization = 0.8 N, L, S available
		< 1460	0.8		n	10^7		"Unpolarized" beam has P = 0.2 at 20°
		"	0.8		$\vec{n}$	10^4		Polarization = 0.5; max 0° energy is given; other ports up to 37° give lower energies
	External proton beam	665–1460	< 0.1	< 6	p	< 100 nA	1460	H^- beam stripped to H^0 or H^+
					H^0	"		
					H^-	"		
					$\vec{p}$	10 nA		Polarization = 0.8 N, L, S available
					$\vec{H}^0$	"		Independent of polarization direction of internal beam
					$\vec{H}^-$	"		
Area C	HRS	475–1460	0.26		p	100 nA		For high resolution proton spectrometer
					$\vec{p}$	10 nA		
LAN SCE/WNR	Neutrino, facility	0–53		$\sim 4\pi$ sr	ν_e	3×10^{14}	total	Peak momentum is 35 MeV/c for ν_μ
					ν_μ	"		Flux at 8 m is $4 \times 10^8 \nu/\text{cm}^2$-sec
					$\bar{\nu}_\mu$	"		Source subtends $\pm 1.5°$ for target 8 m away
	Proton storage ring	1460	0.3		p	25 μA	1460	270 ns pulses at 12 Hz; aim is 100 μA and eventually 200 μA at 24 Hz
	Line D bypass	665–1460	0.1		p	200 nA	1460	Chopped 1 μs micropulses; available spacing 0.1 to 100 μs
	PSR neutron source	thermal &EPI thermal			n	$\sim 10^{16}$		Optimally moderated spallation source

SERPUKHOV BEAMS (Source: N.A. Galiaev and R.A. Rzaev, Serpukhov)

Protons are accelerated to a maximum momentum of 70 GeV/c. The intensity is about 3×10^{12} protons per pulse. The repetition rate is 0.115/sec, and the beam spill time is about 2 sec.

Beam	Momentum range (GeV/c)	$\pm\Delta p/p$ (%)	Production angle (mr)	Solid angle (μsr)	Beam length (m)	Particles	Typical flux in particles per pulse	$\rightarrow$ at (GeV/c)	Comments
2/14	30–70	1	6–35	10	120	hadrons+	10^6	60	Internal target lines 2A, 2B, 14; the e^-'s may be used for polarized γ's
	35–65	1	0–5	30		hadrons−	1.5×10^6	60	
	5–45	3	0–7	30		e^-	4×10^5	30	
4	20–50	1	0–5	40	130	hadrons−	6×10^6	40	Internal target lines 4A, 4B, 4V, 4L, 4E
18	3–17	2	0–200	120	50	hadrons+	10^8	5	Internal target, injection in ring
	2–14	2	240–400	80		hadrons−	10^4	8	
21	70		0		180	p	10^{11}	70	Slow ejection
	7–70	2.5	0	60	110	hadrons+	6×10^7	35	External target
						hadrons−	2×10^7	35	Slow ejection
22	70					p	10^{10}		Slow ejection of diffractively scattered protons
	10–60	2.5				π^+	10^9	35	For 10^{13} protons on external target
	10–60	2.5				π^-	3×10^8	35	
23	5–35				500	ν_e	5.5×10^{-8}/m^2 per p		Tagged from $K \rightarrow \pi e \nu$ decay
	5–35				500	ν_μ	1.5×10^{-2}/m^2 per p		Tagged from $K \rightarrow \mu \nu$ decay
4N	≤ 70		12	1	40	neutrals	10^7	total	Internal target
8	< 40 (mean = 6)		0	5000	500	$\nu, \overline{\nu}$	5×10^9	total	Wide-band neutrino beam
	70		0			p	10^{12}	70	Slow ejection

SIN BEAMS (Source: R. Frosch, SIN)

The average energy of the primary proton beam is 589 MeV with a FWHM spread of 0.4%. The pulse rate is 5×10^7 per sec and the pulse width is 1 nsec. The maximum intensity at extraction is 300 μA. Secondary beam rates given below are for $I_p = 200$ μA

Pion beams

Beam	Energy range (MeV)	Minimum $\pm\Delta p/p$ (%)	Maximum flux (per sec)		for maximum flux: Energy (MeV)	$\pm\Delta p/p$ (%)	FWHM spot size H×V (cm)
πE1	50–350	0.4	π^+	9×10^9	225	2.5	2×5
			π^-	8×10^8			
πE3	8–105	1.0	π^+	8×10^8	85	5.0	5.6×2.6
			π^-	1.6×10^8			
πM3	8–350	0.1	π^+	3×10^8	225	3.0	4×2
			π^-	5×10^7			
πM1	50–350	0.05	π^+	6×10^7	225	1.0	0.9×0.7
			π^-	6×10^6			

Muon beams (μ^+ fluxes are 4 or 5 times μ^- fluxes)

Beam	Momentum (MeV/c)	μ^- flux (per sec)	Δ-range (g/cm^2)	Stop density μ^- (stops/g-sec)	Particle ratios	Burst width (nsec)	FWHM spot size H×V (cm)
μE1	120–50	6×10^7–8×10^5	4–0.3	10^5–3×10^4	0.01–3 (e^-/μ^-)	$\gtrsim 4$	6×4
μE4	stopping			2×10^5	0.3 (π^-/μ^-)		6×4
πE3	28	10^7 (μ^+)	0.04	2×10^7 (μ^+)	0.1 (e^+/μ^+)		5×4
πM3	28	10^6 (μ^+)	0.04	6×10^6 (μ^+)	< 0.01 (e^+/μ^+)		2×2

Neutron beams (nE1) — Neutron beams with a 20-m flight path and correspondingly higher rates are also possible (the energy resolution at 560 MeV then is 20 MeV)

Energy range (MeV)	Intensity (MeV cm^2 sec)$^{-1}$	Flight path (m)	Polarization %	Resolution from TOF at 560 MeV (MeV)	Comments
120–560	$(1\text{–}3) \times 10^4$	60	0	7	200 μA incident proton beam
200–560	100–300	60	25–45	7	2 μA incident polarized protons

SLAC BEAMS (Source: T. Fieguth, SLAC)

Accelerator mode	Particles	Momenta (GeV/c)	Particles per pulse	Pulse length (μs)	Repetition rate (Hz)	Comments
SLC	e^-	≤ 50	$\leq 2 \times 10^{10}$	2 at 5×10^{-6}	≤ 120	The Linac will serve as the source for the SLC (1987). Damped beams.
	e^+	≤ 50	$\leq 5 \times 10^9$	5×10^{-6}	"	
Long pulse	e^-	≤ 28	10^{11}	≤ 1.6	"	
NPI -long pulse	e^-	5	6×10^{11}	1.5	"	Sector 25 off-axis injector, used for SSRL, nuclear physics experiments, and test beams
-short pulse	e^-	9	4×10^{11}	0.2	"	

Colliding beams	Particles	C.m. energy (GeV)	Peak luminosity (cm^{-2} sec^{-1})	Average luminosity (cm^{-2} sec^{-1})	Comments
SPEAR	e^+e^-	2–7.4	2×10^{31} at 6.4 GeV	10^{30} at 3.7 GeV	SPEAR has 2 interaction regions, PEP has 6. At PEP, the luminosity scales as E^{-2} (E^{-3}) for c.m. energies below (above) that at the peak.
PEP	e^+e^-	8–36	3.2×10^{31} at 29 GeV	1.2×10^{31}	
SLC*	e^+e^-	≈ 100	6.4×10^{29}		Single interaction region; repetition rate ≤ 120 Hz

*The luminosity is the initial design value. See J. Rees, "Progress Report on SLAC Linear Collider," SLAC-Pub-3986 (June 1986) for qualifying factors.

Beam	Momentum range (GeV/c)	$\pm\Delta p/p$ (%)	Production angle (°)	Solid angle (msr)	Particles	Maximum particles per pulse	→ at (GeV/c)	Repetition rate (Hz)	Facility	Comments
21	1–16	≤ 4.0	1	0.03	K^+/K^-	17/8	10	≤ 120	Test beams	Separated: $\pi/K \sim 1/30$ $\pi/\bar{p} \sim 1/14$
					$p/\bar{p}$	40/6				
					π^+/π^-	10^3				
					e^-	10^4				
	1–8				e^+	10^4	2.5			
27	20	9.0 FWHM	0	10^{-7}	γ	10^2	20	≤ 20	Test beam	Backscattered laser beam
3	≤ 23.5	0.1–1.0			e^+	5×10^9	All	≤ 120	ESA 1.6, 8, & 20 GeV spectrometers	All fluxes at $\Delta p/p = \pm 0.25\%$
	≤ 23.5	0.1–1.0			e^-	5×10^{11}	All	≤ 120		
	≤ 21.5	Brems.	0		γ	4×10^9 EQ	20	≤ 120		0° bremsstrahlung
6	0.1–16	≤ 2.0	1.6–6	0.03	e^-	10		≤ 60	Test beams	
	1–16				π^-	10				
19	1–25	0.25	0		e^+	10	10	≤ 60	Test beam	Very pure; $\sigma_x = 1$ mm

TRIUMF BEAMS [Source: Status of TRIUMF Plans for Development, G. Dutto, E.W. Blackmore, and M.K. Craddock, TRI-82-PP-37 (October 1982); tables revised by J. Doornbos, TRIUMF.]

The cyclotron energy range is 180–520 MeV with an energy spread of 0.1%/(FWHM). The unpolarized intensity is 150 μA, and the polarized intensity is 300 nA; the polarization is 75–82%. The BL4/BL1A split ratio is $1/10^4$. The phase width is variable from 0.5 to 6.0 ns. The pulse separation is 43 or 217 ns. There are plans to upgrade various performance levels.

Main beam lines

Beam	Particle	Energy (MeV)	Intensity	Momentum spread FWHM (%)	Polarization (%)	Spot size H×V(cm)
BL1A	p	180–520	140 μA (500 MeV)	0.2	0	0.2×0.5
BL4/1B	$\vec{p}$	180–520	300 nA	0.2	70–80	0.2×0.5
BL4A	$\vec{n}$	160–500	10^6/sec	1.0	40–75	6×6
BL2C	p	65–100	10 μA	0.2	0	1×2

Secondary lines The M8, M9, and M20 fluxes are for full momentum acceptance with 100 μA of protons on a 10-cm beryllium target. The M11, M13, and M15 fluxes are for full momentum acceptance with 100 μA of protons on a 1-cm carbon target. Beams of π^- and μ^- have the same properties as the π^+ and μ^+ beams, except fluxes are about five times lower.

Beam	Particle	Momentum (MeV/c)	Particle flux (per sec)	→ at (MeV/c)	Momentum spread FWHM (%)	Polarization (%)	Spot size H×V (cm)
M8	π^-	0–220	1.3×10^8	180	13	–	1×2
M9	μ^-	30–150	10^6	77	14	50	8×8
	π^+	30–250	2×10^8	120	14	–	10×2
M20	μ^+	30–200	2.5×10^6	30	5	> 90	4×3
			2×10^6	85	8	75	8×8
M13	π^+	30–130	5×10^7	130	10	–	3×2
	μ^+	30 (surface)	1.3×10^6	30	10	> 90	3×2
M11	π^+	90–470	5×10^6	200	3	–	2×3
M15	μ^+	30 (surface)	1.4×10^6	30	10	> 90	1.2×1.6

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