

# Lawrence Berkeley National Laboratory

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**Title**

COMPILATION OF CURRENT HIGH ENERGY PHYSICS EXPERIMENTS

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# COMPILATION OF CURRENT HIGH ENERGY PHYSICS EXPERIMENTS

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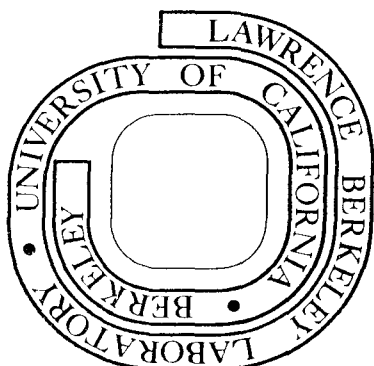
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## Table of Contents

Introduction . . . . .	1
Beam-Target-Momentum Index. . . . .	3
Particle Index . . . . .	9
Spokesman Index . . . . .	10
Illustrative Key for Compilation Listing . . . . .	12
Appendix I - Accelerator Abbreviations . . . . .	13
Appendix II - Detector Abbreviations . . . . .	13
Appendix III - Beam Momentum Designations . . . . .	13
Appendix IV - Reaction Data Descriptors . . . . .	13
Appendix V - Particle Properties Descriptors . . . . .	14
Appendix VI - Institution Abbreviations . . . . .	14
Appendix VII - Particle Abbreviations . . . . .	17
Complete Compilation Listing (on Microfiche) . . . . .	Inside front cover

## Introduction

This compilation of current high energy physics experiments has been assembled in a collaborative effort by the Berkeley Particle Data Group, the SLAC Library, and the seven participating laboratories, ANL, BNL, CERN, DESY, FNAL, RHEL, and SLAC. Work on the compilation was begun early in 1975 and it is now intended to include all currently active high energy physics experiments at the participating laboratories. By "currently active" we mean experiments that were approved but had not finished running by June 1976. Nearly all experiments that completed running since the summer of 1975 are also included, as well as a few older experiments.

This report includes three indices to the compilation, seven appendices with definitions of the symbols used, and a microfiche listing of the compilation itself. The first index is keyed to beam and target particles and beam momenta in order of increasing particle mass and beam momentum; the two subsequent indices are keyed to individual particles studied and to spokesman names. The appendices contain lists of symbols used for accelerators, detectors, beam momentum designations, data descriptors, particle properties, institutions, and particle names. An illustrative key precedes the appendices, showing the format of the compilation listing and indicating the appropriate appendices for the various symbols used. The compilation listing for each experiment contains, in addition to the indexed information mentioned above, a list of participants and their institutions, a list of the reactions studied, information on the running status of the experiment, and various comments on the technique and/or physics goals of the experiment.

Users of this compilation who want more information about a specific experiment would be well advised to contact the experimental spokesman directly. Although proposals are sometimes available in libraries, it is not always easy to identify all the relevant information for a particular experiment. There are often important letters, addenda, revisions, etc., attached to a proposal after it is first submitted which may not be available with library copies. The "bibliographic comments" included in the compilation listing are intended to help the user find all relevant material. Users should also note that at two laboratories the experiment number that we list and the proposal number are not the same. The ANL proposal number corresponding to experiment number E-xxx is P-xxx. The CERN proposal number(s) corresponding to a specific experiment consists of the numbers of all CERN documents submitted in its support, and can usually be found in the CERN approved experiment list for the appropriate accelerator.

It is planned to keep this compilation up-to-date in the future, to add more laboratories, and to issue updated versions of this report every year. This report has been distributed to libraries at universities, high energy physics laboratories, etc., and to the experimental spokesmen listed in the index. A limited number of copies are also available for other interested individuals who may request a copy by writing to:

Particle Data Group  
LBL-91 Request  
Building 50, Room 304  
Lawrence Berkeley Laboratory  
Berkeley, California 94720 USA

Any comments concerning the compilation, such as missing or incorrect entries, should be sent to Robert Kelly at the Particle Data Group.

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The information appearing in this report has been extracted from a new computerized data storage and retrieval system being developed by the Berkeley Particle Data Group, in collaboration with the California Institute of Technology and the University of Durham. In the next step of its development, this "Particle Physics Data System" will contain the same kind of information as appears in this report for all experimental particle physics documents: proposals (past as well as current), preprints, reports, theses, journal articles, etc. It is also planned that it will ultimately contain the actual physics data extracted from these documents -- both reaction data and particle properties measurements. The stored material will be searchable in response to specific requests, and will also be used to produce periodic indices such as this one, as well as various graphical "trend-of-the-data" reports. We welcome suggestions concerning the development of this system.

This project is jointly supported by the U. S. Energy Research and Development Administration, the Office of the Standard Reference Data of the National Bureau of Standards, and the National Science Foundation.

## BEAM-TARGET-MOMENTUM INDEX

BEAM AND TARGET	LAB MOMENTUM OR MOMENTUM RANGE (GEV/C)	EXPERIMENT	BEAM AND TARGET	LAB MOMENTUM OR MOMENTUM RANGE (GEV/C)	EXPERIMENT
GAMMA E-	?	SLAC-SP-78	NUMU P	35.0 64.0	FNAL-388
GAMMA P	2.0 19.0	SLAC-E-112	NUMU P	50.0 150.0	FNAL-380
GAMMA P	2.5	DESY-115	NUMU P	70.0	FNAL-254
GAMMA P	4.0 7.0	DESY-94	NUMU P	91.0 95.0	FNAL-388
GAMMA P	5.5 6.5	DESY-136	NUMU P	100.0	FNAL-320
GAMMA P	6.0	SLAC-E-108	NUMU P	131.0 143.0	FNAL-388
GAMMA P	9.0	SLAC-E-108	NUMU N	0. 4.0	ANL-E-412
GAMMA P	10.0 40.0	CERN-WA-4	NUMU N	0. 10.0	BNL-427
GAMMA P	10.0 60.0	CERN-WA-4	NUMU N	0. 10.0	BNL-629
GAMMA P	12.0	SLAC-E-108	NUMU N	0. 400.0	FNAL-310
GAMMA P	13.0	SLAC-E-114	NUMU N	1.0 5.0	BNL-605
GAMMA P	14.0 300.0	FNAL-25A	NUMU N	1.0 8.0	BNL-589-639
GAMMA P	15.0	SLAC-E-114	NUMU N	2.0 3.5	BNL-693
GAMMA P	16.0	SLAC-E-114	NUMU N	3.0 5.0	BNL-693
GAMMA P	17.0	SLAC-E-114	NUMU N	4.0	BNL-589-639
GAMMA P	19.0	SLAC-E-114	NUMU N	4.0 19.0	CERN-T-224
GAMMA P	20.0 60.0	FNAL-152B	NUMU N	10.0	BNL-589-639
GAMMA P	20.0 200.0	FNAL-263	NUMU N	10.0 100.0	FNAL-151A
GAMMA P	21.0	SLAC-E-114	NUMU N	10.0 100.0	FNAL-227
GAMMA P	>21.0	SLAC-E-114	NUMU D	0. 10.0	BNL-427
GAMMA N	3.4 5.0	DESY-129	NUMU D	10.0 100.0	FNAL-151A
GAMMA N	13.0	SLAC-E-114	NUMU NE	0. 200.0	FNAL-53A
GAMMA N	15.0	SLAC-E-114	NUMU NE	5.0 155.0	FNAL-28A
GAMMA N	16.0	SLAC-E-114	NUMU NE	28.0 43.0	FNAL-388
GAMMA N	17.0	SLAC-E-114	NUMU NE	35.0 64.0	FNAL-388
GAMMA N	19.0	SLAC-E-114	NUMU NE	50.0 150.0	FNAL-380
GAMMA N	21.0	SLAC-E-114	NUMU NE	91.0 95.0	FNAL-388
GAMMA N	>21.0	SLAC-E-114	NUMU NE	131.0 143.0	FNAL-388
GAMMA D	2.0 19.0	SLAC-E-112	NUMU FE	0. 260.0	CERN-WA-1
GAMMA D	14.0 300.0	FNAL-25A	NUMU PB	0. 400.0	FNAL-310
GAMMA BE	2.0 19.0	SLAC-E-112	NUMU NUCLEUS	4.0 19.0	CERN-T-245
GAMMA BE	40.0 200.0	FNAL-401	NUMU NUCLEUS	10.0 100.0	FNAL-1A
GAMMA C	2.0 19.0	SLAC-E-112	NUMU NUCLEUS	40.0 300.0	FNAL-21A
GAMMA C	60.0	FNAL-25A	NUMU NUCLEUS	300.0	FNAL-21A
GAMMA C	170.0	FNAL-25A	NUMU	?	FNAL-155
GAMMA AL	2.0 19.0	SLAC-E-112	NUMU	?	FNAL-356
GAMMA CU	2.0 19.0	SLAC-E-112	ANUMU E-	0. 100.0	FNAL-390
GAMMA CU	60.0	FNAL-25A	ANUMU E-	0. 200.0	FNAL-180
GAMMA CU	170.0	FNAL-25A	ANUMU E-	0. 400.0	FNAL-310
GAMMA AG	2.0 19.0	SLAC-E-112	ANUMU E-	1.0 5.0	BNL-605
GAMMA PB	2.0 19.0	SLAC-E-112	ANUMU E-	4.0	BNL-589-639
GAMMA PB	60.0	FNAL-25A	ANUMU E-	10.0	BNL-589-639
GAMMA PB	170.0	FNAL-25A	ANUMU E-	10.0 100.0	FNAL-253
GAMMA NUCLEUS	?	CERN-WA-4	ANUMU P	0. 5.0	BNL-532
GAMMA NUCLEUS	13.0	SLAC-E-114	ANUMU P	0. 100.0	FNAL-31A
GAMMA NUCLEUS	15.0	SLAC-E-114	ANUMU P	0. 100.0	FNAL-390
GAMMA NUCLEUS	16.0	SLAC-E-114	ANUMU P	0. 130.0	FNAL-172
GAMMA NUCLEUS	17.0	SLAC-E-114	ANUMU P	0. 200.0	FNAL-180
GAMMA NUCLEUS	19.0	SLAC-E-114	ANUMU P	0. 400.0	FNAL-310
GAMMA NUCLEUS	20.0 60.0	FNAL-152B	ANUMU P	1.0 8.0	BNL-589-639
GAMMA NUCLEUS	20.0 200.0	FNAL-87A	ANUMU P	4.0	BNL-589-639
GAMMA NUCLEUS	21.0	SLAC-E-114	ANUMU P	4.0 19.0	CERN-T-224
GAMMA NUCLEUS	>21.0	SLAC-E-114	ANUMU P	10.0	BNL-589-639
GAMMA NUCLEUS	100.0 300.0	FNAL-87A	ANUMU P	10.0 50.0	FNAL-320
NUE E-	0. 400.0	FNAL-310	ANUMU P	28.0 43.0	FNAL-388
NUE E-	5.0 70.0	FNAL-45A	ANUMU P	35.0 64.0	FNAL-388
NUE E-	10.0 100.0	FNAL-253	ANUMU P	50.0 150.0	FNAL-380
NUE P	0. 400.0	FNAL-310	ANUMU P	91.0 95.0	FNAL-388
NUE P	1.0 8.0	BNL-589-639	ANUMU P	100.0	FNAL-320
NUE P	5.0 70.0	FNAL-45A	ANUMU P	131.0 143.0	FNAL-388
NUE N	0. 400.0	FNAL-310	ANUMU N	0. 100.0	FNAL-390
NUE N	1.0 8.0	BNL-589-639	ANUMU N	0. 130.0	FNAL-172
ANUE E-	10.0 100.0	FNAL-253	ANUMU N	0. 200.0	FNAL-180
ANUE P	0. 400.0	FNAL-310	ANUMU N	0. 400.0	FNAL-310
ANUE P	1.0 8.0	BNL-589-639	ANUMU N	1.0 8.0	BNL-589-639
ANUE P	5.0 70.0	FNAL-45A	ANUMU N	4.0	BNL-589-639
ANUE N	0. 400.0	FNAL-310	ANUMU N	4.0 19.0	CERN-T-224
ANUE N	1.0 8.0	BNL-589-639	ANUMU N	10.0	BNL-589-639
NUMU E-	0. 10.0	BNL-629	ANUMU D	0. 100.0	FNAL-390
NUMU E-	0. 12.0	BNL-613	ANUMU NE	0. 130.0	FNAL-172
NUMU E-	0. 400.0	FNAL-310	ANUMU NE	0. 200.0	FNAL-180
NUMU E-	1.0 5.0	BNL-605	ANUMU NE	28.0 43.0	FNAL-388
NUMU E-	4.0	BNL-589-639	ANUMU NE	35.0 64.0	FNAL-388
NUMU E-	5.0 70.0	FNAL-45A	ANUMU NE	50.0 150.0	FNAL-380
NUMU E-	10.0	BNL-589-639	ANUMU NE	91.0 95.0	FNAL-388
NUMU E-	10.0 100.0	FNAL-253	ANUMU NE	131.0 143.0	FNAL-388
NUMU P	?	FNAL-247	ANUMU FE	0. 260.0	CERN-WA-1
NUMU P	0. 4.0	ANL-E-412	ANUMU NUCLEUS	10.0 100.0	FNAL-1A
NUMU P	0. 10.0	BNL-427	ANUMU NUCLEUS	40.0 300.0	FNAL-21A
NUMU P	0. 10.0	BNL-629	ANUMU	?	BNL-652
NUMU P	0. 12.0	BNL-613	ANUMU	?	FNAL-155
NUMU P	0. 200.0	FNAL-53A	ANUMU	?	FNAL-356
NUMU P	0. 400.0	FNAL-310	E- P	?	SLAC-E-122
NUMU P	1.0 5.0	BNL-605	E- P	2.5	DESY-137
NUMU P	1.0 8.0	BNL-589-639	E- P	2.6	DESY-126
NUMU P	2.0 3.5	BNL-693	E- P	2.9	DESY-114
NUMU P	3.0 5.0	BNL-693	E- P	3.8	DESY-137
NUMU P	4.0	BNL-589-639	E- P	4.7	DESY-137
NUMU P	4.0 19.0	CERN-T-224	E- P	5.0	SLAC-E-107
NUMU P	5.0 70.0	FNAL-45A	E- P	6.0	DESY-125
NUMU P	10.0	BNL-589-639	E- P	6.0	SLAC-E-80
NUMU P	10.0 50.0	FNAL-320	E- P	6.4	DESY-137
NUMU P	10.0 100.0	FNAL-1A	E- P	6.7	DESY-137
NUMU P	10.0 100.0	FNAL-151A	E- P	12.9	SLAC-E-95
NUMU P	10.0 100.0	FNAL-227	E- P	17.7	SLAC-E-95
NUMU P	28.0 43.0	FNAL-388	E- P	19.3	SLAC-E-95





## BEAM-TARGET-MOMENTUM INDEX

BEAM AND TARGET	LAB MOMENTUM OR MOMENTUM RANGE (GEV/C)	EXPERIMENT	BEAM AND TARGET	LAB MOMENTUM OR MOMENTUM RANGE (GEV/C)	EXPERIMENT	
PI-P	10.0	CERN-S-144	PI-U	300.0	FNAL-304	
PI-P	10.0	FNAL-290	PI-NUCLEUS	?	BNL-694	
PI-P	12.0	BNL-557	PI-NUCLEUS	?	CERN-NA-1	
PI-P	12.0	BNL-588	PI-NUCLEUS	?	FNAL-379	
PI-P	12.0	SLAC-BC-58	PI-NUCLEUS	100.0	FNAL-178	
PI-P	12.0	SLAC-E-123A	PI-NUCLEUS	100.0	300.0	FNAL-387
PI-P	12.0	SLAC-E-123B	PI-NUCLEUS	100.0	350.0	FNAL-258
PI-P	15.0	BNL-671	PI-NUCLEUS	150.0	FNAL-272	
PI-P	17.0	SLAC-E-123A	PI-NUCLEUS	200.0	FNAL-178	
PI-P	17.0	SLAC-E-123B	PI-NUCLEUS	200.0	FNAL-339	
PI-P	17.2	CERN-S-136	PI-NUCLEUS	200.0	400.0	FNAL-362
PI-P	20.0	BNL-686	PI-NUCLEUS	225.0	FNAL-416	
PI-P	20.0	BNL-688	PI-NUCLEUS	300.0	FNAL-272	
PI-P	20.0	CERN-WA-7	PI-	3.0	15.0	CERN-S-150
PI-P	20.0	CERN-WA-10	PI-	25.0	FNAL-327	
PI-P	20.0	BNL-679	PI-	50.0	FNAL-327	
PI-P	20.0	FNAL-104	PI-	100.0	FNAL-327	
PI-P	24.0	BNL-682	PI-	175.0	FNAL-327	
PI-P	25.0	FNAL-396	K+ E-	200.0	FNAL-446	
PI-P	30.0	CERN-WA-3	K+ P	?	CERN-NA-1	
PI-P	40.0	CERN-WA-7	K+ P	?	FNAL-236A	
PI-P	40.0	CERN-WA-10	K+ P	0.5	BNL-524	
PI-P	40.0	FNAL-324	K+ P	0.5	1.1	BNL-691
PI-P	50.0	CERN-WA-9	K+ P	0.7	1.1	BNL-524
PI-P	50.0	FNAL-7	K+ P	2.0	8.0	ANL-E-335
PI-P	50.0	FNAL-61	K+ P	2.0	8.0	ANL-E-365
PI-P	50.0	FNAL-110A	K+ P	3.0	4.0	RHEL-126
PI-P	50.0	CERN-WA-6	K+ P	4.0		RHEL-150
PI-P	50.0	FNAL-69A	K+ P	4.0	6.0	BNL-546
PI-P	55.0	CERN-WA-3	K+ P	4.0	6.0	BNL-596
PI-P	60.0	CERN-WA-7	K+ P	5.0		CERN-S-144
PI-P	70.0	FNAL-138	K+ P	6.0	10.0	BNL-594
PI-P	75.0	CERN-WA-9	K+ P	10.0		CERN-S-131
PI-P	80.0	CERN-WA-3	K+ P	10.0		CERN-S-144
PI-P	80.0	CERN-WA-7	K+ P	10.0		SLAC-E-109
PI-P	80.0	CERN-WA-10	K+ P	18.0		CERN-WA-8
PI-P	80.0	FNAL-7	K+ P	20.0		CERN-WA-10
PI-P	80.0	FNAL-324	K+ P	20.0	500.0	FNAL-104
PI-P	100.0	CERN-WA-9	K+ P	25.0	200.0	FNAL-396
PI-P	100.0	FNAL-61	K+ P	32.0		CERN-WA-8
PI-P	100.0	FNAL-110A	K+ P	40.0		CERN-WA-10
PI-P	100.0	FNAL-268	K+ P	40.0		FNAL-324
PI-P	100.0	FNAL-350	K+ P	50.0		CERN-WA-9
PI-P	100.0	FNAL-83A	K+ P	50.0		FNAL-7
PI-P	100.0	FNAL-258	K+ P	50.0		FNAL-110A
PI-P	110.0	FNAL-7	K+ P	50.0		FNAL-118A
PI-P	125.0	CERN-WA-9	K+ P	50.0	150.0	CERN-WA-6
PI-P	140.0	FNAL-7	K+ P	50.0	200.0	FNAL-69A
PI-P	150.0	CERN-WA-9	K+ P	50.0	200.0	FNAL-96
PI-P	150.0	FNAL-61	K+ P	75.0		CERN-WA-9
PI-P	150.0	FNAL-89	K+ P	80.0		CERN-WA-10
PI-P	150.0	FNAL-268	K+ P	80.0		FNAL-7
PI-P	150.0	FNAL-299	K+ P	80.0		FNAL-324
PI-P	150.0	FNAL-331	K+ P	100.0		CERN-WA-9
PI-P	150.0	FNAL-350	K+ P	100.0		FNAL-110A
PI-P	150.0	FNAL-393	K+ P	100.0		FNAL-118A
PI-P	150.0	FNAL-192	K+ P	110.0		FNAL-7
PI-P	160.0	FNAL-324	K+ P	140.0		FNAL-7
PI-P	170.0	FNAL-7	K+ P	150.0		FNAL-118A
PI-P	200.0	FNAL-110A	K+ P	150.0		FNAL-299
PI-P	200.0	FNAL-260	K+ P	150.0		FNAL-331
PI-P	200.0	FNAL-268	K+ P	160.0		FNAL-324
PI-P	200.0	FNAL-350	K+ P	170.0		FNAL-7
PI-P	200.0	FNAL-369	K+ P	200.0		FNAL-110A
PI-P	200.0	FNAL-411	K+ P	300.0		FNAL-277
PI-P	250.0	FNAL-138	K+ N	0.7	0.9	BNL-641
PI-P	250.0	FNAL-281	K+ N	0.7	1.4	RHEL-136
PI-P	360.0	FNAL-384	K+ N	6.0		CERN-S-137
PI-P	400.0	FNAL-138	K+ N	150.0		FNAL-331
PI-P	400.0	FNAL-215	K+ D	20.0	500.0	FNAL-104
PI-N	150.0	FNAL-331	K+ D	25.0	200.0	FNAL-396
PI-N	150.0	FNAL-192	K+ D	50.0		FNAL-118A
PI-N	200.0	FNAL-338	K+ D	100.0		FNAL-118A
PI-N	400.0	FNAL-338	K+ D	150.0		FNAL-118A
PI-D	8.0	SLAC-E-103	K+ HE	1.0	3.0	ANL-E-406
PI-D	16.0	SLAC-E-103	K+ C	1.0	3.0	ANL-E-406
PI-D	20.0	FNAL-104	K+ NE	1.0	3.0	ANL-E-406
PI-D	25.0	FNAL-396	K+ NUCLEUS	?		BNL-694
PI-D	200.0	FNAL-338	K+ NUCLEUS	?		CERN-NA-1
PI-D	400.0	FNAL-338	K+ NUCLEUS	?		FNAL-379
PI-HE	1.0	ANL-E-406	K+ NUCLEUS	100.0		FNAL-178
PI-HE	5.0	CERN-S-143	K+ NUCLEUS	200.0		FNAL-178
PI-HE	50.0	FNAL-86A	K+	3.0	15.0	CERN-S-150
PI-C	0.2	FNAL-444	K+	25.0		FNAL-327
PI-C	1.0	ANL-E-406	K+	50.0		FNAL-327
PI-C	16.0	BNL-687	K+	100.0		FNAL-327
PI-C	24.0	BNL-687	K+	175.0		FNAL-327
PI-C	25.0	BNL-647	K0	6.0	16.0	BNL-615
PI-NE	1.0	ANL-E-406	KL E-	?		FNAL-226
PI-NE	150.0	FNAL-89	KL P	?		FNAL-425
PI-CU	16.0	BNL-687	KL P	2.0	8.0	CERN-S-147
PI-CU	24.0	BNL-687	KL P	4.0	16.0	CERN-S-130
PI-CU	200.0	FNAL-415	KL P	>40.0		FNAL-82
PI-WT	16.0	BNL-687	KL C	>40.0		FNAL-82
PI-WT	24.0	BNL-687	KL CU	8.0	20.0	SLAC-E-119
PI-PB	300.0	FNAL-304	KL NUCLEUS	?		FNAL-226

## BEAM-TARGET-MOMENTUM INDEX

BEAM AND TARGET	LAB MOMENTUM OR MOMENTUM RANGE (GEV/C)		EXPERIMENT	BEAM AND TARGET	LAB MOMENTUM OR MOMENTUM RANGE (GEV/C)		EXPERIMENT
KL	?		BNL-631	K- C	0.6		BNL-664
KL	1.0	4.0	RHEL-168	K- C	1.0	3.0	ANL-E-406
KL	2.0	6.0	ANL-E-333	K- NE	1.0	3.0	ANL-E-406
AKO	6.0	16.0	BNL-615	K- NUCLEUS	?		BNL-694
K- E-	100.0		FNAL-216	K- NUCLEUS	?		CERN-NA-1
K- E-	200.0		FNAL-216	K- NUCLEUS	?		FNAL-379
K- E-	200.0		FNAL-446	K- NUCLEUS	0.		CERN-S-152
K- E-	250.0		FNAL-456	K- NUCLEUS	0.6		BNL-646
K- P	?		CERN-NA-1	K- NUCLEUS	0.8		BNL-646
K- P	?		FNAL-236A	K- NUCLEUS	0.9		CERN-P-11
K- P	0.		BNL-643	K- NUCLEUS	0.9		CERN-S-154
K- P	0.		CERN-S-151	K- NUCLEUS	100.0		FNAL-178
K- P	0.4	0.8	RHEL-117	K- NUCLEUS	150.0		FNAL-272
K- P	0.4		ANL-E-347	K- NUCLEUS	200.0		FNAL-178
K- P	0.5	0.9	CERN-T-236	K- NUCLEUS	300.0		FNAL-272
K- P	0.5	1.1	BNL-634	K-	3.0	15.0	CERN-S-150
K- P	0.5	1.1	BNL-691	K-	25.0		FNAL-327
K- P	0.7	1.2	BNL-524	K-	50.0		FNAL-327
K- P	0.7	1.4	RHEL-136	K-	100.0		FNAL-327
K- P	1.2	1.9	RHEL-120	K-	175.0		FNAL-327
K- P	2.0	8.0	ANL-E-335				
K- P	2.0	8.0	ANL-E-365				
K- P	2.8		RHEL-119				
K- P	3.0		BNL-593				
K- P	4.0		BNL-673				
K- P	4.0		RHEL-150				
K- P	4.0	6.0	BNL-546				
K- P	4.0	6.0	BNL-596				
K- P	4.6		BNL-593				
K- P	5.0		BNL-588				
K- P	5.0		BNL-673				
K- P	5.0		CERN-S-144				
K- P	5.1		ANL-E-379				
K- P	6.0		CERN-S-140				
K- P	6.0	10.0	BNL-594				
K- P	6.5		ANL-E-289-292				
K- P	6.7		SLAC-BC-60				
K- P	7.0		BNL-588				
K- P	7.0	9.0	SLAC-BC-61				
K- P	8.3		CERN-T-209				
K- P	10.0		BNL-588				
K- P	10.0		CERN-S-131				
K- P	10.0		CERN-S-144		0.	300.0	FNAL-317
K- P	10.0		SLAC-E-109		1.0	3.0	ANL-E-395
K- P	12.0		BNL-588		1.2		ANL-E-416
K- P	18.0		CERN-WA-8		1.5		ANL-E-416
K- P	20.0		CERN-WA-7		1.9		ANL-E-416
K- P	20.0		CERN-WA-10		2.0		ANL-E-372
K- P	20.0	500.0	FNAL-104		2.0		ANL-E-402
K- P	25.0	200.0	FNAL-396		2.0	8.0	ANL-E-418
K- P	30.0		CERN-WA-3		2.0	8.0	ANL-E-335
K- P	32.0		CERN-WA-8		2.0		ANL-E-365
K- P	40.0		CERN-WA-7		2.5		ANL-E-416
K- P	40.0		CERN-WA-10		3.0		ANL-E-339
K- P	40.0		FNAL-324		3.0		ANL-E-372
K- P	50.0		CERN-WA-9		3.0		ANL-E-402
K- P	50.0		FNAL-7		3.0		ANL-E-416
K- P	50.0		FNAL-110A		3.0		ANL-E-418
K- P	50.0	150.0	CERN-WA-6		4.0		ANL-E-339
K- P	50.0	200.0	FNAL-69A		4.0		ANL-E-372
K- P	50.0	200.0	FNAL-96		4.0		ANL-E-402
K- P	55.0		CERN-WA-3		4.0		ANL-E-415
K- P	60.0		CERN-WA-7		4.0		ANL-E-416
K- P	75.0		CERN-WA-9		4.0		ANL-E-418
K- P	80.0		CERN-WA-3		5.0		CERN-S-144
K- P	80.0		CERN-WA-7		6.0		ANL-E-339
K- P	80.0		CERN-WA-10		6.0		ANL-E-366
K- P	80.0		FNAL-7		6.0		ANL-E-367
K- P	80.0		FNAL-324		6.0		ANL-E-372
K- P	100.0		CERN-WA-9		6.0		ANL-E-381
K- P	100.0		FNAL-110A		6.0		ANL-E-385
K- P	100.0	150.0	FNAL-83A		6.0		ANL-E-393
K- P	110.0		FNAL-7		6.0		ANL-E-399
K- P	140.0		FNAL-7		6.0		ANL-E-401
K- P	150.0		FNAL-299		6.0		ANL-E-402
K- P	150.0		FNAL-331		6.0		ANL-E-407
K- P	150.0	300.0	FNAL-192		6.0		ANL-E-416
K- P	160.0		FNAL-324		6.0		ANL-E-418
K- P	170.0		FNAL-7		7.0	500.0	FNAL-198A
K- P	200.0		FNAL-110A		8.0		ANL-E-415
K- N	0.7	1.4	RHEL-136		8.0		ANL-E-418
K- N	0.9		CERN-T-211		8.0	400.0	RHEL-112
K- N	1.0		CERN-T-211		8.0		FNAL-381
K- N	2.0		CERN-T-211		9.0		ANL-E-391
K- N	2.2		CERN-T-211		9.0		SLAC-BC-64
K- N	2.3		CERN-T-211		10.0		CERN-S-131
K- N	2.5		CERN-T-211		10.0		CERN-S-144
K- N	150.0		FNAL-331		10.0		SLAC-E-109
K- N	150.0	300.0	FNAL-192		11.0		ANL-E-371
K- D	0.		BNL-643		12.0		ANL-E-366
K- D	20.0	500.0	FNAL-104		12.0		ANL-E-367
K- D	25.0	200.0	FNAL-396		12.0		ANL-E-391
K- HE	0.		BNL-643		12.0		ANL-E-399
K- HE	1.0	3.0	ANL-E-406		12.0		ANL-E-408
K- BE	0.6		BNL-664		12.0		ANL-E-415
K- C	0.2		FNAL-444		12.0		ANL-E-418

IN THE FOLLOWING INDEX OF PP EXPERIMENTS, ISR EXPERIMENTS ARE ORDERED BY THE EQUIVALENT LAB MOMENTUM FOR A STATIONARY TARGET RATHER THAN THE ACTUAL LAB (CENTER-OF-MASS) MOMENTUM.

## BEAM-TARGET-MOMENTUM INDEX

BEAM AND TARGET	LAB MOMENTUM OR MOMENTUM RANGE (GEV/C)	EXPERIMENT	BEAM AND TARGET	LAB MOMENTUM OR MOMENTUM RANGE (GEV/C)	EXPERIMENT
P P	14.0	SLAC-E-109	P P	2049.3	CERN-R-805
P P	15.0	BNL-671	P P	2074.0	CERN-R-108
P P	15.0 30.0	BNL-642	P P	2114.1	CERN-R-411
P P	20.0	BNL-658	P N	2.0	ANL-E-418
P P	20.0	CERN-WA-7	P N	3.0	ANL-E-418
P P	20.0	CERN-WA-10	P N	4.0	ANL-E-418
P P	20.0 50.0	FNAL-363	P N	6.0	ANL-E-418
P P	20.0 500.0	FNAL-104	P N	8.0 400.0	FNAL-381
P P	22.0	BNL-658	P N	9.0	ANL-E-391
P P	24.0	BNL-650	P N	12.0	ANL-E-391
P P	24.0	BNL-658	P N	50.0 200.0	FNAL-12
P P	24.0	CERN-S-141	P N	100.0	FNAL-196
P P	24.0	FNAL-396	P N	150.0	FNAL-331
P P	25.0 200.0	BNL-658	P N	200.0	FNAL-194
P P	26.0	BNL-658	P N	205.0	FNAL-280
P P	28.0	FNAL-313	P N	300.0	FNAL-209
P P	30.0 400.0	CERN-WA-7	P N	400.0	FNAL-194
P P	40.0	CERN-WA-10	P D	0.	FNAL-317
P P	40.0	FNAL-324	P D	2.0	ANL-E-339
P P	40.0	FNAL-7	P D	3.0	ANL-E-339
P P	50.0	FNAL-61	P D	4.0	ANL-E-339
P P	50.0	FNAL-110A	P D	6.0	ANL-E-339
P P	50.0	FNAL-118A	P D	7.0	FNAL-198A
P P	50.0 150.0	CERN-WA-6	P D	8.0 400.0	FNAL-381
P P	50.0 200.0	FNAL-69A	P D	20.0 200.0	FNAL-186
P P	50.0 200.0	FNAL-96	P D	20.0 500.0	FNAL-104
P P	60.0	CERN-WA-7	P D	25.0 200.0	FNAL-396
P P	70.0	FNAL-138	P D	50.0	FNAL-118A
P P	80.0	CERN-WA-7	P D	100.0	FNAL-118A
P P	80.0	CERN-WA-10	P D	100.0	FNAL-196
P P	80.0	FNAL-7	P D	100.0	FNAL-300
P P	80.0	FNAL-324	P D	150.0	FNAL-118A
P P	100.0	CERN-WA-9	P D	200.0	FNAL-194
P P	100.0	FNAL-61	P D	200.0	FNAL-300
P P	100.0	FNAL-110A	P D	205.0	FNAL-280
P P	100.0	FNAL-118A	P D	250.0	FNAL-118A
P P	100.0	FNAL-196	P D	300.0	FNAL-300
P P	100.0	FNAL-284	P D	400.0	FNAL-194
P P	100.0	FNAL-300	P D	400.0	FNAL-300
P P	100.0 500.0	FNAL-95A	P D	500.0	FNAL-300
P P	110.0	FNAL-7	P HE	0.4 5.0	ANL-E-414
P P	140.0	FNAL-7	P HE	1.0 3.0	ANL-E-406
P P	150.0	FNAL-61	P HE	8.0 500.0	FNAL-289
P P	150.0	FNAL-118A	P HE	12.0	ANL-E-351
P P	150.0	FNAL-299	P BE	?	BNL-669
P P	150.0	FNAL-331	P BE	28.5	BNL-658
P P	160.0	FNAL-324	P BE	300.0	FNAL-354
P P	170.0	FNAL-7	P BE	400.0	FNAL-400
P P	200.0	FNAL-110A	P C	0.2	FNAL-444
P P	200.0	FNAL-177A	P C	1.0 3.0	ANL-E-406
P P	200.0	FNAL-260	P C	100.0 300.0	FNAL-418
P P	200.0	FNAL-284	P C	200.0	FNAL-369
P P	200.0	FNAL-300	P C	300.0	FNAL-275
P P	200.0	FNAL-369	P O	300.0	FNAL-275
P P	200.0	FNAL-395	P NE	1.0 3.0	ANL-E-406
P P	205.0	FNAL-280	P NE	100.0	FNAL-291
P P	250.0	FNAL-118A	P NE	400.0	FNAL-291
P P	250.0	FNAL-138	P FE	400.0	FNAL-439
P P	281.0	CERN-R-411	P CU	100.0 300.0	FNAL-418
P P	281.0 2114.1	CERN-R-702	P CU	400.0	FNAL-436
P P	293.3	CERN-R-108	P WT	100.0 300.0	FNAL-418
P P	293.3 2100.7	CERN-R-413	P NUCLEUS	?	CERN-NA-1
P P	300.0	FNAL-209	P NUCLEUS	?	CERN-S-132
P P	300.0	FNAL-268	P NUCLEUS	?	FNAL-100A
P P	300.0	FNAL-277	P NUCLEUS	?	FNAL-184
P P	300.0	FNAL-281	P NUCLEUS	?	FNAL-276
P P	300.0	FNAL-284	P NUCLEUS	?	FNAL-379
P P	300.0	FNAL-300	P NUCLEUS	1.0 11.5	ANL-E-384
P P	300.0	FNAL-343	P NUCLEUS	2.5 10.0	BNL-675
P P	300.0	FNAL-395	P NUCLEUS	6.0	ANL-E-354
P P	300.0	FNAL-404	P NUCLEUS	6.0	ANL-E-403
P P	300.0 400.0	FNAL-413	P NUCLEUS	10.0 500.0	FNAL-442
P P	400.0	FNAL-138	P NUCLEUS	15.0	BNL-676
P P	400.0	FNAL-177A	P NUCLEUS	21.0	BNL-676
P P	400.0	FNAL-284	P NUCLEUS	29.0	BNL-676
P P	400.0	FNAL-300	P NUCLEUS	50.0 200.0	FNAL-81A
P P	400.0	FNAL-341	P NUCLEUS	100.0	FNAL-178
P P	400.0	FNAL-404	P NUCLEUS	200.0	FNAL-8
P P	400.0	FNAL-441	P NUCLEUS	200.0	FNAL-28A
P P	478.7 2047.5	CERN-R-806	P NUCLEUS	200.0	FNAL-48
P P	480.5	CERN-R-805	P NUCLEUS	200.0	FNAL-178
P P	498.0	CERN-R-108	P NUCLEUS	200.0	FNAL-271
P P	500.0	FNAL-207	P NUCLEUS	200.0	FNAL-292
P P	500.0	FNAL-300	P NUCLEUS	200.0	FNAL-435
P P	511.2	CERN-R-411	P NUCLEUS	200.0	FNAL-453
P P	1032.6	CERN-R-109	P NUCLEUS	200.0	FNAL-466
P P	1032.6	CERN-R-805	P NUCLEUS	200.0 500.0	FNAL-171
P P	1068.6	CERN-R-108	P NUCLEUS	300.0	FNAL-244
P P	1078.2	CERN-R-411	P NUCLEUS	300.0	FNAL-251
P P	1441.8	CERN-R-109	P NUCLEUS	300.0	FNAL-335
P P	1441.8	CERN-R-605	P NUCLEUS	300.0	FNAL-374
P P	1441.8	CERN-R-606	P NUCLEUS	300.0	FNAL-419
P P	1441.8	CERN-R-805	P NUCLEUS	300.0	FNAL-421
P P	1479.1	CERN-R-108	P NUCLEUS	300.0	FNAL-426
P P	1495.9	CERN-R-411	P NUCLEUS	400.0	FNAL-238
P r	2049.3	CERN-R-109	P NUCLEUS	400.0	FNAL-243

## BEAM-TARGET-MOMENTUM INDEX

BEAM AND TARGET	LAB MOMENTUM OR MOMENTUM RANGE (GEV/C)	EXPERIMENT	BEAM AND TARGET	LAB MOMENTUM OR MOMENTUM RANGE (GEV/C)	EXPERIMENT
P NUCLEUS	400.0	FNAL-245	AP P	6.0 10.0	BNL-594
P NUCLEUS	400.0	FNAL-249	AP P	6.3	BNL-654
P NUCLEUS	400.0	FNAL-251	AP P	7.3	CERN-T-237
P NUCLEUS	400.0	FNAL-265	AP P	8.7	BNL-654
P NUCLEUS	400.0	FNAL-279	AP P	9.0	SLAC-BC-64
P NUCLEUS	400.0	FNAL-329	AP P	10.0	CERN-S-144
P NUCLEUS	400.0	FNAL-336	AP P	10.0	SLAC-E-109
P NUCLEUS	400.0	FNAL-346	AP P	10.0 12.0	BNL-661
P NUCLEUS	400.0	FNAL-364	AP P	12.0	CERN-T-243
P NUCLEUS	400.0	FNAL-385	AP P	15.0	BNL-671
P NUCLEUS	400.0	FNAL-423	AP P	20.0	CERN-WA-7
P NUCLEUS	400.0	FNAL-428	AP P	20.0	CERN-WA-10
P NUCLEUS	400.0	FNAL-434	AP P	20.0 500.0	FNAL-104
P NUCLEUS	400.0	FNAL-461	AP P	25.0 200.0	FNAL-396
P NUCLEUS	400.0	FNAL-462	AP P	30.0 60.0	FNAL-344
P NUCLEUS	400.0	FNAL-463	AP P	40.0	CERN-WA-7
P NUCLEUS	500.0	FNAL-48	AP P	40.0	CERN-WA-10
P NUCLEUS	500.0	FNAL-249	AP P	40.0	FNAL-324
P NUCLEUS	500.0	FNAL-271	AP P	50.0	CERN-WA-9
P NUCLEUS	500.0	FNAL-288	AP P	50.0	FNAL-7
P NUCLEUS	500.0	FNAL-292	AP P	50.0	FNAL-110A
P NUCLEUS	500.0	FNAL-329	AP P	50.0 200.0	FNAL-69A
P NUCLEUS	500.0	FNAL-435	AP P	50.0 200.0	FNAL-96
P	3.0 15.0	CERN-S-150	AP P	60.0	CERN-WA-7
P	25.0	FNAL-327	AP P	75.0	CERN-WA-9
P	50.0	FNAL-327	AP P	80.0	CERN-WA-7
P	50.0 500.0	FNAL-108	AP P	80.0	CERN-WA-10
P	100.0	FNAL-327	AP P	80.0	FNAL-7
P	175.0	FNAL-327	AP P	80.0	FNAL-324
N P	25.0 200.0	FNAL-396	AP P	100.0	CERN-WA-9
N P	40.0 300.0	FNAL-4	AP P	100.0	FNAL-110A
N P	40.0 300.0	FNAL-248	AP P	100.0	FNAL-311
N P	50.0 300.0	FNAL-305	AP P	100.0 150.0	FNAL-83A
N P	100.0 200.0	FNAL-366	AP P	110.0	FNAL-7
N N	50.0 300.0	FNAL-305	AP P	140.0	FNAL-7
N D	25.0 200.0	FNAL-396	AP P	150.0	FNAL-299
N D	40.0 300.0	FNAL-4	AP P	150.0	FNAL-311
N D	100.0 200.0	FNAL-366	AP P	150.0	FNAL-331
N BE	>6.0	BNL-656	AP P	150.0 300.0	FNAL-192
N BE	30.0 300.0	FNAL-438	AP P	160.0	FNAL-324
N BE	200.0	FNAL-397	AP P	170.0	FNAL-7
N C	30.0 300.0	FNAL-438	AP P	200.0	FNAL-110A
N AL	30.0 300.0	FNAL-438	AP P	200.0	FNAL-302
N FE	30.0 300.0	FNAL-438	AP P	200.0	FNAL-392
N CU	30.0 300.0	FNAL-438	AP N	100.0	FNAL-345
N CD	30.0 300.0	FNAL-438	AP N	150.0	FNAL-331
N WT	30.0 300.0	FNAL-438	AP N	150.0 300.0	FNAL-192
N PB	30.0 300.0	FNAL-438	AP D	?	BNL-660
N U	30.0 300.0	FNAL-438	AP D	0.	BNL-643
N NUCLEUS	40.0 300.0	FNAL-4	AP D	0.	ANL-E-413
N NUCLEUS	50.0 300.0	FNAL-305	AP D	2.0 4.0	BNL-625
N NUCLEUS	100.0 200.0	FNAL-366	AP D	20.0 500.0	FNAL-104
N NUCLEUS	300.0	FNAL-358	AP D	25.0 200.0	FNAL-396
N NUCLEUS	400.0	FNAL-358	AP HE	0.	BNL-643
AN P	0. 0.8	ANL-E-303	AP HE	1.0 3.0	ANL-E-406
AN P	5.0E-02 0.7	BNL-626	AP C	1.0 3.0	ANL-E-406
AN P	50.0 300.0	FNAL-305	AP NE	?	ANL-E-409
AN N	50.0 300.0	FNAL-305	AP NE	1.0 3.0	ANL-E-406
AN NUCLEUS	50.0 300.0	FNAL-305	AP NUCLEUS	?	BNL-694
AP P	?	ANL-E-368	AP NUCLEUS	?	CERN-NA-1
AP P	?	ANL-E-409	AP NUCLEUS	?	FNAL-379
AP P	?	BNL-660	AP NUCLEUS	10.0 12.0	BNL-661
AP P	?	CERN-NA-1	AP NUCLEUS	150.0	FNAL-272
AP P	?	FNAL-236A	AP NUCLEUS	300.0	FNAL-272
AP P	0.	BNL-643	AP	3.0 15.0	CERN-S-150
AP P	0.	CERN-S-135	AP	25.0	FNAL-327
AP P	0.	CERN-S-142	AP	50.0	FNAL-327
AP P	0.	CERN-S-151	AP	100.0	FNAL-327
AP P	0.	ANL-E-413	AP	175.0	FNAL-327
AP P	0.	ANL-E-303	LAMBDA P	60.0 130.0	FNAL-8
AP P	0.3 1.0	BNL-634	LAMBDA P	75.0 150.0	FNAL-97
AP P	0.3 1.0	BNL-666	LAMBDA	6.0 15.0	BNL-597
AP P	0.4	BNL-662	LAMBDA	150.0 210.0	FNAL-440
AP P	0.4 0.9	CERN-S-149	ALAMBDA P	60.0 130.0	FNAL-8
AP P	0.5	BNL-662	SIGMA+	100.0	CERN-WA-2
AP P	0.6	BNL-662	SIGMA- P	75.0 150.0	FNAL-97
AP P	1.2	ANL-E-382	SIGMA-	?	BNL-618
AP P	1.2 3.0	BNL-644	SIGMA-	100.0	CERN-WA-2
AP P	2.0	RHEL-115	XI- P	75.0 150.0	FNAL-97
AP P	2.0 8.0	ANL-E-365	XI-	?	BNL-618
AP P	2.6	ANL-E-383	XI-	100.0	CERN-WA-2
AP P	3.9	BNL-654	OMEGA- P	75.0 150.0	FNAL-97
AP P	4.0 10.0	BNL-596	HADRON P	?	CERN-NA-3
AP P	5.0	CERN-S-144	HADRON P	?	CERN-NA-5
AP P	5.7	ANL-E-383	NEUTRAL NUCLEUS	?	FNAL-386
AP P	6.0	BNL-601			

## PARTICLE INDEX

PARTICLE	EXPERIMENT(S)	PARTICLE	EXPERIMENT(S)
MU-	CERN-S-97	SIGMA-	ANL-E-347; BNL-618; CERN-WA-2
MU+	CERN-S-97	SIG(1385P13)+	ANL-E-289-292
HVY-LEPTON+	FNAL-192	SIG(1385P13)-	ANL-E-289-292
HVY-LEPTON-	FNAL-192	SIG(1670B)+	ANL-E-289-292
HVY-LEPTONO	FNAL-192	SIG(1670B)0	ANL-E-289-292
HVY-LEPTON	BNL-632; CERN-WA-1; DESY-138, 139, 140; FNAL-45A, 48, 203A, 247, 379, 391, 435, 439	SIG(1670B)-	ANL-E-289-292
AHVY-LEPTON	FNAL-172, 180	SIG(1915B)+	ANL-E-289-292
PI+	FNAL-446	SIG(1915B)0	ANL-E-289-292
PIO	FNAL-171, 265	SIG(1915B)-	ANL-E-289-292
PI-	FNAL-446	SIG(2250B)+	ANL-E-289-292
EPSILON(700)	ANL-E-370, E-400	SIG(2250B)0	ANL-E-289-292
RHO0	DESY-115; SLAC-E-123A	SIG(2250B)-	ANL-E-289-292
RHO-	FNAL-272	XI0	FNAL-8
OMEGA	DESY-115	XI-	BNL-618; CERN-WA-2
ETAPRIME	ANL-E-289-292; BNL-593; RHEL-128	XI(1530P13)0	ANL-E-289-292; RHEL-119
DELTA(970)+	ANL-E-289-292, E-382, E-397	XI(1530P13)-	ANL-E-289-292; BNL-673; RHEL-119
DELTA(970)-	ANL-E-289-292, E-382, E-397; BNL-557, 593	XI(1630)0	ANL-E-289-292; RHEL-119
H(990)	ANL-E-397	XI(1630)-	ANL-E-289-292; RHEL-119
S*(993)	ANL-E-370; RHEL-128	XI(1820)0	ANL-E-289-292; RHEL-119
PHI	DESY-115	XI(1820)-	ANL-E-289-292; BNL-673; RHEL-119
ETA(1080)	ANL-E-368	XI(1940)0	ANL-E-289-292; RHEL-119
A1(1100)0	ANL-E-397	XI(1940)-	ANL-E-289-292; BNL-673; RHEL-119
F	ANL-E-289-292	XI(2030)0	ANL-E-289-292
D(1285)	ANL-E-368, E-382, E-397	XI(2030)-	ANL-E-289-292
A2(1310)+	RHEL-91	XI(2250)0	ANL-E-289-292
A2(1310)-	FNAL-272	XI(2250)-	ANL-E-289-292
E(1420)	ANL-E-368, E-382	XI(2500)0	ANL-E-289-292
FPRIME	ANL-E-289-292	XI(2500)-	ANL-E-289-292
F1(1540)0	BNL-593; CERN-WA-8	XI*(UNSPEC)	CERN-T-209
A3(1640)-	BNL-557	XI*(UNSPEC)	BNL-593
G(1680)-	BNL-557	OMEGA-	CERN-T-209
S(1930)-	ANL-E-413	HE3	SLAC-E-121
J/PSI(3100)0	ANL-E-411; DESY-140; FNAL-391, 444	HE	SLAC-E-121
PSI(3700)0	DESY-138, 140; FNAL-391, 444; SLAC-SP-27	HNUCLEUS	CERN-S-152, S-154
K+	FNAL-446	QUARK(2/3)	FNAL-89
KS	ANL-E-363; BNL-615	QUARK(1/3)	FNAL-89
KL	ANL-E-333, E-363; BNL-631; FNAL-82, 425; RHEL-168	QUARK	FNAL-45A
K-	FNAL-446, 456	W+	FNAL-21A, 45A, 48, 53A, 192, 288, 435
K*(892)-	FNAL-272	W0	CERN-R-804; FNAL-288
K*(1420)+	BNL-546	W-	FNAL-172, 180, 192, 288, 411
K*(1420)-	BNL-546; FNAL-272	W	CERN-WA-1; FNAL-310, 379
KN(1700)+	CERN-S-131	S+	FNAL-53A, 180
KN(1700)-	CERN-S-131	S-	FNAL-180
L(1770)-	ANL-E-289-292	CHARM	BNL-654, 658, 669, 679, 682, 686, 688, 694; CERN-R-605, R-702, T-243, T-245; DESY-138, 139; FNAL-151A, 247, 346, 357, 364, 369, 374, 379, 382, 384, 390, 397, 400, 411, 413, 416, 419, 428, 472; SLAC-E-123B
K*(UNSPEC)-	ANL-E-289-292	TACHYON	FNAL-202
AP	BNL-643	MONOPOLE	CERN-R-109, R-301; FNAL-3, 25A, 45A, 76, 202
N(1470B)+	ANL-E-339	UNSPEC	CERN-R-406; FNAL-45A, 171, 184, 238, 243, 421, 423
N(1520B)+	ANL-E-339	CHARGED+	FNAL-276; RHEL-144
N(1520B)0	ANL-E-339	CHARGED-	FNAL-276
N(1700B)+	ANL-E-339	NEUTRAL	FNAL-330, 366
N(1700B)0	ANL-E-339		
DEL(1232P33)++	ANL-E-339		
DEL(1950B)++	ANL-E-339		
LAMBDA	BNL-597, 618; FNAL-440		
SIGMA+	CERN-WA-2		

## SPOKESMAN INDEX

SPOKESMAN	INSTITUTION	EXPERIMENT	SPOKESMAN	INSTITUTION	EXPERIMENT
ABOLINS, M.A.	MSU	FNAL-366	ENGELMANN, R.	STON	FNAL-227
ADAIR, R.K.	YALE	BNL-676	ENGELMANN, R.	STON	FNAL-196
ADAIR, R.K.	YALE	FNAL-435	ERMOLOV, P.F.	SERP	FNAL-180
ADAIR, R.K.	YALE	FNAL-436	ERNE, F.C.	?	CERN-R-207
ADAIR, R.K.	YALE	FNAL-48	FACKLER, O.	ROCK	FNAL-335
AKERLOF, C.	MICH	BNL-588	FEBEL, T.	ROCH	FNAL-272
ALBROW, M.	LIVP	CERN-R-413	FIDECARD, G.	?	CERN-WA-6
ALLISON, W.W.M.	OXF	FNAL-327	FIELDS, T.	ANL	FNAL-280
ANDERSON, H.L.	CHIC	FNAL-398	FISHER, C.M.	RHEL	RHEL-119
ANDERSON, H.L.	CHIC	FNAL-98	FITCH, V.	PRIN	BNL-661
ANKENBRANDT, C.	FNAL	FNAL-446	FITCH, V.	PRIN	BNL-694
ARONSON, S.H.	FNAL	FNAL-82	FOA, L.	PI SA, SNSP	CERN-WA-1
ARONSON, S.H.	FNAL	FNAL-425	FOX, G.	CIT	FNAL-350
ASTBURY, A.	RHEL	RHEL-136	FRETTER, W.B.	UCB	FNAL-89
ASTBURY, P.	LOIC	CERN-S-134	FRIEDMAN, A.	STRB	ANL-E-351
AWSCHALOM, M.	FNAL	FNAL-108	FRIEDMAN, J.I.	MIT	SLAC-E-107
BAILLEY, J.	DARE	CERN-S-142	FRIEDMAN, J.I.	MIT	FNAL-118A
BAILLON, P.	CERN	CERN-S-144	FRIES, D.C.	KARL	DESY-94
BAILLON, P.	CERN	CERN-S-153	FRISCH, H.J.	CHIC	FNAL-453
BAKER, W.F.	FNAL	FNAL-290	FRY, W.	WISC	FNAL-28A
BAKER, W.F.	FNAL	FNAL-354	FRY, W.F.	WISC	BNL-532
BALTAY, C.	COLU	BNL-589-639	FU, C.	IIT	ANL-E-371
BALTAY, C.	COLU	FNAL-380	FUKUI, K.	EMMA	FNAL-426
BALTAY, C.	COLU	FNAL-53A	GABATHULER, E.	DARE	CERN-WA-2
BANNER, M.	SACL	CERN-R-702	GAILLARD, J.M.	ORSA	CERN-WA-2
BARBARO-GALTIERI, A.	LBL	SLAC-SP-26	GARELICK, D.	NEAS	FNAL-411
BARISH, B.	CIT	FNAL-21A	GARELICK, D.	NEAS	FNAL-439
BARISH, B.C.	CIT	FNAL-356	GARELICK, D.	NEAS	FNAL-413
BARNES, V.E.	PURD	FNAL-277	GARFINKEL, A.F.	PURD	FNAL-390
BARTLETT, D.F.	COLO	FNAL-202	GASPARINI, F.	PADO	CERN-S-130
BENSINGER, J.	BRAN	BNL-682	GAYLER, J.	DESY	DESY-137
BERGER, C.	DESY	DESY-125	GENZEL, H.	DESY	DESY-129
BINGHAM, H.H.	UCB	FNAL-172	GENZEL, H.	DESY	DESY-136
BINNIE, D.	LOIC	RHEL-128	GIACOMELLI, G.	BGNA	FNAL-419
BINNIE, D.M.	LOIC	RHEL-168	GIACOMELLI, G.	BGNA	CERN-R-301
BIZZARRI, R.	ROMA	ANL-E-382	GIACOMELLI, G.	BGNA	FNAL-462
BLOOM, E.D.	SLAC	SLAC-SP-24	GIOBBI, B.	NWES	FNAL-305
BLOOM, E.D.	MPIM	CERN-S-140	GOGGI, G.	PAVI	CERN-R-411
BOOTH, N.	OXF	RHEL-112	GOLDBERG, M.	SYRA	BNL-688
BORGIA, B.	ROMA	CERN-R-107	GOLDBERG, M.	SYRA	BNL-601
BRABSON, B.B.	IND	SLAC-E-103	GOLDBERG, M.	SYRA	BNL-593
BRACCINI, P.L.	?	CERN-R-804	GOLDEN, R.L.	MSCC	FNAL-399
BROWN, R.M.	RHEL	RHEL-81	GOLDHABER, G.	LBL	FNAL-215
BROWN, R.M.	RHEL	RHEL-101	GORDON, H.	BNL	BNL-686
BUCHANAN, C.	UCLA	SLAC-SP-10	GORMLEY, M.	ILL	FNAL-401
BUNCE, G.	WISC	FNAL-440	GOTTFRIED, K.	CORN	FNAL-271
BURHOP, E.H.S.	LOUC	FNAL-247	GOTTFRIED, K.	CORN	FNAL-292
BUSZA, W.	MIT	FNAL-178	GOULIANOS, K.	ROCK	FNAL-396
CALDWELL, D.	UCSB	FNAL-25A	GRACCO, V.	?	CERN-WA-7
CARITHERS, W.C.	ROCH	BNL-631	GRAFSTROM, P.	UOPP	CERN-S-143
CARITHERS, W.C.	ROCH	BNL-656	GRAY, S.W.	IND	ANL-E-399
CARRIGAN, R.A.	FNAL	FNAL-76	GURAGOSSIAN, Z.G.T.	STAN	FNAL-192
CASON, N.M.	NDAM	ANL-E-400	GUSAKOM, M.	LYON	CERN-S-152
CESTER-REGGE, R.	PRIN	FNAL-302	GUSTAFSON, H.R.	MICH	FNAL-330
CHADWICK, G.B.	SLAC	SLAC-BC-59	GUTAY, L.J.	PURD	FNAL-344
CHAMBERLAIN, D.	LBL	FNAL-61	HAND, L.	CORN	FNAL-382
CHAUDHARY, B.S.	TATA	RHEL-115	HEBERT, J.	OTTA	FNAL-428
CHEN, K.W.	MSU	FNAL-319	HEINZELMANN, G.	HEID	DESY-140
CHEN, M.	MIT	FNAL-263	HEUSCH, C.A.	UCSC	FNAL-152B
CHEN, M.	MIT	BNL-675	HUGHES, E.B.	STAN	SLAC-SP-16
CHERTOK, B.T.	AMER	SLAC-E-121	HUGHES, V.W.	YALE	BNL-524
CHERTOK, B.T.	AMER	SLAC-E-101	HUSON, F.R.	YALE	SLAC-E-80
CHRISTENSON, J.H.	NYU	BNL-615	HYMAN, L.G.	FNAL	FNAL-384
CHUNG, S.U.	BNL	BNL-682	JAIN, P.L.	ANL	ANL-E-412
CHUNG, S.U.	BNL	BNL-673	JAIN, P.L.	BUFF	FNAL-245
CHUNG, S.U.	BNL	BNL-557	JAIN, P.L.	BUFF	FNAL-244
CLINE, D.	?	FNAL-310	JARLSKOG, G.	BUFF	FNAL-362
CLINE, D.	WISC	FNAL-1A	JARLSKOG, G.	?	CERN-R-410
CLINE, D.	WISC	ANL-E-303	JENSEN, D.	?	CERN-R-413
COOL, R.	ROCK	FNAL-317	JONES, L.W.	PRIN	BNL-597
CORBETT, I.F.	RHEL	RHEL-150	JONES, L.W.	MICH	FNAL-438
COWARD, D.H.	SLAC	SLAC-E-107	KALBFLEISCH, G.R.	MICH	FNAL-404
COX, B.	JHU	FNAL-95A	KALBFLEISCH, G.R.	BNL	BNL-589-639
CRONIN, J.W.	CHIC	FNAL-300	KALMUS, G.	BNL	FNAL-254
CRONIN, J.W.	EFI	FNAL-325	KALOGEROPOULOS, T.E.	RHEL	RHEL-91
CRONIN, J.W.	CHIC	ANL-E-333	KALOGEROPOULOS, T.E.	SYRA	BNL-660
CROZON, M.	CDEF	CERN-S-130	KANE, J.R.	SYRA	BNL-626
DAKE, S.	KOBE	FNAL-434	KANDOSKY, A.	WILL	BNL-643
DAKE, S.	KOBE	FNAL-340	KANDOSKY, A.	LEHI	ANL-E-406
DALPIAZ, P.	TORI	CERN-S-135	KAUFMAN, S.B.	LEHI	BNL-664
DAO, F.T.	?	FNAL-209	KAUFMAN, S.B.	ANL	FNAL-81A
DARRIULAT, P.	CERN	CERN-R-702	KENNEY, R.	ANL	FNAL-466
DAVIS, D.H.	LOUC	FNAL-374	KENNEY, V.P.	LBL	FNAL-350
DE BOUARD, X.	ORSA	CERN-R-410	KERTH, L.T.	NDAM	ANL-E-370
DELLA NEGRA, M.	CDEF	CERN-R-407-408	KERTH, L.T.	UCB	FNAL-391
DERRICK, M.	ANL	FNAL-31A	KILIAN, K.	LBL	FNAL-203A
DI LELLA, L.	CERN	CERN-R-108	KIRK, T.	HEID	CERN-S-149
DICK, L.	CERN	CERN-S-141	KIRKBY, J.	ILL	FNAL-369
DIEBOLD, R.	ANL	FNAL-99	KIRSCH, L.	STAN	SLAC-SP-25
DOBINSON, R.W.	?	CERN-R-805	KITAGAKI, T.	BRAN	BNL-688
DORNAN, P.J.	LOIC	SLAC-BC-40	KITAGAKI, T.	TOHD	ANL-E-409
DOWELL, J.D.	BIRM	CERN-WA-8	KITAGAKI, T.	TOHD	ANL-E-368
DUCROS, Y.	SACL	CERN-S-137	KO, W.	TOHD	FNAL-83A
EBERHARD, P.H.	LBL	FNAL-3	KOCH, H.	UCD	FNAL-341
EDELSTEIN, R.M.	CARN	BNL-596	KRAMER, S.L.	?	CERN-S-151
EDWARDS, K.W.	CARL	ANL-E-397	KRIENEN, F.	ANL	ANL-E-391
EKELOF, T.	JUPP	CERN-WA-9	KRISCH, A.D.	CERN	CERN-S-97
EKSPONG, G.	STOH	FNAL-346	KRISCH, A.D.	MICH	ANL-E-381
EKSPONG, G.	STOH	FNAL-345	KUSUMOTO, O.	MICH	ANL-E-366
ENGE, W.	KIEL	FNAL-275	KYCIA, T.F.	OSAK	FNAL-251
ENGELMANN, R.	STON	FNAL-343	KYCIA, T.F.	BNL	FNAL-104
ENGELMANN, R.	STON	FNAL-207		BNL	BNL-656

## SPOKESMAN INDEX

SPOKESMAN	INSTITUTION	EXPERIMENT	SPOKESMAN	INSTITUTION	EXPERIMENT
KYCIA, T. F.	BNL	BNL-671	PREPOST, R.	WISC	SLAC-E-114
LACH, J.	FNAL	FNAL-97	PRESCOTT, C.	SLAC	SLAC-E-122
LAGNAUX, J. P.	BELG	CERN-S-132	PRESCOTT, C. Y.	SLAC	SLAC-E-95
LEDERMAN, L. M.	COLU	FNAL-288	PRICE, L. E.	COLU	ANL-E-415
LEE, W.	COLU	BNL-605	REAY, N. W.	OSU	FNAL-12
LEE, W.	COLU	FNAL-87A	REAY, N. W.	OSU	FNAL-366
LEE, W.	COLU	BNL-652	REAY, N. W.	OSU	ANL-E-380
LEE, W.	COLU	BNL-693	RHINES, D.	ILL	ANL-E-360
LEE, W.	COLU	FNAL-358	RITSON, D. M.	STAN	FNAL-96
LEE-FRANZINI, J.	STON	FNAL-321	RITSON, D. R.	SLAC	SLAC-E-112
LEITH, D. W. G. S.	SLAC	SLAC-E-109	ROBERTS, J.	RICE	ANL-E-408
LINDENBAUM, S. J.	CUNY, BNL	BNL-594	ROBINSON, D. K.	CASE	ANL-E-367
LINDENBAUM, S. J.	BNL, CUNY	BNL-679	ROE, B.	MICH	FNAL-45A
LIPMAN, N.	RHEL	RHEL-126	RHODE, M.	?	DESY-115
LITT, J.	DARE	CERN-WA-4	ROSEN, J.	NWES	FNAL-397
LIU, J. K.	SLAC	SLAC-E-119	ROBBIA, C.	?	CERN-NA-4
LONGO, M. J.	MICH	FNAL-4	RUBBIA, C.	HARV	BNL-613
LONGO, M. J.	MICH	FNAL-248	RUDDICK, K.	MINN	ANL-E-411
LORD, J. J.	WASH	FNAL-386	RUSS, J.	CARN	BNL-642
LORD, J. J.	WASH	FNAL-171	RUTHERFOORD, J.	TUFT	SLAC-E-108
LORD, J. J.	WASH	FNAL-461	SACTON, J.	BRUX	FNAL-364
LORD, J. J.	WASH	FNAL-238	SAKITT, M.	BNL	BNL-641
LUBATTI, H. J.	WASH	FNAL-416	SAMIOS, N.	BNL	BNL-629
LUBATTI, H. J.	WUSL	FNAL-86A	SAMIOS, N.	BNL	BNL-427
LYNCH, H. L.	SLAC	SLAC-SP-17	SANDLER, B.	ANL	ANL-E-385
MA, Z. M.	MSU	ANL-E-363	SANNES, F.	RUTG	FNAL-418
MALAMUD, E.	FNAL	FNAL-289	SAXON, D. H.	RHEL	RHEL-166
MALAMUD, E.	FNAL	FNAL-381	SCHALK, T.	UCSC	SLAC-E-123B
MALOS, J.	BRIS	RHEL-83	SCHMIDT, D.	DESY	DESY-126
MALOS, J.	BRIS	RHEL-105	SCHNEEGANS, M.	STRB	CERN-S-135
MALOS, J.	BRIS	RHEL-120	SCHULTZ, P.	ANL	ANL-E-413
MANN, A. K.	PENN	BNL-613	SCHWARTZ, M.	STAN	BNL-614
MANN, W. A.	TUFT	FNAL-291	SCHWITTERS, R. F.	SLAC	SLAC-SP-17
MARSHAK, M.	MINN	ANL-E-407	SCIULLI, F.	CIT	FNAL-320
MARSHAK, M.	MINN	ANL-E-414	SCIULLI, F. J.	CIT	FNAL-356
MARSHAK, M.	MINN	ANL-E-393	SELOVE, W.	PENN	FNAL-246
MARTIN, F.	SLAC	SLAC-E-121	SELOVE, W.	PENN	BNL-557
MARTIN, H.	GEVA	CERN-S-131	SELOVE, W.	PENN	FNAL-395
MARTIN, H.	?	CERN-WA-10	SEYBOTH, P.	MPIM	CERN-NA-5
MARX, J.	YALE	FNAL-69A	SHIBATA, E. I.	PURD	ANL-E-379
MASEK, G.	UCSD	SLAC-SP-14	SINCLAIR, C.	SLAC	SLAC-E-122
MASEK, G.	UCSD	SLAC-SP-27	SMITH, A. J. S.	PRIN	FNAL-444
MASSAM, T.	BGNA	CERN-R-406	SMITH, G. A.	MSU	ANL-E-289-292
MCLEOD, D.	ILLC	FNAL-260	SMITH, G. A.	MSU	SLAC-BC-64
MCLEOD, D.	ILLC	FNAL-110A	SMITH, P. F.	RHEL	RHEL-144
MELISSINOS, A.	ROCH	FNAL-186	SNOW, G. A.	UMD	FNAL-151A
MELISSINOS, A. C.	ROCH	BNL-687	STANFIELD, K.	PURD	FNAL-472
MELISSINOS, A. C.	ROCH	BNL-632	STANTON, N. R.	OSU	ANL-E-380
MELLEMA, J.	CIT	FNAL-268	STEINBERG, E. P.	ANL	ANL-E-384
MEYER, D.	MICH	FNAL-357	STEINBERGER, J.	CERN	CERN-WA-1
MEYER, D.	MICH	FNAL-7	STEVENSON, M. L.	UCB	FNAL-388
MICHELINI, A.	CERN	CERN-NA-3	STONE, S. L.	VAND	SLAC-E-103
MILLER, D.	NWES	ANL-E-401	STORK, D.	UCLA	FNAL-216
MILLER, D.	NWES	ANL-E-372	STROOT, J. P.	BELG	CERN-S-132
MILLER, D. H.	PURD	SLAC-BC-61	SUGIMOTO, H.	TOKY	FNAL-423
MILLER, D. J.	LOUC	RHEL-117	SWALLOW, E. C.	CHIC	ANL-E-347
MO, L. W.	CHIC	FNAL-253	TAUSCHER, L.	?	CERN-S-151
MOCKETT, P. M.	WASH	FNAL-236A	TELEGDI, V. L.	FNAL	FNAL-425
MONETI, G. C.	SYRA	BNL-593	TELEGDI, V. L.	FNAL	FNAL-82
MONETI, G. C.	SYRA	BNL-625	TELEGDI, V. L.	CHIC	FNAL-226
MORIYASU, K.	WASH	FNAL-338	THERMOPSON, J. A.	PITT	BNL-618
MOZLEY, R.	SLAC	SLAC-E-123A	TICHO, H.	UCLA	SLAC-BC-58
MULLER, F.	CERN	CERN-R-606	TIMM, U.	DESY	DESY-138
MULLER, F.	CERN	CERN-R-605	TING, S. C. C.	MIT	BNL-669
MURPHY, C. T.	FNAL	FNAL-194	TING, S. C. C.	MIT	BNL-658
MUSGRAVE, B.	ANL	ANL-E-289-292	TING, S. C. C.	?	CERN-R-804
NAGLE, D.	LASL	ANL-E-403	TRETJAKOVA, M. I.	LEBD	FNAL-329
NAGLE, D. E.	LASL	ANL-E-354	TRETJAKOVA, M. I.	LEBD	FNAL-463
NEAL, H. A.	IND	FNAL-313	TRIPP, R.	LBL	BNL-666
NEALE, W. W.	FNAL	FNAL-311	TRIPP, R.	LBL	BNL-691
NEALE, W. W.	CAVE	FNAL-392	TRIPP, R. D.	LBL	BNL-634
NEUHOFER, G.	?	CERN-R-401	TURKOT, F.	FNAL	FNAL-442
NIELD, K.	ANL	ANL-E-402	VAN GINNEKEN, A.	FNAL	FNAL-276
NIU, K.	NAGO	FNAL-243	VANDER VELDE, J.	MICH	FNAL-138
OGATA, T.	KWAN	FNAL-336	VENUS, W.	RHEL	ANL-E-383
OLSEN, S.	ROCH	FNAL-363	WALKER, J. K.	FNAL	FNAL-284
OLSEN, S. L.	ROCH	FNAL-198A	WALKER, T.	RHEL	RHEL-114
OREAR, J.	CDRN	FNAL-177A	WALKER, W. D.	DUKE	FNAL-304
OZAKI, S.	BNL	BNL-594	WALKER, W. D.	DUKE	SLAC-BC-63
O'NEILL, G. K.	PRIN	SLAC-SP-27	WALTERS, J.	CARL	BNL-546
O'NEILL, G. K.	PRIN	SLAC-SP-19	WANDERER, P.	WISC	FNAL-184
PALEVSKY, H.	BNL	BNL-646	WANG, C. L.	BNL	BNL-664
PANVINI, R. S.	VANO	SLAC-E-103	WANG, C. L.	BNL	ANL-E-406
PEOPLES, J.	FNAL	FNAL-400	WEBER, G.	DESY	DESY-114
PERL, M.	SLAC	SLAC-SP-26	WEBSDALE, D.	LOIC	CERN-S-134
PETERSON, E.	MINN	ANL-E-418	WEILHAMMER, P.	CERN	CERN-WA-3
PETERSON, E.	MINN	ANL-E-365	WEISBERG, H.	PENN	BNL-650
PETERSON, V. Z.	HAWA	FNAL-155	WEISBERG, H.	PENN	FNAL-324
PHILLIPS, G. C.	RICE	ANL-E-395	WICKLUND, A. B.	ANL	ANL-E-339
PICCIONI, O.	UCSD	BNL-647	WIK, B. H.	DESY	DESY-139
PIEKARZ, H.	WARS	CERN-S-152	WILKES, R. J.	WASH	FNAL-387
PILCHER, J.	?	FNAL-331	WILLIS, W.	CERN	CERN-R-806
PIROUE, P. A.	PRIN	FNAL-100A	WILLIS, W.	?	CERN-R-806T
PIROUE, P. A.	PRIN	FNAL-258	WOJCICKI, S.	STAN	FNAL-379
PLESS, I. A.	MIT	FNAL-393	WOLTER, W.	CRAC	FNAL-249
PLESS, I. A.	MIT	FNAL-299	WOLTER, W.	CRAC	FNAL-339
POIRIER, J. A.	NDAM	ANL-E-335	YAMIN, P.	RUTG	BNL-644
PONDROM, L.	WISC	FNAL-441	YEKUTIELI, G.	REHO	FNAL-295
PONDROM, L. G.	WISC	FNAL-415	YUAN, L. C. L.	BNL	CERN-R-107
PONDROM, L. G.	WISC	FNAL-8	ZELLER, M.	YALE	BNL-662
POVH, B.	?	CERN-S-154			
PRAKASH, Y.	JAMU	FNAL-385			

ILLUSTRATIVE KEY FOR COMPILATION LISTING

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FNAL-8 (JUN 1970); APPROVED AUG 1970; STARTED ; COMPLETED 22 MAR 1976. ← EXPERIMENT NUMBER AND STATUS. PROPOSAL DATE IN PARENTHESES.

EXPERIMENTS IN A NEUTRAL HYPERON BEAM ← PROPOSAL TITLE AND/OR BRIEF DESCRIPTION (DESCRIPTION ENCLOSED IN BRACKETS).

WISC -- R.H.MARCH, L.G.PONDROM(SPOKESMAN)  
MICH -- D.E.OVERSETH  
RUTG -- ET AL.

ACCELERATOR=FNAL; DETECTOR=SPEC ← { ACCELERATOR, DETECTOR, AND POLARIZATION INFORMATION (IF ANY).  
SEE APPENDIX I FOR ACCELERATOR ABBREVIATIONS; APPENDIX II FOR DETECTORS.

P NUCLEUS --> LAMBDA ANYTHING	200 GEV (PLAB)	ANGP
P NUCLEUS --> ALAMBDA ANYTHING	"	"
P NUCLEUS --> XIO ANYTHING	"	"
P NUCLEUS --> AXIO ANYTHING	"	"
P NUCLEUS --> KL ANYTHING	"	"
P NUCLEUS --> KS ANYTHING	"	"
LAMBDA P --> ANYTHING	60-130 GEV (PLAB)	CS
ALAMBDA P --> ANYTHING	"	"
LAMBDA P --> LAMBDA P	60-130 GEV (PLAB)	ANGP
ALAMBDA P --> ALAMBDA P	"	"

} REACTIONS STUDIED (LEFTMOST), BEAM MOMENTA (MIDDLE), AND  
"DATA DESCRIPTORS" INDICATING TYPE OF DATA TAKEN (RIGHTMOST).  
SEE APPENDIX VII FOR PARTICLE NAME ABBREVIATIONS,  
APPENDIX III FOR VARIOUS BEAM MOMENTUM DESIGNATIONS, AND  
APPENDIX IV FOR DATA DESCRIPTORS.

XIO PW

<EXPERIMENTAL COMMENT> NUCLEAR PRODUCTION MEASUREMENTS ARE ZERO DEGREE YIELDS FOR HYPERON BEAM; APPROVED FOR 400 HOURS; RAN 2350 HOURS.

\*\*\*\*\*

FNAL-12 (12 JUN 1970); APPROVED AUG 1970; STARTED ; COMPLETED 2 DEC 1974.

A STUDY OF NEUTRON-PROTON CHARGE-EXCHANGE SCATTERING IN THE MOMENTUM RANGE 50-200 GEV/C

OSU -- N.W.REAY(SPOKESMAN), K.REIBEL, T.A.ROMANOWSKI, N.R.STANTON, J.S.FITCH, C.J.RUSH  
MSU -- M.A.ABOLINS, M.T.LIN, G.A.SMITH  
CARL -- K.W.EDWARDS

} INSTITUTIONS AND PARTICIPANTS. SEE APPENDIX VI FOR  
INSTITUTION ABBREVIATIONS.  
UNKNOWN INSTITUTIONS INDICATED BY "????".  
UNKNOWN AUTHORS INDICATED BY "ET AL."

ACCELERATOR=FNAL; DETECTOR=SPEC

P N --> N P 50-200 GEV (PLAB) ANGP

<DATA COMMENT> SMALL ANGLE CEX, -T=.002-1.0 GEV<sup>2</sup>  
<EXPERIMENTAL COMMENT> APPROVED FOR 600 HOURS; RAN FOR 1300 HOURS.

\*\*\*\*\*

FNAL-21A (10 JUN 1970); APPROVED OCT 1970; STARTED ; COMPLETED 2 NOV 1975.

NEUTRINO PHYSICS AT VERY HIGH ENERGIES ← COLLABORATION NAME (IF ANY) APPEARS HERE.

CIT -- F.SCIULLI, B.BARISH(SPOKESMAN), W.FORD, P.ODDONE, C.PECK  
FNAL -- A.MASCHKE

ACCELERATOR=FNAL; DETECTOR=COMB

NUMU NUCLEUS --> MU- ANYTHING	40-300 GEV (PLAB)	CS, ANGP
ANUMU NUCLEUS --> MU+ ANYTHING	"	"
NUMU NUCLEUS --> NUCLEUS MU- MU+ NUMU	300 GEV (PLAB)	ANGP, MASS

W+ EX, DEC ← { INDIVIDUAL PARTICLES (LEFT) AND PARTICLE PROPERTIES (RIGHT)  
STUDIED. SEE APPENDIX V FOR "PARTICLE PROPERTY DESCRIPTORS".

<EXPERIMENTAL COMMENT> MONOCHROMATIC NEUTRINO BEAM; APPROVED FOR 1200 HOURS; RAN FOR 2450 HOURS.

<BIBLIOGRAPHIC COMMENT> DOCUMENT HAS ONE ADDENDUM AND IS NUMBERED FNAL-21 IN SLAC COLLECTION

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#### Appendix I - Accelerator Abbreviations

The abbreviations used for high energy physics facilities are listed below. For the primary accelerator, the abbreviation is simply the institution at which the accelerator is located. For additional facilities, an appropriate modifier is appended to the institution abbreviation.

ANL	ARGONNE (ZGS) PROTON SYNCH. (12.7 GEV)
BNL	BROOKHAVEN (AGS) PROTON SYNCH. (33 GEV)
CERN	CERN (CPS) PROTON SYNCH. (28 GEV)
CERN-ISR	CERN (ISR) PROTON-PROTON ISR (11-31 GEV)
CERN-SPS	CERN PROTON SYNCH (400 GEV)
COSM	COSMIC RAYS
DESY	HAMBURG DEUTCHES ELECTRON SYNCH. (7.5 GEV)
DESY-DORIS	HAMBURG (DORIS) ELECTRON-POSITRON RING (3 GEV)
FNAL	FNAL BATAVIA PROTON SYNCH. (500 GEV)
RHEL	RUTHERFORD (NIMROD) PROTON SYNCH. (8 GEV)
SLAC	STANFORD ELECTRON LINEAR ACCEL. (22 GEV)
SLAC-SPEAR	STANFORD (SPEAR) ELECTRON-POSITRON RING (4.2 GEV)

#### Appendix II - Detector Abbreviations

The abbreviations used for non-bubble-chamber detectors are as follows:

CALO	Calorimeter
COMB	Combinations of different types of detectors. Can include a hybrid system involving a bubble chamber, if the bubble chamber is a minor part of the system.
EMUL	Emulsion. Also used for detectors like plastic where tracks are "frozen" in a solid medium.
OTHER	Rare non-electronic detectors.
STRC	Streamer Chamber
For a spectrometer	system, including magnets for momentum analysis:
DAS	Double Arm Spectrometer
SAS	Single Arm Spectrometer
WAS	Wide Angle Spectrometer
SPEC	General spectrometer system not fitting one of the above or where specific type not given.

For other electronic detector systems, not including magnets for momentum analysis:

CNTR	Counters (no chambers)
OPSK	Optical spark chambers
WIRE	Wire chambers (proportional wire chambers, drift chambers). Includes all non-optical spark chambers by convention.
SPRK	Spark chamber of unspecified type.

Acronyms for specific devices:

DASP	DESY Double Arm Spectrometer System
EMS	Argonne Effective Mass Spectrometer
LASS	SLAC Large Aperture Solenoid Spectrometer
MPS	BNL Multiparticle Spectrometer
OMEGA	CERN OMEGA Spectrometer
PLUTO	DESY Superconducting Solenoid Spectrometer
RMS	Rutherford Magnetic Spectrometer Facility
SFM	CERN-ISR Split Field Magnet
SMAG	SLAC-SPEAR Magnetic Detector

For bubble chambers we use a hyphenated construction, such as HLBC-15FT-HYB, where the first element, HBC, DBC, HECB, or HLBC indicates a hydrogen, deuterium, helium, or heavy-liquid device, the second element indicates the size or name, and the third element, HYP, RAP, or TST, is included if the device is hybrid, rapid cycling, or track sensitive.

#### Appendix III - Beam Momentum Designations

The beam "momentum" designation given in parentheses following the numerical value and units can be one of the following:

PLAB	beam momentum in the lab frame.
ELAB	beam energy in the lab frame.
TLAB	beam kinetic energy in the lab frame.
ECM	total energy in the CM frame.
S	total CM energy squared.

For colliding beam experiments the momentum of the second beam is given indented below that of the first. Alternately, a single line with the total center of mass energy or equivalent lab beam momentum may be given.

For electroproduction or other reactions involving a virtual photon, the second and third lines indented below the beam momentum specify the equivalent of the mass and momentum of the virtual photon. These can have the following designations:

W	mass of the target-virtual photon system.
W2	square of W.
Q2	absolute value of the mass squared of the virtual photon = absolute value of the squared 4-momentum transfer to the electron.
NU	energy of the virtual photon in the lab frame = energy loss of the electron in the lab frame.

#### Appendix IV - Reaction Data Descriptors

The data descriptors refer to the nature of the data taken in an experiment. Any of the variables below can also be understood to refer to functions (including averages or other moments, but not derivatives or integrals) of that variable, unless such functions involve other variables from the list. For data which represent a function of two variables, such as a scatter plot, combinations like MASS\*MASS are used.

#### GENERAL

CS	Cross section, cross section ratio, and cross section upper limit. Can also be listed for very rare reactions whose existence is being established, even though the number of events is not converted to a cross section. Does not include <u>parametrizations</u> of the cross section, e.g., as a function of energy.
ANGP	Production angular distribution, i.e., of one or more of the outgoing particles relative to one of the incident particles. Includes $d\sigma/d\Omega$ , $d\sigma/dt$ , $d\sigma/dt'$ , $d\sigma/dQ^2$ , etc. Also the equivalent, expressed as moments or polynomial expansion coefficients. Also invariant cross section as a function of production angle or $t$ . By convention, does not include rapidity or its approximation, $y \approx -\ln \tan \theta/2$ (see P).
ANG	Angular distribution between or among particles in the final state. Includes also angular distribution involving decay products of particles listed in the reaction, even though those decay products are not themselves explicitly listed. Includes angles used to study the decay of a system produced in the final state, even though the coordinate system axes may be defined with respect to the incident particles (e.g., Jackson angles, etc.) Also the equivalent, expressed as moments, etc.
MASS	Mass spectrum, $M^2$ spectrum, or invariant cross section as a function of mass or mass squared.
PT	Transverse momentum spectrum, $p_T^2$ spectrum, or invariant cross section as a function of $p_T$ . Does not include <u>momentum</u> transfer spectrum (see ANGP). Includes transverse mass $= \sqrt{p_T^2 + m^2}$ , unless the particle mass ( $m$ ) is also variable.

Appendix IV - Reaction Data Descriptors (cont'd)

P Any function of outgoing momentum or energy not included in any of the above. Includes, E, y (rapidity, also rapidity gaps),  $x (=p_y/p_{max})$ ,  $p_y$ , or other momentum or energy variable.

FV (for proposals only) Experiment proposes to measure complete four-vectors, without specifying exactly what analysis of them will be done.

AMPLITUDES

Functions linear in the amplitudes (i.e., involving the phases).

PWA Partial wave amplitudes. Includes formation partial waves and production partial waves. Any attempt to measure amplitudes of definite j (angular momentum). Includes scattering length and effective range.

AMP Amplitude not decomposed into states of definite j. Re/Im ratio, helicity amplitude, etc.

VARIABLES RELATED TO SPIN

DME Density matrix elements, including joint density matrix elements.

POL Final state spin-1/2 polarization measurement. Includes Wolfenstein spin rotation parameters. Includes measurement of asymmetry off a polarized target when it is equal to the final state polarization.

ASYM Asymmetry in scattering off a polarized target and/or with a polarized beam (with exception of special case noted under POL).

MULTIPLICITIES

MULT Multiplicity distribution, its average, ratio, or moments. Generally used in association with final states of the form N(PRONG), N(HADRON), etc., so that the individual final states do not have to be listed.

SYNOPSIS

DD	TYPICAL USE
CS	cross section.
ANGP	$d\sigma/dt, d\sigma/d\Omega, d\sigma/du, dN/dt$ , etc.
ANG	ang. dist. between particles in final state
MASS	mass, mass <sup>2</sup>
PT	$p_T, p_T^2$
P	x, y, $p_y$ , E, $\Delta y$
FV	four-vectors (proposals only)
PWA	production or formation partial wave analysis
AMP	amplitudes not decomposed into states of definite j
DME	density matrix elements
POL	final state spin 1/2 polarization measurement
ASYM	asymmetry in scattering off polarized target
MULT	multiplicity distribution, its average or other moments
MASS*MASS	Dalitz plot, triangle plot
ANGP*MASS	Chew-Low plot
P*P	longitudinal phase space plot, rapidity correlation contour plot
PT*P	Peyrou plot
ANGP*P	$d\sigma/d\Omega^{lab}$ for several bins in $p^{lab}$

Appendix V - Particle Properties Descriptors

Types of particle properties data are indicated by the following descriptors:

MASS Mass or mass difference

W Total width, total rate, mean life. Also difference and ratios of these.

PW Partial widths, partial rate, as well as any ratio or product of these such as branching ratio or integrated cross section. Also upper limits on these. Also differences of these unless included in DEC (DEC includes charge asymmetry  $\delta$  for  $K_L \rightarrow \pi l \nu$ ,  $\eta$  for  $K_L \rightarrow \pi^+ \pi^-$ ,  $x+iy$  for  $K_S \rightarrow \pi^+ \pi^- \pi^0$ ).

MOM Electric moment, magnetic moment, charge radius, moment ratios.

DEC Weak or electromagnetic decay parameter as defined by Review of Particle Properties, Rev. Mod. Phys. 48, no.2, pt.2, April 1976, Ch. VI:

$\rho, \eta, \xi, \delta, h,  g_A/g_V , \phi_{AV}, \xi_S, \xi_T, \xi_P$	for $\mu$ decay
slopes g and slope difference $\sigma$ (CP viol)	for $K \rightarrow 3\pi$
form factors $f_+, f_-, f_0, \lambda_+, \lambda_-, \lambda_0, \xi, f_S, f_T$	for $K \rightarrow \pi l \nu$
CP violation parameter $x+iy$	for $K_S \rightarrow \pi^+ \pi^- \pi^0$
charge asymmetry $\delta$	for $K_L \rightarrow \pi l \nu$
CP viol. parameters $\eta_{+-}, \eta_{00}, \phi_{+-}, \phi_{00}, \epsilon, \epsilon'$	for $K_L \rightarrow \pi \pi$
$\Delta S \neq \Delta Q$ parameter x	{ for $K^0 \rightarrow \pi^+ l^- \nu$ or $\bar{K}^0 \rightarrow \pi^- l^+ \nu$
charge asymmetry	for $\eta$ decay
$ g_A/g_V , \delta, \alpha, \beta, \gamma, \phi, \Delta$	for baryon decay

QN Quantum numbers.

EX Existence (e.g., particle search or evidence for a new particle in a mass spectrum).

Appendix VI - Institution Abbreviations

AACH	PHYS. INST. DER TECH. HOCHSCHULE	AACHEN, GERMANY
AARH	AARHUS UNIV.	AARHUS, DENMARK
ACUS	PHYSICAL INST. OF ACAD. OF SCIENCES	MOSCOW, USSR
AECL	ATOMIC ENERGY CENTER AT LAHORE	LAHORE, INDIA
AERE	ATOMIC ENERGY RES. ESTAB.	HARWELL, BERKS., ENGLAND
AFCR	AIR FORCE CAMBRIDGE RESEARCH LABS	BEDFORD, MASS., USA
AICH	AICHI EDUCATIONAL UNIV.	TOYOTA, AICHI PREF., JAPAN
ALBA	STATE UNIV. OF NEW YORK AT ALBANY	ALBANY, N. Y., USA
ALMA	INSTITUTE FOR HIGH ENERGY PHYSICS	ALMA-ATA, USSR
AMER	AMERICAN UNIV.	WASHINGTON DC, USA
AMMC	ACADEMY OF MINING AND METALLURGY	CRACOW, POLAND
AMST	UNIV. OF AMSTERDAM	AMSTERDAM, NETHERLANDS
ANKA	MIDDLE EAST TECHNICAL UNIV.	ANKARA, TURKEY
ANL	ARGONNE NAT. LAB.	ARGONNE, ILL., USA
ANUC	AUSTRALIAN NATIONAL UNIV. AT CANBERRA	CANBERRA, AUSTRALIA
AOYA	AOYAMA GAKUIN UNIV.	TOKYO, JAPAN
ARIZ	UNIV. OF ARIZONA	TUCSON, ARIZ., USA
ATEN	NUCLEAR RES. CENTRE DEMOKRITOS	ATHENS, GREECE
AUCK	AUCKLAND UNIV.	AUCKLAND, NEW ZEALAND
BARI	UNIV. DI BARI	BARI, ITALY
BELG	INST. INTERUNIV. DES SCI. NUC.	BRUXELLES, BELGIUM
BERG	FYSISK INSTITUTT	BERGEN, NORWAY
BERL	INST. HOCHENERGIEPHYS. DAW	ZETHEN/BERLIN, DDR
BERN	UNIV. BERN	BERN, SWITZERLAND
BGNA	UNIV. DI BOLOGNA	BOLOGNA, ITALY
BIEL	UNIV. BIELEFELD	BIELEFELD, GERMANY
BING	STATE UNIV. OF NEW YORK AT BINGHAMTON	BINGHAMTON, N. Y., USA

## Appendix VI - Institution Abbreviations (cont'd)

BIRM BIRMINGHAM UNIV.  
 BNL BROOKHAVEN NATIONAL LAB.  
 BOHR NIELS BOHR INSTITUTE  
 BONN UNIV. BONN  
 BOST BOSTON UNIV.  
 BRAN BRANDEIS UNIV.  
 BRIS H. H. WILLS PHYS. LAB., U. OF BRISTOL  
 BROW BROWN UNIV.  
 BRUX UNIV. LIBRE DE BRUXELLES  
 BUCH BUCHAREST STATE UNIV.  
 BUDA CENTRAL RESEARCH INSTITUTE OF PHYSICS  
 BUFF STATE UNIV. OF NEW YORK AT BUFFALO  
 CAEN LAB. DE PHYS. CORPUSCULAIRE  
 CAMB CAMBRIDGE UNIV.  
 CAMP UNIV. OF CAMPINAS  
 CARL CARLTON UNIV.  
 CARN CARNEGIE-MELLON UNIV.  
 CASE CASE WESTERN RESERVE UNIV.  
 CAVE CAVENDISH LAB., CAMBRIDGE UNIV.  
 CDEF COLLEGE DE FRANCE  
 CEA CAMBRIDGE ELECTRON ACCEL.  
 CERN EUROPEAN ORG. FOR NUC. RES.  
 CHIC UNIV. OF CHICAGO  
 CHTI CZECH. HIGHER TECH. INST. AT PRAGUE  
 CINC UNIV. OF CINCINNATI  
 CIOW CARNEGIE INST. OF WASHINGTON  
 CIPP CANADIAN INST. OF PARTICLE PHYS.  
 CIT CALIF. INSTITUTE OF TECHNOLOGY  
 CLER UNIV. DE CLERMONT-FERRAND  
 CNRC CANADIAN NATIONAL RESEARCH COUNCIL  
 COLO UNIV. OF COLORADO  
 COLU COLUMBIA UNIV.  
 CORN CORNELL UNIV.  
 COSU COLORADO STATE UNIV.  
 COUN THE COOPER UNION  
 CRAC INST. FOR NUCLEAR RESEARCH  
 CRNL CHALK RIVER NUCLEAR LABORATORIES  
 CUNY CITY UNIV. OF NEW YORK  
 CURI LABORATOIRE JOLIO-CURIE  
 DARE DARESBURY NUC. PHYS. LAB.  
 DART DARTMOUTH COLLEGE  
 DELH UNIV. OF DELHI  
 DESY DEUTSCHES ELEKTRONEN-SYNCH.  
 DORT UNIV. DORTMUND  
 DSRL DUPONT AND CO., SAVANNAH RIVER LAB.  
 DUKE DUKE UNIV.  
 DURH UNIV. OF DURHAM  
 DUUC UNIVERSITY COLLEGE  
 EDIN UNIV. OF EDINBURGH  
 EFI ENRICO FERMI INST. FOR NUCL. STUDIES  
 EMMA EMMANUEL COLLEGE  
 EPOL ECOLE POLYTECHNIQUE  
 EREV STATE ATOMIC ENERGY COMM. AT EREVAN  
 ETHZ SWISS FEDERAL INST. OF TECHNOLOGY  
 FIRZ UNIV. DI FIRENZE  
 FISK FISK UNIV.  
 FLOR UNIV. OF FLORIDA  
 FNAL FERMI NATIONAL ACCELERATOR LAB.  
 FOM FOUN. FOR FUNDAMENTAL RESEARCH ON MATTER  
 FRAS LAB. NAZIONALI DEL SINCROTRONE  
 FREI UNIV. FREIBURG  
 FRIB UNIV. DE FRIBOURG  
 FSU FLORIDA STATE UNIV.  
 FUKU FUKUSHIMA UNIV.

BIRMINGHAM, ENGLAND  
 UPTON, L.I., N. Y., USA  
 COPENHAGEN, DENMARK  
 BONN, GERMANY  
 BOSTON, MASS., USA  
 WALTHAM, MASS., USA  
 BRISTOL, ENGLAND  
 PROVIDENCE, R. I., USA  
 BRUXELLES, BELGIUM  
 BUCHAREST, ROMANIA  
 BUDAPEST, HUNGARY  
 BUFFALO, N. Y., USA  
 CAEN, FRANCE  
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 MONTREAL, CANADA  
 PASADENA, CALIF., USA  
 CLERMONT-FERRAND, FRANCE  
 OTTAWA, CANADA  
 BOULDER, COLO., USA  
 NEW YORK, N. Y., USA  
 ITHACA, N. Y., USA  
 FORT COLLINS, COLO., USA  
 NEW YORK, N. Y., USA  
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 CHALK RIVER, CANADA  
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 AIKEN, S.C., USA  
 DURHAM, N. C., USA  
 DURHAM, ENGLAND  
 DUBLIN, IRELAND  
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 FIRENZE, ITALY  
 NASHVILLE, TENN., USA  
 GAINSVILLE, FLA., USA  
 BATAVIA, ILL., USA  
 UTRECHT, NETHERLANDS  
 FRASCATI, ITALY  
 FREIBURG, GERMANY  
 FRIBOURG, SWITZERLAND  
 TALLAHASSEE, FLA., USA  
 FUKUSHIMA, JAPAN

## Appendix VI - Institution Abbreviations (cont'd)

GENO UNIV. DI GENOVA  
 GESC GENERAL ELECTRIC R AND D CENTER  
 GEVA UNIV. DE GENEVE  
 GLAS UNIV. OF GLASGOW  
 GRAZ UNIV. GRAZ  
 GREN GRENOBLE UNIV.  
 GRUM GRUMMAN AEROSPACE CORP.  
 GSCO GEOLOGICAL SURVEY OF CANADA  
 GUIL UNIV. OF SURREY AT GUILFORD  
 HAIF TECHNION - ISRAEL INST. OF TECHNOLOGY  
 HAMB UNIV. HAMBURG  
 HANO HANOI UNIV.  
 HARV HARVARD UNIV.  
 HAWA UNIV. OF HAWAII  
 HEID UNIV. HEIDELBERG  
 HELS HELSINGIN YLIOPISTO  
 HIRO HIROSHIMA UNIV.  
 HOUS UNIV. OF HOUSTON  
 IASD INST. FOR ADVANCED STUDIES AT DUBLIN  
 IBM INTERNATIONAL BUSINESS MACHINES, INC.  
 ICUT INTERNATIONAL CHRISTIAN UNIV. AT TOKYO  
 IFA INST. FOR ATOMIC PHYSICS  
 IIT ILLINOIS INST. OF TECH.  
 ILL UNIV. OF ILLINOIS  
 ILLC UNIV. OF ILLINOIS AT CHICAGO  
 IND UNIV. OF INDIANA  
 INNPN INST. FOR NUCL. PROBLEMS, ACAD. OF SCI.  
 INUS INST. FOR NUCLEAR STUDY AT TOKYO UNIV.  
 IOWA UNIV. OF IOWA  
 IPN INST. DE PHYS. NUCLEAIRE  
 IPNP INSTITUT DE PHYSIQUE NUCLEAIRE  
 IRAD INSTITUTE DU RADIUM  
 ISSP SOLID STATE PHYS. INST., UNIV. OF TOKYO  
 ISU IOWA STATE UNIV.  
 ITEP INST. FOR TEOR. AND EXP. PHYS.  
 IUPU INDIANA U. - PURDUE U. AT INDIANAPOLIS  
 JAGL JAGELLONIAN UNIV.  
 JAMU UNIV.  
 JHU JOHNS HOPKINS UNIV.  
 JINR JOINT INST. FOR NUCL. RESEARCH  
 KANS UNIV. OF KANSAS  
 KARL TECHNISCHE UNIV. KARLSRUHE  
 KEK NAT. LAB FOR HIGH ENERGY PHYS., JAPAN  
 KFAJ KFA JULICH  
 KHAR PHYSICO-TECH. INST., ACAD. SCI., UKR.SSR  
 KIAE KURCHATOV INST. OF ATOMIC ENERGY  
 KIEL KIEL UNIV.  
 KINK KINKI UNIV.  
 KNTY UNIV. OF KENTUCKY  
 KOBE KOBE UNIV.  
 KONA KONAN UNIV.  
 KWAN KWANSAN GAKUIN UNIV.  
 KYOT KYOTO UNIV.  
 LALO LINEAR ACCELERATOR LAB, ORSAY  
 LANC LANCASTER UNIV.  
 LAPP LAPP UNIV.  
 LASL U. C. LOS ALAMOS SCIENTIFIC LAB.  
 LAUS UNIV. OF LAUSANNE  
 LBL U. C. LAWRENCE BERKELEY LAB.  
 LEBD LEBEDEV PHYSICS INST.  
 LEHI LEHIGH UNIV.  
 LEID INST. LORENTZ  
 LENI INST. OF NUCL. PHYS., AKAD. NAUK USSR  
 LINZ LINZ INSTITUT FUR PHYSIK, KEPLER HOCH.

GENOVA, ITALY  
 SCHENECTADY, N. Y., USA  
 GENEVA, SWITZERLAND  
 GLASGOW, SCOTLAND  
 GRAZ, AUSTRIA  
 GRENOBLE, FRANCE  
 BETHPAGE, N. Y., USA  
 OTTAWA, CANADA  
 GUILFORD, SURREY, ENGLAND  
 HAIFA, ISRAEL  
 HAMBURG, GERMANY  
 HANOI, VIETNAM  
 CAMBRIDGE, MASS., USA  
 HONOLULU, HAWAII, USA  
 HEIDELBERG, GERMANY  
 HELSINKI, FINLAND  
 HIROSHIMA, JAPAN  
 HOUSTON, TEXAS, USA  
 DUBLIN, IRELAND  
 PALO ALTO, CALIF., USA  
 TOKYO, JAPAN  
 BUCHAREST, ROMANIA  
 CHICAGO, ILL., USA  
 URBANA, ILL., USA  
 CHICAGO, ILL., USA  
 BLOOMINGTON, IND., USA  
 MOSCOW, USSR  
 TOKYO, JAPAN  
 IOWA CITY, IOWA, USA  
 ORSAY, FRANCE  
 PARIS, FRANCE  
 PARIS, FRANCE  
 TOKYO, JAPAN  
 AMES, IOWA, USA  
 MOSCOW, USSR  
 INDIANAPOLIS, IND., USA  
 CRACOW, POLAND  
 JAMMU-TAWI, INDIA  
 BALTIMORE, MD., USA  
 DUBNA, USSR  
 LAWRENCE, KANSAS, USA  
 KARLSRUHE, GERMANY  
 TSUKUBA-GUN, JAPAN  
 BONN, GERMANY  
 KHARKOV, USSR  
 MOSCOW, USSR  
 KIEL, GERMANY  
 OSAKA, JAPAN  
 LEXINGTON, KY., USA  
 KOBE, JAPAN  
 KOBE, JAPAN  
 HYOGO-KEN, JAPAN  
 KYOTO, JAPAN  
 ORSAY, FRANCE  
 LANCASTER, ENGLAND  
 ANNECY, FRANCE  
 LOS ALAMOS, N. M., USA  
 LAUSANNE, SWITZERLAND  
 BERKELEY, CALIF., USA  
 MOSCOW, USSR  
 BETHLEHEM, PA., USA  
 LEIDEN, NETHERLANDS  
 LENINGRAD, USSR  
 LINZ, AUSTRIA

## Appendix VI - Institution Abbreviations (cont'd)

LIYP LIVERPOOL UNIV.  
 LLL LAWRENCE LIVERMORE LAB  
 LOIC IMPERIAL COL. OF SCI. AND TECH.  
 LOKC KING'S COLLEGE  
 LOQM QUEEN MARY COLLEGE  
 LOUC UNIVERSITY COLLEGE  
 LOUG LOUGHBOROUGH UNIV. OF TECHNOLOGY  
 LOWC WESTFIELD COLLEGE  
 LPGP LAB. DE PHYS. GENERAL, UNIV. PARIS  
 LPNP LAB. DE PHYS. NUCL. ET HAUTES ENERGIES  
 LRC LEWIS RESEARCH CENTER, NASA  
 LSU LOUISIANA STATE UNIV.  
 LUND UNIV. I LUND  
 LYON INST. DE PHYS. NUCL., UNIV. DE LYON  
 MADR JUNTA DE ENERGIA NUCLEAR  
 MANH MANHATTAN COLLEGE  
 MANI UNIV. OF MANITOBA  
 MANZ UNIV. MAINZ  
 MASA UNIV. OF MASSACHUSETTS  
 MASB UNIV. OF MASSACHUSETTS  
 MCGI MCGILL UNIV.  
 MCHS UNIV. MANCHESTER  
 MELB UNIV. OF MELBOURNE  
 MICH UNIV. OF MICHIGAN  
 MILA UNIV. DI MILANO  
 MINN UNIV. OF MINNESOTA  
 MIOH MIAMI UNIV.  
 MIRA INTL. CENTER FOR THEO. PHYS., MIRAMARE  
 MISU MISSISSIPPI STATE UNIV.  
 MIT MASSACHUSETTS INST. OF TECHNOLOGY  
 MODE ISTITUTO DI FISICA DELLA UNIVERSITA  
 MONS UNIV. DE L'ETAT, MONS  
 MOSU MOSCOW UNIV.  
 MPIH MAX-PLANCK-INST. FUR PHYS.-ASTROPHYS.  
 MPIM MAX-PLANCK-INST. FUR PHYS.-ASTROPHYS.  
 MSCC NASA MANNED SPACECRAFT CENTER  
 MSNA INS. DI FISICA DELL UNIV.  
 MSU MICHIGAN STATE UNIV.  
 MTHO MT. HOLYOKE COLLEGE  
 MUDD HARVEY MUDD COLLEGE  
 MULH CENTRE UNIV. DU HAUT-RHIN  
 MUNI MUNICH UNIV.  
 NAGO NAGOYA UNIV.  
 NANC UNIV. DE NANCY  
 NAPL UNIV. DI NAPOLI  
 NARA NARA WOMEN'S UNIV.  
 NDAM UNIV. OF NOTRE DAME  
 NEAS NORTHEASTERN UNIV.  
 NEBR UNIV. OF NEBRASKA  
 NEUC UNIV. OF NEUCHATEL  
 NEVI NEVIS LAB.  
 NIJM R. K. UNIV. NIJMEGEN  
 NILU NORTHERN ILLINOIS UNIV.  
 NORD NORDISK INS. FOR TEOR. ATOMFYS.  
 NOVO INST. OF NUCL. PHYS.  
 NRL NAVAL RESEARCH LABORATORY  
 NSF NATIONAL SCIENCE FOUNDATION  
 NWES NORTHWESTERN UNIV.  
 NYU NEW YORK UNIV.  
 OBER OBERLIN COLLEGE  
 OHIO OHIO UNIV.  
 OREG UNIV. OF OREGON  
 ORNL OAK RIDGE NATIONAL LAB.

LIVERPOOL, ENGLAND  
 LIVERMORE, CALIF., USA  
 LONDON, ENGLAND  
 LONDON, ENGLAND  
 LONDON, ENGLAND  
 LONDON, ENGLAND  
 LOUGHBOROUGH, ENGLAND  
 LONDON, ENGLAND  
 PARIS, FRANCE  
 PARIS, FRANCE  
 CLEVELAND, OHIO, USA  
 BATON ROUGE, LA., USA  
 LUND, SWEDEN  
 VILLEURBANNE, FRANCE  
 MADRID, SPAIN  
 NEW YORK, N. Y., USA  
 WINNIPEG, CANADA  
 MAINZ, GERMANY  
 AMHERST, MASS., USA  
 BOSTON, MASS., USA  
 MONTREAL, CANADA  
 MANCHESTER, ENGLAND  
 PARKVILLE, AUSTRALIA  
 ANN ARBOR, MICH., USA  
 MILANO, ITALY  
 MINNEAPOLIS, MINN., USA  
 OXFORD, OHIO, USA  
 TRIESTE, ITALY  
 STATE COLLEGE, MISS, USA  
 CAMBRIDGE, MASS., USA  
 MODENA, ITALY  
 MONS, BELGIUM  
 MOSCOW, USSR  
 HEIDELBERG, GERMANY  
 MUNICH, GERMANY  
 HOUSTON, TEXAS, USA  
 MESSINA, ITALY  
 EAST LANSING, MICH., USA  
 SOUTH HADLEY, MASS., USA  
 CLAREMONT, CALIF., USA  
 MULHOUSE, FRANCE  
 MUNICH, GERMANY  
 NAGOYA, JAPAN  
 NANCY, FRANCE  
 NAPOLI, ITALY  
 NARA, JAPAN  
 NOTRE DAME, IND., USA  
 BOSTON, MASS., USA  
 LINCOLN, NEBR., USA  
 NEUCHATEL, SWITZERLAND  
 IRVINGTON-ON-HUDSON, N.Y., USA  
 NIJMEGEN, NETHERLANDS  
 DEKALB, ILL., USA  
 COPENHAGEN, DENMARK  
 NOVOSIBIRSK, USSR  
 WASHINGTON, D.C., USA  
 WASHINGTON, D.C., USA  
 EVANSTON, ILL., USA  
 NEW YORK, N. Y., USA  
 OBERLIN, OHIO, USA  
 ATHENS, OHIO, USA  
 EUGENE, ORE., USA  
 OAK RIDGE, TENN., USA

## Appendix VI - Institution Abbreviations (cont'd)

ORSA UNIV. DE PARIS, FAC. DES SCI.  
 OSAK OSAKA UNIV.  
 OSLO OSLO UNIV.  
 OSMA OSMANIA UNIV.  
 OSSE SCI. EDUC. INST. OF OSAKA PREF.  
 OSU OHIO STATE UNIV.  
 OTTA UNIV. OF OTTAWA  
 OXF OXFORD UNIV.  
 PADO UNIV. DI PADOVA  
 PARM UNIV. OF PARMA  
 PATR UNIV. OF PATRAS  
 PAVI UNIV. DI PAVIA  
 PENN UNIV. OF PENNSYLVANIA  
 PISA UNIV. DI PISA  
 PITT UNIV. OF PITTSBURGH  
 PPA PRINCETON-PENN. PROTON ACCEL.  
 PRAG INSTITUTE OF PHYSICS, CSAV  
 PRIN PRINCETON UNIV.  
 PSU PENNSYLVANIA STATE UNIV.  
 PTIU PHYSICAL TECH. INST. OF ACAD. OF SCI.  
 PURD PURDUE UNIV.  
 QUB QUEENS UNIV. AT BELFAST  
 QUEB UNIV. DU QUEBEC  
 QUNS QUEENS COLLEGE OF CUNY  
 RAMA TEL-AVIV UNIV. AT RAMAT AVIV  
 REED REED COLLEGE  
 REHO WEIZMANN INST. OF SCI.  
 RHEL RUTHERFORD HIGH ENERGY LAB.  
 RICE WILLIAM MARSH RICE UNIV.  
 RISO RESEARCH ESTAB. RISO  
 RMCS ROYAL MILITARY COLLEGE OF SCIENCE  
 ROCH UNIV. OF ROCHESTER  
 ROCK ROCKEFELLER UNIV  
 ROMA UNIV. DI ROMA  
 RUTG RUTGERS UNIV.  
 SACL CNTR. D'ETUDES NUC. SACLAY  
 SAGA SAGA UNIV.  
 SAIT SAITAMA UNIV.  
 SANI IST. SUPERIORE DI SANITA  
 SANT UNIV. DE SANTANDER  
 SCST STATE COMM. ON SCIENCE AND TECH.  
 SEAT SEATTLE PACIFIC COLLEGE  
 SERP INST. OF HIGH EN. PHYS.  
 SETO SETON HALL UNIV.  
 SHEF UNIV. OF SHEFFIELD  
 SHMP UNIV. OF SOUTHAMPTON  
 SIEG SIEGEN UNIV.  
 SLAC STANFORD LINEAR ACCEL. CENTER  
 SMAS SOUTHEASTERN MASSACHUSETTS UNIV.  
 SMU SOUTHERN METHODIST UNIV.  
 SNRC ISRAEL AEC SOTEG. NUCL. RESEARCH CENTER  
 SNSP SCUOLA NORMALE SUPERIORE  
 SOFC HIGH INST. OF CHEM. TECH.  
 SOFI BULGARIAN ACAD. OF SCI.  
 SRI STANFORD RESEARCH INST.  
 STAN WASHINGTON, D.C., USA  
 STEL UNIV. OF STELLENBOSCH  
 STEV STEVENS INST. OF TECH.  
 STLO ST. LOUIS UNIV.  
 STOJ STOCKHOLM UNIV.  
 STON STATE UNIV. OF NEW YORK AT STONYBROOK  
 STRB CENTRE DES RES. NUCLEAIRES  
 SUFF SUFFOLK UNIV.

ORSAY, FRANCE  
 OSAKA, JAPAN  
 OSLO, NORWAY  
 HYDERABAD, INDIA  
 OSAKA, JAPAN  
 COLUMBUS, OHIO, USA  
 OTTAWA, CANADA  
 OXFORD, ENGLAND  
 PADOVA, ITALY  
 PARMA, ITALY  
 PATRAS, GREECE  
 PAVIA, ITALY  
 PHILADELPHIA, PA., USA  
 PISA, ITALY  
 PITTSBURGH, PA., USA  
 PRINCETON, N. J., USA  
 PRAGUE, CZECHOSLOVAKIA  
 PRINCETON, N. J., USA  
 UNIVERSITY PARK, PA., USA  
 TASHKENT, USSR  
 LAFAYETTE, IND., USA  
 BELFAST, NORTHERN IRELAND  
 MONTREAL, CANADA  
 FLUSHING, N. Y., USA  
 RAMAT AVIV, ISRAEL  
 PORTLAND, OREGON, USA  
 REHOVOTH, ISRAEL  
 CHILTON, DID., OXON., ENGLAND  
 HOUSTON, TEXAS, USA  
 ROSKILDE, DENMARK  
 SHRIVENHAM, ENGLAND  
 ROCHESTER, N. Y., USA  
 NEW YORK, N. Y., USA  
 ROMA, ITALY  
 NEW BRUNSWICK, N. J., USA  
 GIF-SUR-YVETTE, FRANCE  
 SAGA, JAPAN  
 SAITAMA, JAPAN  
 ROMA, ITALY  
 SANTANDER, SPAIN  
 HANOI, NORTH VIETNAM  
 SEATTLE, WASH., USA  
 SERPUKOV, USSR  
 SOUTH ORANGE, N. J., USA  
 SHEFFIELD, YORKS., ENGLAND  
 SOUTHAMPTON, ENGLAND  
 HUTTENTAL, GERMANY  
 STANFORD, CALIF., USA  
 NORTH DARTMOUTH, MASS., USA  
 DALLAS, TEXAS, USA  
 YAVNEH, ISRAEL  
 PISA, ITALY  
 SOFIA, BULGARIA  
 SOFIA, BULGARIA  
 MENLO PARK, CALIF., USA  
 STANFORD, CALIF., USA  
 CAPE PROVINCE, SOUTH AFRICA  
 HOBOKEN, N. J., USA  
 ST. LOUIS, MO., USA  
 STOCKHOLM, SWEDEN  
 STONYBROOK, L.I., N. Y., USA  
 STRASBOURG, FRANCE  
 SUFFOLK, ENGLAND

Appendix VI - Institution Abbreviations (cont'd)

SUSS SUSSEX UNIV. SUSSEX, ENGLAND  
 SYDN UNIV. OF SYDNEY SYDNEY, AUSTRALIA  
 SYRA SYRACUSE UNIV. SYRACUSE, N. Y., USA  
 TAMU TEXAS A AND M UNIV. COLLEGE STATION, TEXAS, USA  
 TASM TASMANIA UNIV. HOBART, TASMANIA, AUSTRALIA  
 TATA TATA INST. OF FUNDAMENTAL RESEARCH BOMBAY, INDIA  
 TBIL INST. OF PHYSICS TBILSI, USSR  
 TELA UNIV. OF TEL-AVIV TEL-AVIV, ISRAEL  
 TEMP TEMPLE UNIV. PHILADELPHIA, PA., USA  
 TENN UNIV. OF TENNESSEE KNOXVILLE, TENN., USA  
 TEXA UNIV. OF TEXAS AT AUSTIN AUSTIN, TX, USA  
 TMSK NUCL. PHYS. INST., TOMSK POLYTECH. INST. TOMSK, USSR  
 TMU TOKYO METROPOLITAN UNIV. TOKYO, JAPAN  
 TINTO UNIV. OF TORONTO TORONTO, CANADA  
 TOGA TOHOKU-GAKUIN UNIV. MIYAGI, JAPAN  
 TOHO TOHOKU UNIV. SENDAI, JAPAN  
 TOIN TOKYO INST. OF TECH. TOKYO, JAPAN  
 TOKY UNIV. OF TOKYO TOKYO, JAPAN  
 TORI UNIV. DI TORINO TORINO, ITALY  
 TRIU TRIUMF, UNIV. OF BRITISH COLUMBIA VANCOUVER, CANADA  
 TRST UNIV. DI TRIESTE TRIESTE, ITALY  
 TSOP SOPHIA UNIV. TOKYO, JAPAN  
 TUAT TOKYO UNIV. OF AGRICULTURE AND TECH. TOKYO, JAPAN  
 TUED TOKYO UNIV. OF EDUCATION TOKYO, JAPAN  
 TUFT TUFTS UNIV. MEDFORD, MASS., USA  
 TWAS WASEDA UNIV. TOKYO, JAPAN  
 UATH UNIV. OF ATHENS ATHENS, GREECE  
 UBEL UNIV. OF BELGRADE BELGRADE, YUGOSLAVIA  
 UCB UNIV. OF CALIF. AT BERKELEY BERKELEY, CALIF., USA  
 UCD UNIV. OF CALIF. AT DAVIS DAVIS, CALIF., USA  
 UCI UNIV. OF CALIF. AT IRVINE IRVINE, CALIF., USA  
 UCLA UNIV. OF CALIF. AT LOS ANGELES LOS ANGELES, CALIF., USA  
 UCND UNION CARBIDE NUCLEAR DIVISION OAK RIDGE, TENN., USA  
 UCR UNIV. OF CALIF. AT RIVERSIDE RIVERSIDE, CALIF., USA  
 UCSB UNIV. OF CALIF. AT SANTA BARBARA SANTA BARBARA, CALIF., USA  
 UCSC UNIV. OF CALIF. AT SANTA CRUZ SANTA CRUZ, CALIF., USA  
 UCSD UNIV. OF CALIF. AT SAN DIEGO LA JOLLA, CALIF., USA  
 ULAN INST OF PHYS-CHEM, MONGOLIAN SCI. ACAD. ULAN-BATOR, MONGOLIA  
 UMAD UNIV. DE MADRID MADRID, SPAIN  
 UMD UNIV. OF MARYLAND COLLEGE PARK, MD., USA  
 UNC UNIV. OF NORTH CAROLINA GREENSBORO, N. C., USA  
 UNCS UNION COLLEGE SCHENECTADY, N. Y., USA  
 UNM UNIV. OF NEW MEXICO ALBUQUERQUE, NEW MEX., USA  
 UPNJ UPSALA COLLEGE EAST ORANGE, N. J., USA  
 USC UNIV. OF SOUTHERN CALIF. LOS ANGELES, CALIF., USA  
 USPS U. S. NAVAL POSTGRADUATE SCHOOL MONTEREY, CALIF., USA  
 UTAH UNIV. OF UTAH SALT LAKE CITY, UTAH, USA  
 UTRU UNIVERSITY OF UTRECHT UTRECHT, NETHERLANDS  
 UTSU UTSUNOMIYA UNIV. UTSUNOMIYA, JAPAN  
 UUPP UNIV. OF UPPSALA UPPSALA, SWEDEN  
 VALE UNIV. DE VALENCIA VALENCIA, SPAIN  
 VAND VANDERBILT UNIV. NASHVILLE, TENN., USA  
 VARA BANARES HINDU UNIV. VARANASI, INDIA  
 VASS VASSAR COLLEGE POUCHKEEPSIE, N. Y., USA  
 VIEN INST. FOR HIGH EN. PHYS., A. A. S. VIENNA, AUSTRIA  
 VIRG UNIV. OF VIRGINIA CHARLOTTESVILLE, VA., USA  
 VPI VIRGINIA POLYTECHNIC INST. BLACKSBURG, VA., USA  
 WAKA WAKAYAMA MEDICAL COLLEGE WAKAYAMA-SHI, JAPAN  
 WARS UNIV. OF WARSAW WARSAW, POLAND  
 WASH UNIV. OF WASHINGTON SEATTLE, WASH., USA  
 WAYN WAYNE STATE UNIV. DETROIT, MICH., USA  
 WEST WESTERN UNIV. LONDON, CANADA  
 WIEN UNIV. WIEN VIENNA, AUSTRIA

Appendix VI - Institution Abbreviations (cont'd)

WILL COLLEGE OF WILLIAM AND MARY WILLIAMSBURG, VA., USA  
 WISC UNIV. OF WISCONSIN MADISON, WISC., USA  
 WITW UNIV. OF THE WITWATERSRAND JOHANNESBURG, SOUTH AFRICA  
 WOOD WOODSTOCK COLLEGE WOODSTOCK, MD., USA  
 WOPI WORCESTER POLYTECHNIC INST. WORCESTER, MASS., USA  
 WUPP UNIV. WUPPERTAL WUPPERTAL, GERMANY  
 WUSL WASHINGTON UNIV. ST. LOUIS, MO., USA  
 WYOM UNIV. OF WYOMING LARAMIE, WYOMING, USA  
 YALE YALE UNIV. NEW HAVEN, CONN., USA  
 YERE YEREVAN PHYSICS INST. YEREVAN, ARMENIA, USSR  
 YOKO YOKOHAMA NATIONAL UNIV. YOKOHAMA, JAPAN  
 ZAGR INSTITUTE RUDER BOSKOVIC, ZAGREB ZAGREB, YUGOSLAVIA  
 ZEEM ZEEMAN LAB., UNIV. OF AMSTERDAM AMSTERDAM, NETHERLANDS  
 ? UNKNOWN INSTITUTION

Appendix VII - Particle Abbreviations

AD  
 ADEL(1232P33)0 ADEL(1232P33)+ ADEL(1232P33)- ADEL(1232P33)--  
 ADEL(1650S31)0 ADEL(1650S31)+ ADEL(1650S31)- ADEL(1650S31)--  
 ADEL(1670D33)0 ADEL(1670D33)+ ADEL(1670D33)- ADEL(1670D33)--  
 ADEL(1690P33)0 ADEL(1690P33)+ ADEL(1690P33)- ADEL(1690P33)--  
 ADEL(1890F35)0 ADEL(1890F35)+ ADEL(1890F35)- ADEL(1890F35)--  
 ADEL(1900S31)0 ADEL(1900S31)+ ADEL(1900S31)- ADEL(1900S31)--  
 ADEL(1910P31)0 ADEL(1910P31)+ ADEL(1910P31)- ADEL(1910P31)--  
 ADEL(1950B)0 ADEL(1950B)+ ADEL(1950B)- ADEL(1950B)--  
 ADEL(1950F37)0 ADEL(1950F37)+ ADEL(1950F37)- ADEL(1950F37)--  
 ADEL(1960D35)0 ADEL(1960D35)+ ADEL(1960D35)- ADEL(1960D35)--  
 ADEL(2160)0 ADEL(2160)+ ADEL(2160)- ADEL(2160)--  
 ADEL(2420B)0 ADEL(2420B)+ ADEL(2420B)- ADEL(2420B)--  
 ADEL(2420H311)0 ADEL(2420H311)+ ADEL(2420H311)- ADEL(2420H311)--  
 ADEL(2850B)0 ADEL(2850B)+ ADEL(2850B)- ADEL(2850B)--  
 ADEL(3230B)0 ADEL(3230B)+ ADEL(3230B)- ADEL(3230B)--  
 AD\*0 AD\*-- AD\*--  
 AG C= SILVER NUCLEUS  
 AHE C= ANTI-HELIUM-4 NUCLEUS  
 AHVY-LEPTON C= GENERAL ANTI HEAVY-LEPTON  
 AHYPERON C= GENERAL ANTI-HYPERON  
 AKAPPA0 C= AKPI S-WAVE  
 AKN(I=0) C= ANTI-K NUCLEON I=0 INITIAL STATE (AND ELASTIC FINAL STATE)  
 AKN(I=1) C= ANTI-K NUCLEON I=1 INITIAL STATE (AND ELASTIC FINAL STATE). DO NOT USE FOR THE SINGLE PHYSICAL STATE (K- N)  
 AKN(1660)0  
 AKN(1700)0 C= POSSIBLE K- OMEGA STATE  
 AKPI(S30)--  
 AKPRIME(1400)0 C= JP=0- STATE SEEN IN PWA BY BRANDENBURG 76, DECAYING PREDOMINATLY INTO EPSILON K0  
 AKPRIME(1400)- C= JP=0- STATE SEEN IN PWA BY BRANDENBURG 76, DECAYING PREDOMINATLY INTO EPSILON K0  
 AKO  
 AK\*(UNSPEC)  
 AK\*(UNSPEC)0  
 AK\*(1225)0  
 AK\*(1420)0  
 AK\*(1660)0  
 AK\*(2200)0  
 AK\*(2800)0  
 AK\*(892)0  
 AL C= ALUMINUM NUCLEUS

## Appendix VII - Particle Abbreviations (cont'd)

ALAMBDA  
 ALAM(1330B)  
 ALAM(1405S01)  
 ALAM(1520D03)  
 ALAM(1600P01)  
 ALAM(1670S01)  
 ALAM(1690D03)  
 ALAM(1800G09)  
 ALAM(1800P01)  
 ALAM(1815F05)  
 ALAM(1830D05)  
 ALAM(1860P03)  
 ALAM(1870S01)  
 ALAM(2010)  
 ALAM(2020F07)  
 ALAM(2100B)  
 ALAM(2100G07)  
 ALAM(2110F05)  
 ALAM(2350B)  
 ALAM(2585B)  
 AL(1770)0  
 AN  
 ANN(I=0)  
 ANN(I=1)  
 ANU  
 ANUCLEON  
 ANUCLEUS  
 ANUE  
 ANYTHING  
 AN(1470B)0  
 AN(1470P11)0  
 AN(1520B)0  
 AN(1520D13)0  
 AN(1535S11)0  
 AN(1670D15)0  
 AN(1688F15)0  
 AN(1700B)0  
 AN(1700D13)0  
 AN(1700S11)0  
 AN(1780P11)0  
 AN(1810P13)0  
 AN(1990F17)0  
 AN(2000F15)0  
 AN(2040D13)0  
 AN(2100D15)0  
 AN(2100S11)0  
 AN(2190B)0  
 AN(2190G17)0  
 AN(2220H19)0  
 AN(2650B)0  
 AN(3030B)0  
 AN(3245B)0  
 AN(3690B)0  
 AN(3755B)0  
 AOMEGA+  
 AP  
 AQHIGH(1340)0  
 AQLow(1240)0  
 AQUARK  
 C= ANTI-L(1770)0  
 C= ANTI-NEUTRON  
 C= ANTI-NUCLEON NUCLEON I=0 INITIAL STATE (AND ELASTIC FINAL STATE)  
 C= ANTI-NUCLEON NUCLEON I=1 INITIAL STATE (AND ELASTIC FINAL STATE). DO NOT USE FOR THE SINGLE PHYSICAL STATE (AP N)  
 C= ANTI-NUCLEON  
 C= GENERAL ANTI-NUCLEUS  
 ANUMU  
 C= FOR USE IN INCLUSIVE REACTIONS, ALSO FOR CROSS-SECTION DATA, AS IN K- P --> ANYTHING  
 AN(1470B)-  
 AN(1470P11)-  
 AN(1520B)-  
 AN(1520D13)-  
 AN(1535S11)-  
 AN(1670D15)-  
 AN(1688F15)-  
 AN(1700B)-  
 AN(1700D13)-  
 AN(1700S11)-  
 AN(1780P11)-  
 AN(1810P13)-  
 AN(1990F17)-  
 AN(2000F15)-  
 AN(2040D13)-  
 AN(2100D15)-  
 AN(2100S11)-  
 AN(2190B)-  
 AN(2190G17)-  
 AN(2220H19)-  
 AN(2650B)-  
 AN(3030B)-  
 AN(3245B)-  
 AN(3690B)-  
 AN(3755B)-  
 C= ANTI-QUARK

## Appendix VII - Particle Abbreviations (cont'd)

AQ(1240-1400)0  
 ASIGMA0  
 ASIG(1385P13)0  
 ASIG(1440B)0  
 ASIG(1480B)0  
 ASIG(1580D13)0  
 ASIG(1620B)0  
 ASIG(1620P11)0  
 ASIG(1620S11)0  
 ASIG(1670B)0  
 ASIG(1670D13)0  
 ASIG(1690B)0  
 ASIG(1750S11)0  
 ASIG(1765D15)0  
 ASIG(1840P13)0  
 ASIG(1880P11)0  
 ASIG(1915B)0  
 ASIG(1915F15)0  
 ASIG(1940D13)0  
 ASIG(2000S11)0  
 ASIG(2030B)0  
 ASIG(2030F17)0  
 ASIG(2070F15)0  
 ASIG(2080P13)0  
 ASIG(2100G17)0  
 ASIG(2210H111)0  
 ASIG(2215G19)0  
 ASIG(2250B)0  
 ASIG(2260D15)0  
 ASIG(2455B)0  
 ASIG(2620B)0  
 ASIG(3000B)0  
 AT  
 AXI0  
 AXI(1530P13)0  
 AXI(1630)0  
 AXI(1820)0  
 AXI(1940)0  
 AXI(2030)0  
 AXI(2250)0  
 AXI(2500)0  
 A1(1100)0  
 A1.5(1170)0  
 A2(1310)0  
 A3(1640)0  
 A4(1900)0  
 BE  
 BOR  
 BR  
 B1(1040)0  
 B(1235)0  
 C  
 CC  
 CD  
 CHARGED  
 CHARGED+  
 CHARGED-  
 CHARM  
 CHGD-HADRON  
 CHI(3410)0  
 CHI(3530)0  
 ASIGMA+  
 ASIG(1385P13)+  
 ASIG(1440B)+  
 ASIG(1480B)+  
 ASIG(1580D13)+  
 ASIG(1620B)+  
 ASIG(1620P11)+  
 ASIG(1620S11)+  
 ASIG(1670B)+  
 ASIG(1670D13)+  
 ASIG(1690B)+  
 ASIG(1750S11)+  
 ASIG(1765D15)+  
 ASIG(1840P13)+  
 ASIG(1880P11)+  
 ASIG(1915B)+  
 ASIG(1915F15)+  
 ASIG(1940D13)+  
 ASIG(2000S11)+  
 ASIG(2030B)+  
 ASIG(2030F17)+  
 ASIG(2070F15)+  
 ASIG(2080P13)+  
 ASIG(2100G17)+  
 ASIG(2210H111)+  
 ASIG(2215G19)+  
 ASIG(2250B)+  
 ASIG(2260D15)+  
 ASIG(2455B)+  
 ASIG(2620B)+  
 ASIG(3000B)+  
 C= ANTI-TRITIUM NUCLFUS  
 AXI+  
 AXI(1530P13)+  
 AXI(1630)+  
 AXI(1820)+  
 AXI(1940)+  
 AXI(2030)+  
 AXI(2250)+  
 AXI(2500)+  
 A1(1100)+  
 A1.5(1170)+  
 A2(1310)+  
 A3(1640)+  
 A4(1900)+  
 C= BERYLLIUM NUCLEUS  
 C= BORON NUCLEUS -- NOTE NAME IS NOT SAME AS CHEMICAL SYMBOL  
 C= BROMINE  
 B1(1040)+  
 B(1235)+  
 C= CARBON NUCLEUS  
 C= CHARGE CONJUGATE REACTION  
 C= CADMIUM NUCLEUS  
 C= CHARGED PARTICLE. UNLIKE PRONG, THIS DOES NOT INCLUDE POSSIBLE NEUTRALS  
 C= POSITIVE CHARGED PARTICLE  
 C= NEGATIVE CHARGED PARTICLE  
 C= CHARMED PARTICLE  
 C= CHARGED HADRON  
 A1(1100)-  
 A1.5(1170)-  
 A2(1310)-  
 A3(1640)-  
 A4(1900)-  
 B1(1040)-  
 B(1235)-  
 C= CHARGED HADRON

Appendix VII - Particle Abbreviations (cont'd)

COSMIC C= COSMIC-RAY PARTICLE OF UNDETERMINED NATURE  
 CU C= COPPER NUCLEUS  
 C\*(4.44) C= 4.44 KEY EXCITED STATE OF CARBON  
 D  
 DD C= DIFFRACTION DISSOCIATION. TO BE FOLLOWED BY NAMES OF PARTICLES WHICH WERE PRODUCED VIA DIFFRACTION DISSOCIATION. E.G. DD <P PIO>  
 DELTA(970)0 DELTA(970)+ DELTA(970)-  
 DEL(UNSPEC)0 C= I=3/2 BARYON OF UNSPECIFIED MASS, USE PRIMARILY IN PROP, RVUE, COMP  
 DEL(UNSPEC)+ C= I=3/2 BARYON OF UNSPECIFIED MASS, USE PRIMARILY IN PROP, RVUE, COMP  
 DEL(UNSPEC)++ C= I=3/2 BARYON OF UNSPECIFIED MASS, USE PRIMARILY IN PROP, RVUE, COMP  
 DEL(UNSPEC)- C= I=3/2 BARYON OF UNSPECIFIED MASS, USE PRIMARILY IN PROP, RVUE, COMP  
 DEL(1232P33)0 DEL(1232P33)+ DEL(1232P33)++ DEL(1232P33)-  
 DEL(1650S31)0 DEL(1650S31)+ DEL(1650S31)++ DEL(1650S31)-  
 DEL(1670D33)0 DEL(1670D33)+ DEL(1670D33)++ DEL(1670D33)-  
 DEL(1690P33)0 DEL(1690P33)+ DEL(1690P33)++ DEL(1690P33)-  
 DEL(1890F35)0 DEL(1890F35)+ DEL(1890F35)++ DEL(1890F35)-  
 DEL(1900S31)0 DEL(1900S31)+ DEL(1900S31)++ DEL(1900S31)-  
 DEL(1910P31)0 DEL(1910P31)+ DEL(1910P31)++ DEL(1910P31)-  
 DEL(1950B)0 DEL(1950B)+ DEL(1950B)++ DEL(1950B)-  
 DEL(1950F37)0 DEL(1950F37)+ DEL(1950F37)++ DEL(1950F37)-  
 DEL(1960D35)0 DEL(1960D35)+ DEL(1960D35)++ DEL(1960D35)-  
 DEL(2160)0 DEL(2160)+ DEL(2160)++ DEL(2160)-  
 DEL(2420B)0 DEL(2420B)+ DEL(2420B)++ DEL(2420B)-  
 DEL(2420H311)0 DEL(2420H311)+ DEL(2420H311)++ DEL(2420H311)-  
 DEL(2850B)0 DEL(2850B)+ DEL(2850B)++ DEL(2850B)-  
 DEL(3230B)0 DEL(3230B)+ DEL(3230B)++ DEL(3230B)-  
 D\*0 D\*\*+ D\*\*\*  
 D(1285) C= LOW MASS D PI PI BUMP  
 EPSILON(1200) C= PIPI S-WAVE (NEAR 1200 MEV)  
 EPSILON(700) C= PIPI S-WAVE (NEAR 700 MEV)  
 ETA  
 ETAPRIME  
 ETA(1080)  
 EXOTIC-HYPERON C= CANNOT BE FORMED OF QUARK-ANTI-QUARK OR QQQ  
 EXOTIC-MESON C= CANNOT BE FORMED OF QUARK-ANTI-QUARK  
 EXOTIC-NUCLEON C= CANNOT BE FORMED OF QQQ  
 EX(1640)0 C= I=5/2 NON-STRANGE BARYON (EXOTIC)  
 EX(1640)+ C= I=5/2 NON-STRANGE BARYON (EXOTIC)  
 EX(1640)++ C= I=5/2 NON-STRANGE BARYON (EXOTIC)  
 EX(1640)+++ C= I=5/2 NON-STRANGE BARYON (EXOTIC)  
 EX(1640)- C= I=5/2 NON-STRANGE BARYON (EXOTIC)  
 EX(1640)-- C= I=5/2 NON-STRANGE BARYON (EXOTIC)  
 E+ C= POSITRON  
 E- C= ELECTRON  
 E(1420)  
 F C= F(1270) MESON RESONANCE  
 FE C= IRON NUCLEUS  
 FL C= FLUORINE NUCLEUS -- NOTE NAME IS NOT SAME AS CHEMICAL SYMBOL  
 FPRIME  
 FRAG C= FRAGMENT FROM NUCLEUS. USED FOR DESCRIPTION OF HEAVY ION EXPERIMENTS  
 FRAGB C= FRAGMENT OF BEAM  
 FRAGT C= FRAGMENT OF TARGET  
 F1(1540)0 F1(1540)+ F1(1540)-  
 GAMMA  
 GAMMAS C= TWO OR MORE GAMMAS

Appendix VII - Particle Abbreviations (cont'd)

GAMMA(S) C= ONE OR MORE GAMMAS  
 G(1680)0 G(1680)+ G(1680)-  
 HADRON C= SINGLE HADRON, ANY CHARGE OR MASS  
 HADRONS C= TWO OR MORE HADRONS  
 HADRON0 C= CHARGE 0 HADRON  
 HADRON+ C= CHARGE + HADRON  
 HADRON- C= CHARGE - HADRON  
 HADRON(S) C= ONE OR MORE HADRONS  
 HE C= HELIUM-4 NUCLEUS  
 HE3 C= HELIUM 3  
 HNUCLEUS C= HYPER-NUCLEUS  
 HVY-LEPTON C= GENERAL HEAVY LEPTON  
 HVY-LEPTON0 C= HEAVY LEPTON  
 HVY-LEPTON+ C= HEAVY LEPTON  
 HVY-LEPTON- C= HEAVY LEPTON  
 HYPERON C= GENERAL HYPERON  
 H(2040) C= I=0, JP=4+ MESON RESONANCE  
 H(990)  
 INELASTIC C= SAME AS ANYTHING, EXCEPT ELASTIC EXCLUDED  
 IR C= IRIDIUM NUCLEUS  
 J/PSI(3100)0  
 KAPPA(1250)0 C= KPI S-WAVE  
 KAPPA(1250)+ C= KPI S-WAVE  
 KAPPA(1250)- C= AKPI S-WAVE  
 KL C= K LONG  
 KN(I=0) C= K NUCLEON I=0 INITIAL STATE (AND ELASTIC FINAL STATE)  
 KN(I=1) C= K NUCLEON I=1 INITIAL STATE (AND ELASTIC FINAL STATE). DO NOT USE FOR THE SINGLE PHYSICAL STATE (K+ P)  
 KN(1660)0 KN(1660)+ KN(1660)-  
 KN(1700)0 C= POSSIBLE K- OMEGA STATE  
 KN(1700)+ C= POSSIBLE K- OMEGA STATE  
 KN(1700)- C= POSSIBLE K- OMEGA STATE  
 KPI(S30)++ C= K PI S-WAVE STATE (EXOTIC)  
 KPRIME(1400)0 C= JP=0- STATE SEEN IN PWA BY BRANDENBURG 76, DECAYING PREDOMINATLY TO EPSILON K0  
 KPRIME(1400)+ C= JP=0- STATE SEEN IN PWA BY BRANDENBURG 76, DECAYING PREDOMINATLY INTO EPSILON K0  
 C= K SHORT  
 K+ K-  
 KS  
 KO  
 K\*(UNSPEC)  
 K\*(UNSPEC)0  
 K\*(UNSPEC)+  
 K\*(UNSPEC)-  
 K\*(1225)0 K\*(1225)+ K\*(1225)-  
 K\*(1420)0 K\*(1420)+ K\*(1420)-  
 K\*(1660)0 K\*(1660)+ K\*(1660)-  
 K\*(2200)0 K\*(2200)+ K\*(2200)-  
 K\*(2800)0 K\*(2800)+ K\*(2800)-  
 K\*(892)0 K\*(892)+ K\*(892)-  
 LAMBDA  
 LAM(UNSPEC) C= I=0, S=-1 BARYON RESONANCE, FOR USE PRIMARILY IN PROP, RVUE, COMP  
 C= BUMP AT 1330 MEV  
 LAM(1330B)  
 LAM(1405S01)  
 LAM(1520D03)  
 LAM(1600P01)  
 LAM(1670S01)  
 LAM(1690D03)  
 LAM(1800G09)  
 LAM(1800P01)  
 LAM(1815F05)

Appendix VII - Particle Abbreviations (cont'd)

LAM(1830D05)  
 LAM(1860P03)  
 LAM(1870S01)  
 LAM(2010)  
 LAM(2020F07)  
 LAM(2100B) C= BUMP AT 2100 MEV  
 LAM(2100G07)  
 LAM(2110F05)  
 LAM(2350B) C= I=0, Y=0 BUMPS  
 LAM(2585B)  
 LI C= LITHIUM NUCLEUS  
 LONGLIVED C= STABLE UNDER STRONG OR E- DECAY; MASS AND OTHER  
 Q NUMBERS NOT WELL-DETERMINED  
 L(1770)0 L(1770)+ L(1770)-  
 MESONS C= TWO OR MORE MESONS  
 MESON(1970)0 C= 1970 MEV I=1 MESON DECAYING INTO K\*(1420) AK  
 MESON(1970)+ C= 1970 MEV I=1 MESON DECAYING INTO K\*(1420) AK  
 MESON(1970)- C= 1970 MEV I=1 MESON DECAYING INTO K\*(1420) AK  
 MESON(2190)0 C= 2190 MEV I=1 MESON OBSERVED IN AP P AND AP D  
 TOTAL CS  
 MESON(2190)+ C= 2190 MEV I=1 MESON OBSERVED IN AP P AND AP D  
 TOTAL CS  
 MESON(2190)- C= 2190 MEV I=1 MESON OBSERVED IN AP P AND AP D  
 TOTAL CS  
 MESON(3270)0 C= NEW POSSIBLE PARTICLE OBSERVED IN E+ E- --> MU+  
 MU- 2GAMMA AS A BUMP IN 2GAMMA MASS REPORTED IN  
 SLAC-PUB-1644  
 MESON(3500)0 C= NEW POSSIBLE PARTICLE OBSERVED IN E+ E- --> MU+  
 MU- 2GAMMA AS A BUMP IN 2GAMMA MASS REPORTED IN  
 SLAC-PUB-1644  
 MESON(3520)0 C= OBSERVED IN E+ E- 2GAMMA FINAL STATE IN WHICH  
 2GAMMA HAS A BUMP AT 160 MEV, SEE R=DESY-75-20  
 FOR DETAIL  
 MM C= TWO OR MORE UNDETECTED NEUTRAL PARTICLES (THIS  
 IS THE STANDARD MEANING OF MISSING MASS IN  
 BUBBLE CHAMBER EXPERIMENTS) \*\* SEE MM.GE.0 AND  
 MM.GE.1 FOR OTHER MISSING MASS STATES  
 MM.GE.0 C= ZERO, ONE OR MORE UNDETECTED NEUTRAL PARTICLES  
 \*\* SEE MM AND MM.GE.1 FOR OTHER MISSING MASS  
 STATES  
 MM.GE.1 C= ONE OR MORE UNDETECTED NEUTRAL PARTICLES \*\* SEE  
 MM AND MM.GE.0 FOR OTHER MISSING MASS STATES  
 MONOPOLE C= MAGNETIC MONOPOLE  
 MU+  
 MU-  
 M(1033) C= NON-STRANGE, I=0 MESON RESONANCE  
 M(1150) C= NON-STRANGE, I=0 MESON RESONANCE  
 M(940) C= NON-STRANGE, I=0 MESON RESONANCE  
 M(953) C= NON-STRANGE, I=0 MESON RESONANCE  
 N C= NEUTRON  
 NANO(2375) C= NUCLEON-ANTINUCLEON I=0 BUMP  
 NE C= NEON NUCLEUS  
 NEPSILON(I=1/2) C= NUCLEON EPSILON I=1/2 FINAL STATE  
 NEUTRAL C= SINGLE NEUTRAL PARTICLE  
 NEUTRALS C= TWO OR MORE NEUTRAL PARTICLES -- DO NOT USE FOR  
 MM  
 NEUTRAL(S) C= ONE OR MORE NEUTRAL PARTICLES -- DO NOT USE FOR  
 MM.GE.1  
 NIT C= NITROGEN 14 NUCLEUS -- NOTE NAME IS NOT SAME AS  
 CHEMICAL SYMBOL  
 NN(I=0) C= NUCLEON NUCLEON I=0 INITIAL STATE (AND ELASTIC  
 FINAL STATE)

Appendix VII - Particle Abbreviations (cont'd)

NN(I=1) C= NUCLEON NUCLEON I=1 INITIAL STATE (AND ELASTIC  
 FINAL STATE). DO NOT USE FOR THE SINGLE  
 PHYSICAL STATE (P P)  
 NONSTR-PRONG C= PRONG PRODUCED BY NON-STRANGE PARTICLE  
 NON-RES C= NON-RESONANT STATE. TO BE FOLLOWED BY NAMES OF  
 PARTICLES WHICH WERE PRODUCED IN A NON-RESONANT  
 STATE. E.G. NON-RES <P PI+>  
 NRHO(I=1/2) C= NUCLEON RHO I=1/2 FINAL STATE  
 NRHO(I=3/2) C= NUCLEON RHO I=3/2 FINAL STATE  
 NU  
 NUCLEON  
 NUCLEUS C= GENERAL NUCLEUS. USE ONLY WHEN THE EXACT  
 NUCLEUS OR NUCLEON IS NOT SPECIFIED. E.G., USE  
 FOR TARGET WHEN DETECTOR IS EMULSION.  
 NUC  
 NUMU  
 N\*5/2(UNSPEC) C= I=5/2, Y=1 BARYON OF UNSPEC MASS AND CHG  
 N\*5/2(UNSPEC)+++ C= I=5/2, Y=1 BARYON OF UNSPEC MASS  
 N\*(UNSPEC) C= S=0 BARYON OF UNSPEC MASS, ISOSPIN, FOR USE IN  
 PROP, RVUE, COMP  
 N\*(UNSPEC)0 C= I UNSPECIFIED, Y=1 BARYON OF UNSPEC MASS  
 N\*(UNSPEC)+ C= I UNSPECIFIED, Y=1 BARYON OF UNSPEC MASS  
 N\*(UNSPEC)- C= I UNSPEC, MASS UNSPEC, Y=1 BARYON  
 N(AP) C= USED FOR MULTIPLICITY DISTRIBUTION OF AP. USE  
 ONLY WITH DD=MULT.  
 N(CHARGED) C= CHARGED PARTICLE, FOR MULTIPLICITY DISTRIBUTION  
 ONLY  
 N(CHGD-HADRON) C= A COLLECTION OF REACTIONS TO DIFFERENT NUMBERS  
 OF CHARGED HADRONS. USE ONLY WITH DD=MULT  
 N(FRAG) C= USED FOR MULTIPLICITY DISTRIBUTION OF HEAVY IONS  
 N(GAMMA) C= GAMMA MULTIPLICITY, USE WITH DD=MULT ONLY  
 N(HADRON) C= A COLLECTION OF REACTIONS TO DIFFERENT NUMBERS  
 OF HADRONS, E.G. 2HADRON, 3HADRON, 4HADRON,  
 ETC.. USE ONLY WITH DD=MULT.  
 N(HE) C= USED FOR MULTIPLICITY DISTRIBUTION OF HELIUM  
 NUCLEI IN FINAL STATE. USE ONLY WITH DD=MULT  
 N(KO) C= A COLLECTION OF REACTION TO DIFFERENT NUMBERS OF  
 KOS. USE ONLY WITH DD=MULT  
 N(K-) C= USED FOR MULTIPLICITY DISTRIBUTION OF K-. USE  
 ONLY WITH DD=MULT.  
 N(LAMBDA) C= A COLLECTION OF REACTIONS TO DIFFERENT NUMBERS  
 OF LAMBDA. USE ONLY WITH DD=MULT  
 N(MESON) C= USED FOR MULTIPLICITY DISTRIBUTION OF MESON.  
 DD=MULT ONLY  
 N(NEUTRAL) C= A COLLECTION OF REACTIONS TO DIFFERENT NUMBERS  
 OF NEUTRALS. USE ONLY WITH DD=MULT  
 N(N) C= USED FOR MULTIPLICITY DISTRIBUTION OF N. USE  
 ONLY WITH DD=MULT.  
 N(PION) C= PION MULTIPLICITY, USE WITH DD=MULT ONLY  
 N(PIO) C= PIO MULTIPLICITY, USE WITH DD=MULT ONLY  
 N(PI-) C= USED FOR MULTIPLICITY DISTRIBUTION OF PI-. USE  
 ONLY WITH DD=MULT  
 N(PRONG) C= A COLLECTION OF REACTIONS WITH DIFFERENT NUMBERS  
 OF PRONGS, E.G. OPRONG, 2PRONG, 4PRONG, ETC..  
 USE ONLY WITH DD=MULT.  
 N(SIGMA0) C= A COLLECTION OF REACTIONS TO DIFFERENT NUMBERS  
 OF SIGMA0S. USE ONLY WITH DD=MULT  
 N(SPECT) C= SPECTATOR NEUTRON (NOT NUMBER OF SPECTATORS)  
 N(UNSPEC) C= I=1/2, Y=1 BARYON OF UNSPECIFIED MASS  
 N(UNSPEC)0 C= I=1/2, Y=1 BARYON OF UNSPEC MASS  
 N(UNSPEC)+ C= I=1/2, Y=1 BARYON OF UNSPEC MASS



Appendix VII - Particle Abbreviations (cont'd)

N(1470B)0  
 N(1470P11)0  
 N(1520B)0  
 N(1520D13)0  
 N(1535S11)0  
 N(1590B)0  
 N(1670D15)0  
 N(1688F15)0  
 N(1700B)0  
 N(1700D13)0  
 N(1700S11)0  
 N(1780P11)0  
 N(1810P13)0  
 N(1990F17)0  
 N(2000F15)0  
 N(2040D13)0  
 N(2100D15)0  
 N(2100S11)0  
 N(2190B)0  
 N(2190G17)0  
 N(2220H19)0  
 N(2650B)0  
 N(3030B)0  
 N(3245B)0  
 N(3690B)0  
 N(3755B)0  
 O  
 OMEGA  
 OMEGA-  
 OMEGA\*(UNSPEC)  
 OMEGA\*(UNSPEC)0  
 OMEGA\*(UNSPEC)-  
 OMEGA\*(UNSPEC)--  
 OMEGA(1675)  
 P  
 PARTON  
 PB  
 PC(3300-3500)0  
 PH  
 PHI  
 PIDEL(I=1/2)  
 PIDEL(I=3/2)  
 PILAM(I=1)  
 PILAM(I=1)0  
 PILAM(I=1)+  
 PILAM(I=1)-  
 PIN(I=1/2)  
 PIN(I=3/2)  
 PIONS  
 PIPI(I=0)  
 PIPI(I=1)  
 PIPI(I=2)  
 PIPI(S20)++  
 PISIG(I=0)  
 PISIG(I=0)  
 PISIG(I=1)  
 PISIG(I=1)0

N(1470B)+  
 N(1470P11)+  
 N(1520B)+  
 N(1520D13)+  
 N(1535S11)+  
 N(1590B)+  
 N(1670D15)+  
 N(1688F15)+  
 N(1700B)+  
 N(1700D13)+  
 N(1700S11)+  
 N(1780P11)+  
 N(1810P13)+  
 N(1990F17)+  
 N(2000F15)+  
 N(2040D13)+  
 N(2100D15)+  
 N(2100S11)+  
 N(2190B)+  
 N(2190G17)+  
 N(2220H19)+  
 N(2650B)+  
 N(3030B)+  
 N(3245B)+  
 N(3690B)+  
 N(3755B)+  
 C= OXYGEN NUCLEUS  
 C= MESON RESONANCE  
 C= THE S=-3 BARYON  
 C= S=-3 BARYON RESONANCE OF UNSPEC I, MASS  
 C= Y=-2 BARYON OF UNSPEC MASS, I  
 C= Y=-2 BARYON OF UNSPEC MASS, I  
 C= Y=-2 BARYON OF UNSPEC MASS, I  
 C= MESON RESONANCE  
 C= HYPOTHESIZED PARTICLE  
 C= LEAD NUCLEUS  
 C= GENERIC NAME FOR EITHER MESON(3500) OR  
 MESON(3270) (Q.V.)  
 C= PHOSPHORUS -- NOTE NAME IS NOT SAME AS CHEMICAL  
 SYMBOL  
 C= PI DELTA I=1/2 FINAL STATE  
 C= PI DELTA I=3/2 FINAL STATE  
 C= I=1 PI LAMBDA SYSTEM OF UNSPEC MASS, FOR PWA  
 C= I=1 PI LAMBDA SYSTEM OF UNSPEC MASS, FOR PWA  
 C= I=1 PI LAMBDA SYSTEM OF UNSPEC MASS, FOR PWA  
 C= I=1 PI LAMBDA SYSTEM OF UNSPEC MASS, FOR PWA  
 C= I=1 PI LAMBDA SYSTEM OF UNSPEC MASS, FOR PWA  
 C= PI NUCLEON I=1/2 INITIAL STATE (AND ELASTIC  
 FINAL STATE)  
 C= PI NUCLEON I=3/2 INITIAL STATE (AND ELASTIC  
 FINAL STATE). DO NOT USE FOR THE SINGLE  
 PHYSICAL STATES (PI+ P) OR (PI- N)  
 C= TWO OR MORE PIONS  
 C= PI PI ISOSPIN 0 STATE  
 C= PI PI ISOSPIN 1 STATE  
 C= PI PI ISOSPIN 2 STATE  
 PIPI(S20)--  
 C= I=0 PI SIGMA SYSTEM OF UNSPEC MASS, FOR PWA  
 C= I=0 PI SIGMA SYSTEM OF UNSPEC MASS, FOR PWA  
 C= I=1 PI SIGMA SYSTEM OF UNSPEC MASS, FOR PWA  
 C= I=1 PI SIGMA SYSTEM OF UNSPEC MASS, FOR PWA

Appendix VII - Particle Abbreviations (cont'd)

PISIG(I=1)+  
 PISIG(I=1)-  
 PIO  
 PIOS  
 PIO(S)  
 PI+  
 PRONG  
 PSI(3700)0  
 PSI(4100)0  
 PSI(4400)0  
 PT  
 P(SPECT)  
 QHIGH(1340)  
 QLOW(1240)  
 QUARK  
 QUARK(1/3)  
 QUARK(2/3)  
 Q(1240-1400)0  
 RHOPI(S21)++  
 RHOPI(S21)--  
 RHOPRIME(1250)0  
 RHOPRIME(1600)0  
 RHO0  
 RHO(2100)0  
 RHO(2275)0  
 S  
 SHOWER  
 SIGMA0  
 SIG(UNSPEC)0  
 SIG(UNSPEC)+  
 SIG(UNSPEC)-  
 SIG(1385P13)0  
 SIG(1440B)0  
 SIG(1440B)+  
 SIG(1440B)-  
 SIG(1480B)0  
 SIG(1480B)+  
 SIG(1480B)-  
 SIG(1580D13)0  
 SIG(1620B)0  
 SIG(1620B)+  
 SIG(1620B)-  
 SIG(1620S11)0  
 SIG(1660P11)0  
 SIG(1670B)0  
 SIG(1670B)+  
 SIG(1670B)-  
 SIG(1670D13)0  
 SIG(1690B)0  
 SIG(1690B)+  
 SIG(1690B)-  
 SIG(1750S11)0  
 SIG(1765D15)0  
 SIG(1770P11)0  
 SIG(1840P13)0  
 SIG(1880P11)0  
 SIG(1915B)0  
 SIG(1915B)+  
 SIG(1915B)-  
 SIG(1915F15)0

C= I=1 PI SIGMA SYSTEM OF UNSPEC MASS, FOR PWA  
 C= I=1 PI SIGMA SYSTEM OF UNSPEC MASS, FOR PWA  
 C= 2 OR MORE PIOS  
 C= 1 OR MORE PIOS  
 PI-  
 C= A CHARGED TRACK ORIGINATING FROM THE PRIMARY  
 INTERACTIONS. ASSUMES OBSERVED OR UNOBSERVED  
 NEUTRALS MAY BE PRESENT, BUT ARE IGNORED UNLESS  
 SPECIFICALLY MENTIONED.  
 C= PLATINUM NUCLEUS  
 C= SPECTATOR PROTON  
 QHIGH(1340)0 QHIGH(1340)+ QHIGH(1340)-  
 QLOW(1240)0 QLOW(1240)+ QLOW(1240)-  
 C= QUARK OF UNSPECIFIED CHARGE  
 C= QUARK OF CHARGE 1/3  
 C= QUARK OF CHARGE 2/3  
 Q(1240-1400)+ Q(1240-1400)-  
 C= A RHO PI RESONANCE  
 C= A RHO PI RESONANCE  
 RHOPRIME(1250)+ RHOPRIME(1250)-  
 RHOPRIME(1600)+ RHOPRIME(1600)-  
 RHO+ RHO-  
 RHO(2100)+ RHO(2100)-  
 RHO(2275)+ RHO(2275)-  
 C= INTERMEDIATE SCALAR BOSON  
 C= SHOWER TRACK  
 SIGMA+ SIGMA-  
 C= I=1, Y=0 PARTICLE OF UNSPEC MASS  
 C= I=1, Y=0 PARTICLE OF UNSPEC MASS  
 C= I=1, Y=0 PARTICLE OF UNSPEC MASS  
 SIG(1385P13)+ SIG(1385P13)-  
 C= I=1, Y=0 BUMPS  
 C= I=1, Y=0 BUMPS  
 C= I=1, Y=0 BUMPS  
 C= I=1, Y=0 BUMPS  
 C= I=1, Y=0 BUMPS  
 C= I=1, Y=0 BUMPS  
 SIG(1580D13)+ SIG(1580D13)-  
 C= I=1, Y=0 BUMPS  
 C= I=1, Y=0 BUMPS  
 C= I=1, Y=0 BUMPS  
 SIG(1620S11)+ SIG(1620S11)-  
 SIG(1660P11)+ SIG(1660P11)-  
 C= I=1, Y=0 BUMPS  
 C= I=1, Y=0 BUMPS  
 C= I=1, Y=0 BUMPS  
 SIG(1670D13)+ SIG(1670D13)-  
 C= I=1, Y=0 BUMPS  
 C= I=1, Y=0 BUMPS  
 C= I=1, Y=0 BUMPS  
 SIG(1750S11)+ SIG(1750S11)-  
 SIG(1765D15)+ SIG(1765D15)-  
 SIG(1770P11)+ SIG(1770P11)-  
 SIG(1840P13)+ SIG(1840P13)-  
 SIG(1880P11)+ SIG(1880P11)-  
 C= I=1, Y=0 BUMPS  
 C= I=1, Y=0 BUMPS  
 C= I=1, Y=0 BUMPS  
 SIG(1915F15)+ SIG(1915F15)-

Appendix VII - Particle Abbreviations (cont'd)

SIG(1940D13)0  
 SIG(2000S11)0  
 SIG(2030B)0  
 SIG(2030B)+  
 SIG(2030B)-  
 SIG(2030F17)0  
 SIG(2070F15)0  
 SIG(2080P13)0  
 SIG(2100G17)0  
 SIG(2210H111)0  
 SIG(2215G19)0  
 SIG(2250B)0  
 SIG(2250B)+  
 SIG(2250B)-  
 SIG(2260D15)0  
 SIG(2455B)0  
 SIG(2455B)+  
 SIG(2455B)-  
 SIG(2620B)0  
 SIG(2620B)+  
 SIG(2620B)-  
 SIG(3000B)0  
 SIG(3000B)+  
 SIG(3000B)-  
 STRANGE  
 STRANGE0  
 SU  
 SO  
 S+  
 S-  
 S\*(993)  
 S(1930)0  
 T  
 TA  
 TACHYON  
 TH  
 T(2200)0  
 U  
 UNLINKED  
 UNSPEC  
 UNSPEC+  
 UNSPEC-  
 UPSI(5970)0  
 U(2360)0  
 VEE  
 W  
 WT  
 W0  
 W+  
 W-  
 XE  
 XIO  
 XI-  
 XI\*3/2(UNSPEC)  
 XI\*3/2(UNSPEC)0

SIG(1940D13)+  
 SIG(2000S11)+  
 C= I=1, Y=0 BUMPS  
 C= I=1, Y=0 BUMPS  
 C= I=1, Y=0 BUMPS  
 SIG(2030F17)+  
 SIG(2070F15)+  
 SIG(2080P13)+  
 SIG(2100G17)+  
 SIG(2210H111)+  
 SIG(2215G19)+  
 C= I=1, Y=0 BUMPS  
 C= I=1, Y=0 BUMPS  
 C= I=1, Y=0 BUMPS  
 SIG(2260D15)+  
 C= I=1, Y=0 BUMPS  
 C= I=1, Y=0 BUMPS  
 C= I=1, Y=0 BUMPS  
 C= I=1, Y=0 BUMPS  
 C= I=1, Y=0 BUMPS  
 C= I=1, Y=0 BUMPS  
 C= I=1, Y=0 BUMPS  
 C= UNSPECIFIED STRANGE PARTICLE  
 N= NEUTRAL STRANGE PARTICLE C= SAME AS STRANGE EXCEPT CHARGE IS SPECIFIED  
 C= SULFUR NUCLEUS -- NOTE NAME IS NOT SAME AS CHEMICAL SYMBOL  
 C= INTERMEDIATE SCALAR BOSON  
 C= INTERMEDIATE SCALAR BOSON  
 C= INTERMEDIATE SCALAR BOSON  
 C= PIFI OR KKBAR S-WAVE  
 S(1930)+ S(1930)-  
 C= TRITIUM NUCLEUS  
 C= TANTALUM NUCLEUS  
 C= THORIUM NUCLEUS  
 T(2200)+ T(2200)-  
 C= URANIUM NUCLEUS  
 C= PSEUDO-PARTICLE USED AS A COMPLETE REACTION BY ITSELF. IMPLIES THAT DD'S IN SAME NODE APPLY IN UNSPECIFIED WAY TO REACTIONS IN ALL OTHER NODES. I.E., DD'S ARE NOT LINKED TO SPECIFIC REACTIONS  
 C= PARTICLE OF UNSPECIFIED TYPE. FOR PARTICLE SEARCH. NORMALLY ITS USE SHOULD BE ACCOMPANIED BY A DATA COMMENT DESCRIBING THE PARTICLE OR SEARCH. USE FOR PARTICLES NOT YET FOUND AND OF UNKNOWN PROPERTIES. PRINCIPALLY FOR USE IN PROP  
 C= SAME AS UNSPEC EXCEPT THAT IT HAS CHARGE+  
 C= SAME AS UNSPEC EXCEPT THAT IT HAS CHARGE-  
 C= LEDERMANS UPSILON TO E+ E-  
 U(2360)+ U(2360)-  
 C= NEUTRAL OF UNSPECIFIED TYPE  
 C= INTERMEDIATE VECTOR BOSON  
 C= TUNGSTEN NUCLEUS -- NOTE NAME IS NOT SAME AS CHEMICAL SYMBOL  
 C= INTERMEDIATE VECTOR BOSON  
 C= INTERMEDIATE VECTOR BOSON  
 C= INTERMEDIATE VECTOR BOSON  
 C= XENON NUCLEUS  
 XI-  
 C= I=3/2, Y=-1 BARYON OF UNSPEC MASS  
 C= I=3/2, Y=-1 BARYON OF UNSPEC MASS

Appendix VII - Particle Abbreviations (cont'd)

XI\*3/2(UNSPEC)+  
 XI\*3/2(UNSPEC)-  
 XI\*3/2(UNSPEC)--  
 XI\*(UNSPEC)  
 XI\*(UNSPEC)0  
 XI\*(UNSPEC)+  
 XI\*(UNSPEC)-  
 XI\*(UNSPEC)--  
 XI(UNSPEC)  
 XI(UNSPEC)0  
 XI(UNSPEC)-  
 XI(1530P13)0  
 XI(1630)0  
 XI(1820)0  
 XI(1940)0  
 XI(2030)0  
 XI(2250)0  
 XI(2500)0  
 X0(1430)  
 X1(1440)0  
 X1(1795)0  
 X(1690)0  
 X(2500-3600)  
 X(2750)0  
 Y\*2(UNSPEC)  
 Y\*2(UNSPEC)++  
 Y\*(UNSPEC)  
 Y\*(UNSPEC)0  
 Y\*(UNSPEC)+  
 Y\*(UNSPEC)-  
 Z0(UNSPEC)  
 Z0(UNSPEC)+  
 Z0(1780)+  
 Z0(1865)+  
 Z1(UNSPEC)  
 Z1(UNSPEC)0  
 Z1(UNSPEC)+  
 Z1(UNSPEC)++  
 Z1(1900)0  
 Z1(1900)+  
 Z1(1900)++  
 Z1(2150)0  
 Z1(2150)+  
 Z1(2150)++  
 Z1(2500)0  
 Z1(2500)+  
 Z1(2500)++  
 Z\*(UNSPEC)  
 Z\*(UNSPEC)0  
 Z\*(UNSPEC)+  
 Z\*(UNSPEC)++  
 OPRONG  
 (GAMMAS)  
 (HADRONS)  
 (NEUTRALS)  
 (PIOS)  
 .GE.4PRONG  
 .GE.7PRONG  
 .GT.10PRONGS  
 C= I=3/2, Y=-1 BARYON OF UNSPEC MASS  
 C= I=3/2, Y=-1 BARYON OF UNSPEC MASS  
 C= I=3/2, Y=-1 BARYON OF UNSPEC MASS  
 C= I=UNSPEC, Y=-1 BARYON OF UNSPEC MASS  
 C= Y=-1 BARYON OF UNSPEC MASS, I  
 C= Y=-1 BARYON OF UNSPEC MASS, I  
 C= Y=-1 BARYON OF UNSPEC MASS, I  
 C= Y=-1 BARYON OF UNSPEC MASS, I  
 C= I=1/2, Y=-1 BARYON OF UNSPEC MASS  
 C= I=1/2, Y=-1 BARYON OF UNSPEC MASS  
 C= I=1/2, Y=-1 BARYON OF UNSPEC MASS  
 XI(1530P13)-  
 XI(1630)-  
 XI(1820)-  
 XI(1940)-  
 XI(2030)-  
 XI(2250)-  
 XI(2500)-  
 X1(1440)+ X1(1440)-  
 X1(1795)+ X1(1795)-  
 C= ANY MESON BUMP SEEN IN PRODUCTION EXPERIMENTS IN THAT MASS REGION (EXCEPT THOSE ASSOCIATED WITH J/PSI, ETC.)  
 C= SEEN IN E+ E- ANNIHILATIONS  
 C= I=2, Y=0 BARYON OF UNSPEC MASS, CHG  
 C= I=2, Y=0 BARYON OF UNSPEC MASS  
 C= Y=0 BARYON OF UNSPEC ISOSPIN AND MASS  
 C= Y=0 BAYON OF UNSPEC ISOSPIN AND MASS  
 C= Y=0 BARYON OF UNSPEC ISOSPIN AND MASS  
 C= Y=0 BARYON OF UNSPEC ISOSPIN AND MASS  
 C= EXOTIC I=0, Y=2 BARYON OF UNSPEC MASS  
 C= EXOTIC I=0, Y=2 BARYON OF UNSPEC MASS  
 C= EXOTIC I=0, Y=2 BARYON  
 C= EXOTIC I=0, Y=2 BARYON  
 C= EXOTIC I=1, Y=2 BARYON OF UNSPEC MASS  
 C= EXOTIC I=1, Y=2 BARYON OF UNSPEC MASS  
 C= EXOTIC I=1, Y=2 BARYON OF UNSPEC MASS  
 C= EXOTIC I=1, Y=2 BARYON OF UNSPEC MASS  
 C= EXOTIC I=1, Y=2 BARYON  
 C= EXOTIC I=1, Y=2 BARYON  
 C= EXOTIC I=1, Y=2 BARYON  
 C= EXOTIC I=1, Y=2 BARYON  
 C= EXOTIC I=1, Y=2 BARYON  
 C= EXOTIC I=1, Y=2 BARYON  
 C= EXOTIC I=1, Y=2 BARYON  
 C= EXOTIC I=1, Y=2 BARYON  
 C= EXOTIC I=UNSPEC, Y=2 BARYON OF UNSPEC MASS  
 C= EXOTIC Y=2 BARYON OF UNSPEC MASS  
 C= EXOTIC Y=2 BARYON OF UNSPEC MASS  
 C= EXOTIC Y=2 BARYON OF UNSPEC MASS, I  
 C= USE FOR REACTIONS WITH NO CHARGED PARTICLES ORIGINATING FROM PRIMARY VTX. IGNORES OBSERVED OR UNOBSERVED VEES.  
 C= ZERO OR MORE GAMMAS  
 C= ZERO OR MORE HADRONS  
 C= ZERO OR MORE NEUTRAL PARTICLES -- DO NOT USE FOR MM.GE.0  
 C= 0 OR MORE PIOS  
 C= GREATER THAN OR EQUAL TO 4 PRONGS  
 C= GREATER THAN OR EQUAL TO 7 PRONGS  
 C= MORE THAN 10 PRONGS