LA-7444-SR, Rev. 3
Status Report

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Issued: March 1982

LA--7444-SR Rev 3

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LAMPF
Proposal Status and Summaries

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Revision 1 issued October 1979
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Revision 3 issued March 1982

Los Alamos National Laboratory
Los Alamos, New Mexico 87545

LAMPF

PROPOSAL STATUS

STATUS OF PROPOSALS AS OF 82/01/11.
THIS REPORT REFLECTS THE ACTIONS OF THE AUGUST 1981 PAC.

PROP. NO.	PHASE	STATUS	CONDITIONS	CHANNEL	SPOKESMAN		PAC-HRS
1	1	WITHDRAWN	NEXT-PAC	LEP	TROWER	W.P.	0.0
2	1	COMPLETE		LEP	JAKOBSON	M.J.	150.0
	2	COMPLETE		LEP			448.0
3	1	WITHDRAWN	PARASITE-Q	SMC	KINSEY	B.B.	0.0
4	1	COMPLETE	W/15	HRS	IGO	G.J.	100.0
5	1	COMPLETE		HRS	CHRIEN	R.E.	200.0
					PALEVSKY	H.	0.0
6	1	WITHDRAWN		HRS	SUTTER	R.J.	0.0
					IGO	G.J.	0.0
7	1	COMPLETE	WITH-12	SMC	SHERA	E.B.	60.0
	2	COMPLETE		SMC			480.0
8	1	INACTIVE		LEP	BUDICK	B.	0.0
					DERMAN	S.	0.0
9	1	COMPLETE		EPICS	MCCARTHY	J.S.	500.0
					MORRIS	C.L.	0.0
10	1	COMPLETE	W/233	HRS	SPENCER	J.E.	140.0
11	F-S	WITHDRAWN	101/69/155	SMC	BOEHM	F.	0.0
12	1	COMPLETE		SMC	POWERS	R.J.	120.0
	2	COMPLETE		SMC	KUNSELMAN	A.R.	96.0
13	1	COMPLETE		EPICS	SETH	K.K.	200.0
14	1	COMPLETE		EPICS	THIESSEN	H.A.	250.0
	2	COMPLETE		EPICS			200.0
15	1	COMPLETE	W/4	HRS	IGO	G.J.	200.0
	2	COMPLETE		HRS	TANAKA	N.	200.0
	3	COMPLETE		HRS			90.0
16	1	INACTIVE		SMC	MEYER	S.L.	10.0
17	1	WITHDRAWN		EPICS	MORRISON	G.C.	230.0
					SETH	K.K.	0.0
					ZEIDMAN	B.	0.0
18	1	COMPLETE		EPICS	ZEIDMAN	B.	250.0
	2	COMPLETE		EPICS			250.0
	3	COMPLETE		EPICS			72.0
19	1	INACTIVE		BIOMED	LIEBER	A.J.	75.0
20	1	WITHDRAWN			HAHN	A.A.	0.0
21	1	REJECTED			BROLLEY	J.E.	0.0
22	1	WITHDRAWN		EPICS	GEMMELL	D.S.	150.0
23	1	COMPLETE		EPICS	WHARTON	W.R.	250.0
24	1	WITHDRAWN	FEAS-STUDY	NEUTRINO-A	LANDE	K.	0.0
25	1	COMPLETE		LEP	BURMAN	R.L.	200.0
	2	COMPLETE		LEP			180.0
	3	COMPLETE		LEP			250.0
26	1	COMPLETE		EPB	VEESER	L.R.	100.0
27	1	COMPLETE		EPB	WILLARD	H.B.	300.0
	2	COMPLETE		EPB			200.0
	3	COMPLETE	AYY-DETERM				0.0
28	1	COMPLETE		LEP	YAVIN	A.I.	150.0
29	1	COMPLETE	WITH-54	LEP	PREEDOM	B.M.	0.0
	2	COMPLETE	W/54	LEP			0.0
30	1	REJECTED			DIETERLE	B.D.	0.0
31	1	COMPLETE		NEUTRINO-A	NEMETHY	P.	800.0
	2	COMPLETE		NEUTRINO-A			0.0
32	1	COMPLETE		P3	MC FARLANE	W.K.	300.0
	2	COMPLETE		P3	MACEK	R.J.	800.0
33	1	ABSORBED	BY 336	EPB	MUTCHLER	G.S.	0.0
					PINSKY	L.S.	0.0
34	1	COMPLETE		P3	MINEHART	R.C.	220.0
35	1	COMPLETE		LEP	ZIOCK	K.O.H.	112.0

STATUS OF PROPOSALS AS OF 82/01/11.

PROP. NO.	PHASE	STATUS	CONDITIONS	CHANNEL	SPOKESMAN		PAC-HRS
36	1	WITHDRAWN		P3	GUGELOT	P.C.	0.0
37	1	COMPLETE		SMC	HUGHES	V.W.	300.0
	2	COMPLETE		SMC	CRANE	T.	550.0
38	1	WITHDRAWN		NEUTRINO-A	REINES	F.	0.0
39	1	COMPLETE	COMB/W 342	EPICS	MACEK	R.J.	175.0
					THIESSEN	H.A.	0.0
40	1	WITHDRAWN			FRANKEL	S.	0.0
41	1	WITHDRAWN		EPICS	BOWEN	T.	0.0
42	1	COMPLETE		EPB	COLE	R.K.	380.0
43	1	WITHDRAWN		EPICS	SWENSON	L.W.	250.0
44	1	COMPLETE		BIOMED	CARLSON	D.E.	30.0
45	1	COMPLETE		BSA-RAD	DUDZIAK	D.J.	0.0
	2	COMPLETE		BSA-RAD	GREEN	W.V.	0.0
					GIORGI	A.L.	0.0
46	1	WITHDRAWN		EPICS	PETERSON	R.J.	300.0
47	1	WITHDRAWN		EPICS	PETERSON	R.J.	100.0
48	1	WITHDRAWN		EPICS	PETERSON	R.J.	0.0
49	1	COMPLETE		HRS	PETERSON	R.J.	150.0
50	1	COMPLETE		LEP	CROWE	K.M.	300.0
	2	COMPLETE		LEP	ROWE	P.	224.0
51	1	COMPLETE		SMC	MALANIFY	J.J.	100.0
52	1	WITHDRAWN	ACCEL-DEV	EPB	BRYANT	H.C.	0.0
53	1	WITHDRAWN	FEAS-STUDY	NEUTRINO-A	DAVIS	RAYMON	0.0
54	1	COMPLETE	WITH-29	LEP	PREEDOM	B.M.	112.0
	2	COMPLETE	W/29	LEP			165.0
55	1	WITHDRAWN		AB	SHIVELY	F.T.	0.0
					HADDOCK	R.P.	0.0
56	1	COMPLETE		AB	NORTHCLIFF	L.C.	400.0
	2	COMPLETE		AB	SIMMONS	J.E.	500.0
57	1	WITHDRAWN			RICHMAN	C.	0.0
					GROCE	D.E.	0.0
58	1	COMPLETE	WITH 120	P3	NEFKENS	B.M.K.	0.0
					FITZGERALD	D.H.	0.0
59	1	WITHDRAWN		HRS	MACEK	R.J.	250.0
60	1	COMPLETE		SMC	KNIGHT	J.D.	200.0
	2	COMPLETE		SMC	SCHILLACI	M.E.	340.0
61	1	WITHDRAWN		EPICS	NAGLE	D.E.	200.0
62	1	WITHDRAWN		P3	LIND	V.G.	0.0
63	1	REJECTED			GRAM	P.A.M.	0.0
64	1	WITHDRAWN			SEAGRAVE	J.D.	0.0
65	1	COMPLETE		AB	SIMMONS	J.E.	250.0
66	1	COMPLETE	FEAS STUDY	AB	SIMMONS	J.E.	300.0
	2	COMPLETE		AB			400.0
67	1	COMPLETE		P3	DROPESKY	B.J.	100.0
				LEP			0.0
	2	COMPLETE		P3			72.0
				LEP			11.0
	3			P3			0.0
68	1	WITHDRAWN		P3	HUGHES	V.W.	0.0
					FITZGERALD	D.H.	0.0
69	F-S	WITHDRAWN	11/101/155	SMC	LU	D.C.	0.0
70	1	WITHDRAWN			FETKOVICH	J.C.	0.0
71	1	REJECTED			KNOWLES	H.B.	0.0
72	1	REJECTED			HOFFMAN	M.M.	0.0
73	1	WITHDRAWN		HRS	COLE	R.K.	100.0
74	1	COMPLETE		EPICS	PEREZ-MEND	V.	350.0
					STETZ	A.W.	0.0
75	1	IN ERROR					0.0
76	1	COMPLETE	COMB	SMC	CHANG	C.Y.	0.0
					KANE	J.R.	0.0
77	1	WITHDRAWN		EPICS	THIESSEN	H.A.	120.0
78	1	WITHDRAWN		BIOMED	PHILLIPS	G.C.	50.0
				LEP			50.0
79	1	COMPLETE	EXP-AR-DEV	LEP	PHILLIPS	G.C.	50.0
				P3			50.0
80	1	COMPLETE		P3	PHILLIPS	G.C.	300.0
	2	COMPLETE		P3			320.0
81	1	COMPLETE		EPB	PHILLIPS	G.C.	200.0
	2	COMPLETE		EPB			420.0
82	1	COMPLETE		P3	PHILLIPS	G.C.	400.0

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83	1	INACTIVE		BIOMED	PHILLIPS	G.C.	100.0
84	1	COMPLETE	FOR PION	BIOMED	PHILLIPS	G.C.	50.0
85	1	COMPLETE		SMC	WELSH	R.E.	150.0
86	1	COMPLETE		TTA	POSKANZER	A.M.	300.0
	2	COMPLETE		TTA			0.0
	3	COMPLETE		TTA			1500.0
87	1	COMPLETE		EPICS	MCCARTHY	J.S.	300.0
88	1	REJECTED			SHIVELY	F.T.	0.0
89	1	REJECTED		EPICS	BARNES	P.D.	300.0
90	1	COMPLETE		P3	SHERMAN	R.H.	300.0
	2	COMPLETE		P3	SHIVELY	F.T.	400.0
					GLODIS	P.F.	0.0
					SPENCER	J.E.	0.0
					WADLINGER	A.	0.0
					NEFKENS	B.M.K.	0.0
91	1	REJECTED		P3	HADDOCK	R.P.	0.0
92	1	WITHDRAWN		EPB	MAGLIC	B.C.	0.0
93	1	WITHDRAWN		P3	PLENDL	H.S.	150.0
					GREENFIELD	M.B.	0.0
94	1	INACTIVE	PARASITE-Q		LEE	Y-K	0.0
95	1	REPLACED	BY 139				0.0
96	1	COMPLETE		LEP	NAGLE	D.E.	150.0
	2	COMPLETE		LEP			300.0
97	1	COMPLETE		SMC	WU	C.S.	32.0
					HUGHES	V.W.	0.0
					DUGAN	G.	0.0
					EGAN	P.D.	0.0
					LU	D.C.	0.0
98	1	REPLACED	BY 139		SPENCER	J.E.	0.0
99	1	COMPLETE		P3	REBKA	G.A.	250.0
	2	COMPLETE		P3	GRAM	P.A.M.	275.0
100	1	COMPLETE		SMC	HUTSON	R.L.	100.0
	2	COMPLETE		SMC			170.0
101	F-S	COMPLETE	11/69/155	SMC	BOEHM	F.	0.0
					LU	D.C.	0.0
102	1	COMPLETE		P3	MARKOWITZ	S.S.	30.0
				LEP			0.0
103	1	COMPLETE		P3	HUDIS	J.	50.0
	2	COMPLETE		AB-NUCCHEM			10.0
				P3			70.0
104	1	COMPLETE	6H-P_6HPI	P3	PATE	B.D.	6.0
				AB-NUCCHEM			6.0
	2	COMPLETE		AB-NUCCHEM			10.0
				P3			10.0
105	1	COMPLETE		AB-NUCCHEM	BUNKER	M.E.	50.0
				SWY-LABS			0.0
	2	COMPLETE		AB-NUCCHEM			75.0
106	1	COMPLETE		AB-NUCCHEM	OBRIEN	H.A.	20.0
	2	APPROVED		AB-NUCCHEM			20.0
107	1	REPLACED	BY 134		RYAN	V.A.	0.0
108	1	WITHDRAWN			PLENDL	H.S.	0.0
109	1	WITHDRAWN		HRS	FLYNN	E.R.	250.0
110	1	WITHDRAWN		P3	SIMON	W.G.	50.0
111	1	COMPLETE		BSA-RAD	HILL	J.C.	150.0
	2	COMPLETE		BSA-RAD			150.0
112	1	WITHDRAWN			PETERSON	R.J.	0.0
113	1	RESUBMIT		BSA-RAD	MICHEL	D.J.	0.0
114	1	WITHDRAWN			KNAPP	E.A.	0.0
115	1	WITHDRAWN		SMC	WOLFSBERG	K.	70.0
116	1	WITHDRAWN			COCK	B.C.	0.0
117	1	COMPLETE		HRS	IGO	G.J.	120.0
118	1	COMPLETE		AB-NUCCHEM	PORILE	N.T.	5.0
				P3			20.0
				SWY-LABS			0.0
	2	COMPLETE		P3			50.0
	2			AB-NUCCHEM			0.0
119	1	COMPLETE		P3	KAUFMAN	S.B.	67.0
	2	COMPLETE		P3			32.0
				AB-NUCCHEM			0.0

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PROP. NO.	PHASE	STATUS	CONDITIONS	CHANNEL	SPOKESMAN		PAC-HRS
120	1	COMPLETE	WITH 58	P3	NEFKENS	B.M.K.	480.0
	2	APPROVED		P3	FITZGERALD	D.H.	900.0
121	1	COMPLETE		LEP	SEGEL	R.E.	120.0
				P3			0.0
	2	COMPLETE		P3			62.0
				LEP			112.0
122	1	COMPLETE		LEP	KUNSELMAN	A.R.	50.0
	2	COMPLETE		SMC			40.0
123	1	COMPLETE		AB-NUCCHEM	KAROL	P.J.	1.0
				P3			50.0
	2	COMPLETE		AB-NUCCHEM			2.0
				P3			80.0
	3	COMPLETE		P3			0.0
	4	COMPLETE		P3			24.0
	5	APPROVED		LEP			24.0
				P3			0.0
124	1	COMPLETE	BY ROSEN	AB	DIETERLE	B.D.	24.0
	2	COMPLETE		EPB	MC FARLANE	W.K.	200.0
	3	REJECTED		EPB			400.0
125	1	COMPLETE		AB	DIETERLE	B.D.	200.0
126	1	REJECTED			BRYANT	H.C.	0.0
127	1	REJECTED			REICH	C.W.	0.0
128	1	COMPLETE	ACCEL-DEV	EPB	HAYWARD	T.D.	0.0
129	1	COMPLETE		AB	WOLFE	D.M.	400.0
130	1	COMPLETE		EPICS	THIESSEN	H.A.	0.0
	2	COMPLETE		EPICS			0.0
131	1	COMPLETE		LEP	PREEDOM	B.M.	125.0
	2	COMPLETE		LEP			216.0
132	1	WITHDRAWN	WITH 160	P3	HWANG	C.F.	250.0
133	1	COMPLETE		EPICS	GEMMELL	D.S.	150.0
134	1	REPLACED	BY 147		RYAN	V.A.	0.0
135	1	REJECTED			MADEY	R.	0.0
136	1	INACTIVE		EPICS	BURLESON	G.R.	0.0
137	1	COMPLETE		EPB	NAGLE	D.E.	500.0
	2	COMPLETE		EPB	MISCHKE	R.E.	700.0
	3	COMPLETE		EPB	FRAUENFELD	H.	330.0
138	1	COMPLETE		HRS	MCDANIELS	D.K.	150.0
					SWENSON	L.W.	0.0
139	1	COMPLETE	TUNE-UP	HRS	SPENCER	J.E.	250.0
					TANAKA	N.	0.0
140	1	COMPLETE	WITH 180	LEP	BARNES	P.D.	50.0
	2	COMPLETE		LEP			112.0
	3	COMPLETE		LEP			360.0
141	1	WITHDRAWN			HARGROVE	C.K.	0.0
142	1	COMPLETE		SMC	HUIZENGA	J.R.	100.0
	2	COMPLETE		SMC			400.0
143	1	COMPLETE		BIOMED	KLIGERMAN	M.M.	0.0
	2	COMPLETE		BIOMED	KNAPP	E.A.	0.0
	3	COMPLETE		BIOMED			0.0
144	1	COMPLETE		LEP	HIGHLAND	V.L.	224.0
	2	COMPLETE		P3	MACEK	R.J.	336.0
145	1	WITHDRAWN		EPICS	TAMAS	G.	0.0
					LAGET	J.-M.	0.0
146	1	WITHDRAWN		EPICS	PETERSON	R.J.	0.0
147	1	INACTIVE		BSA-RAD	PERRY	D.G.	200.0
					BARR	D.W.	0.0
148	1	COMPLETE		NEUTRINO-A	CHEN	H.H.	0.0
	2	COMPLETE	NULL	NEUTRINO-A	REINES	F.	0.0
149	1	INACTIVE	PARASITE	SMC	CHEN	J.R.	0.0
					SWENSON	L.W.	0.0
150	1	COMPLETE		AB-NUCCHEM	TURKEVICH	A.L.	100.0
	2	COMPLETE		AB-NUCCHEM			60.0
151	1	COMPLETE		BIOMED	KNOWLES	H.B.	10.0
152	1	WITHDRAWN		SMC	DIXIT	M.S.	150.0
153	1	COMPLETE		EPB	EISENSTEIN	R.A.	50.0
				P3			50.0
154	1	COMPLETE		P3	MINEHART	R.C.	360.0
	2	COMPLETE		P3	MCCARTHY	J.S.	300.0
155	F-S	APPROVED	11/69/101	SMC	LU	D.C.	0.0
	1	WITHDRAWN		SMC			300.0

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156	1	COMPLETE	PARASITE	EPICS	SWENSON	L.W.	0.0
157	1	WITHDRAWN		BSA-RAD	SEITZ	M.G.	25.0
158	1	INACTIVE	PARASITE	HRS	IGO	G.J.	0.0
159	1	COMPLETE	PARASITE	EPB	EISENSTEIN	R.A.	0.0
160	1	WITHDRAWN	WITH 132	EPB	HWANG	C.F.	100.0
	2	DEFER		EPB			0.0
161	1	APPROVED	WITH 157	BSA-RAD	BURNETT	D.S.	160.0
162	1	COMPLETE		LEP	YAVIN	A.I.	50.0
					ALSTER	J.	0.0
163	1	COMPLETE		SMC	PERKINS	R.B.	100.0
					SHERA	E.B.	0.0
164	1	COMPLETE		LEP	FISHER	T.R.	80.0
					MARSHAK	H.	0.0
165	1	COMPLETE		SMC	HUGHES	V.W.	50.0
166	1	COMPLETE		SMC	POWERS	R.J.	120.0
167	1	COMPLETE	FEAS/PARA	BIOMED	ZIOCK	K.O.H.	0.0
168	1	WITHDRAWN	2-SREL	BIOMED	ZIOCK	K.O.H.	0.0
169	1	COMPLETE		AB-NUCCHEM	ORTH	C.J.	0.0
					SATTIZAHN	J.E.	0.0
170	1	COMPLETE		LEP	ALSTER	J.	50.0
171	1	APPROVED		BIOMED	BENTON	E.V.	14.0
172	1	INACTIVE		SMC	SWALLOW	E.	0.0
173	1	COMPLETE		SMC	BOEHM	F.	300.0
	2	COMPLETE		SMC	VOGEL	P.	300.0
174	1	COMPLETE		BSA-RAD	ROWLAND	F.S.	200.0
	2	COMPLETE		BSA-RAD	MILLER	G.E.	80.0
175	1	COMPLETE		SMC	HUGHES	V.W.	0.0
176	1	COMPLETE		EPB	ANDERSON	B.D.	200.0
	2	COMPLETE		EPB			200.0
177	1	INACTIVE		HRS	IGO	G.J.	0.0
					BAUER	T.S.	0.0
178	1	COMPLETE	IN PRIN.	HRS	SPENCER	J.E.	150.0
					HINTZ	N.M.	0.0
179	1	COMPLETE	DETEC/DEV	LINE-B	BOWMAN	J.D.	0.0
180	1	COMPLETE		LEP	EISENSTEIN	R.A.	50.0
	2	COMPLETE		LEP			280.0
181	1	COMPLETE		LEP	ALSTER	J.	112.0
	2	COMPLETE		LEP	BOWMAN	J.D.	0.0
				P3			0.0
182	1	REJECTED		LEP	PETERSON	R.J.	0.0
183	1	COMPLETE	IN PRINCIP	HRS	HINTZ	N.M.	250.0
					SPENCER	J.E.	0.0
184	1	COMPLETE		ISORAD	OBRIEN	H.A.	0.0
				LINE-X-BS			0.0
185	1	INACTIVE		AB	SIMMONS	J.E.	0.0
186	1	WITHDRAWN		EPB	PETERSON	R.J.	0.0
187	1	APPROVED	PARASITE	BIOMED	REIDY	J.J.	0.0
188	1	INACTIVE		BIOMED	CARLSON	D.E.	50.0
189	1	COMPLETE		AB	VAN DYCK	O.B.	296.0
190	1	APPROVED	PARASITE	LEP	ZIOCK	K.O.H.	200.0
191	1	COMPLETE		LEP	HALPERN	I.	112.0
	2	COMPLETE		LEP			165.0
	3	COMPLETE	BY ROSEN	LEP			200.0
	4	COMPLETE		LEP			190.0
192	1	COMPLETE	ACCEL-DEV.	EPB	HAYWARD	T.D.	45.0
193	1	COMPLETE		AB	DIETERLE	B.D.	250.0
	2	COMPLETE		AB	MC FARLANE	W.K.	0.0
194	1	COMPLETE		EPB	MCNAUGHTON	M.W.	400.0
	2	COMPLETE		EPB			200.0
195	1	COMPLETE		BIOMED	LEON	M.	0.0
	2	COMPLETE		P3	REIDY	J.J.	100.0
				BIOMED			0.0
	3	COMPLETE		P3			168.0
196	1	COMPLETE		BIOMED	DANIEL	H.	0.0
					REIDY	J.J.	0.0
197	1	COMPLETE		EPB	HUNGERFORD	E.V.	225.0
198	1	COMPLETE		BIOMED	POWERS	G.E.	0.0
199	1	WITHDRAWN			BARRETT	R.J.	0.0
200	1	COMPLETE	ACCEL DEV	EPB	BRYANT	H.C.	0.0

STATUS OF PROPOSALS AS OF 82/01/11.

PROP. NO.	PHASE	STATUS	CONDITIONS	CHANNEL	SPOKESMAN		PAC-HRS
201	1	COMPLETE		P3	MINEHART	R.C.	250.0
202	1	REJECTED	FEASTU/450	HRS	IGO	G.J.	0.0
203	1	REJECTED			PHILLIPS	G.C.	0.0
204	1	COMPLETE		HRS	IGO	G.J.	100.0
205	1	COMPLETE	LI7 PART	AB	KENEFICK	R.A.	50.0
206	1	COMPLETE		SMC	HUGHES	V.W.	250.0
					EGAN	P.D.	0.0
207	1	COMPLETE		BIOMED	BRADBURY	J.N.	0.0
					ALLRED	J.C.	0.0
208	1	WITHDRAWN		AB	NORTHCLIFF	L.C.	200.0
209	1	COMPLETE		BIOMED	BRADBURY	J.N.	0.0
				LEP	ALLRED	J.C.	0.0
210	1	COMPLETE		ISORAD	OBRIEN	H.A.	0.0
211	1	COMPLETE		ISORAD	GREEN	W.V.	0.0
212	1	COMPLETE		BIOMED	MEWISSEN	D.J.	16.0
213	1	COMPLETE	AFTER TEST	SMC	SHERA	E.B.	32.0
					STEFFEN	R.M.	0.0
214	1	COMPLETE	W/195	P3	HARGROVE	C.K.	60.0
					LEON	M.	0.0
215	1	APPROVED		BIOMED	PEREZ-MEND	V.	104.0
					BRADBURY	J.N.	0.0
216	1	REJECTED			WADLINGER	A.	0.0
217	1	APPROVED		BIOMED	PACIOTTI	M.A.	32.0
218	1	APPROVED		BIOMED	KATZ	R.	16.0
219	1	COMPLETE		EPB	BEVINGTON	P.R.	225.0
220	1	REJECTED			HOFFMANN	G.W.	0.0
					MOORE	C.F.	0.0
221	1	COMPLETE		P3	HOFFMAN	C.M.	500.0
222	1	COMPLETE		P3	MISCHKE	R.E.	500.0
223	F-S	COMPLETE	PARASITE	HRS	HOFFMANN	G.W.	0.0
	F-S	COMPLETE		EPB			.0.0
224	1	WITHDRAWN		EPICS	ENSSLIN	N.	0.0
					MADLAND	D.G.	0.0
					MORRIS	C.L.	0.0
225	1	APPROVED		NEUTRINO-A	CHEN	H.H.	0.0
226	1	REJECTED			BURLESON	G.R.	0.0
227	1	INACTIVE	PARASITE	HRS	RILEY	P.J.	0.0
					SPENCER	J.E.	0.0
228	1	WITHDRAWN					0.0
229	1	COMPLETE		EPICS	BRAITHWAIT	W.J.	200.0
					MOORE	C.F.	0.0
230	1	WITHDRAWN			BRAITHWAIT	W.J.	0.0
					THIESSEN	H.A.	0.0
					MOORE	C.F.	0.0
231	1	WITHDRAWN		EPICS	BRAITHWAIT	W.J.	0.0
					MOORE	C.F.	0.0
232	1	INACTIVE		EPICS	MADLAND	D.G.	0.0
					MORRIS	C.L.	0.0
					THIESSEN	H.A.	0.0
233	1	COMPLETE	W/10	HRS	SETH	K.K.	140.0
					SPENCER	J.E.	0.0
234	1	COMPLETE		LEP	GOTOW	K.	0.0
235	1	APPROVED		BIOMED	GILLETTE	E.L.	21.0
236	1	APPROVED		BIOMED	RAJU	M.R.	280.0
237	1	WITHDRAWN		BSA-RAD	HOLLAND	J.R.	0.0
					GREEN	W.V.	0.0
238	1	REPLACED	BY 290		MADEY	R.	0.0
239	1	COMPLETE		BIOMED	FRIEDLAND	S.S.	28.0
	2	COMPLETE		BIOMED	MAUSNER	L.F.	0.0
240	1	COMPLETE	D	SMC	SHERA	E.B.	240.0
					WOHLFAHRT	H.D.	0.0
241	1	COMPLETE		EPB	HOFFMAN	C.M.	0.0
					MISCHKE	R.E.	0.0
242	1	COMPLETE		BIOMED	TODD	P.	64.0
243	1	COMPLETE		AB-NUCCHEM	PORILE	N.T.	140.0
244	1	FUR-CONSID		BIOMED	BRILL	A.B.	0.0
245	1	COMPLETE		EPICS	KALLNE	J.	450.0
					THIESSEN	H.A.	0.0
246	1	COMPLETE		EPICS	EISENSTEIN	R.A.	450.0

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PROP. NO.	PHASE	STATUS	CONDITIONS	CHANNEL	SPOKESMAN		PAC-HRS
247	1	COMPLETE		LEP	ORTH	C.J.	72.0
	2	COMPLETE		P3			0.0
				LEP			0.0
248	1	COMPLETE		P3	KALLNE	J.	480.0
					MCCARTHY	J.S.	0.0
					GUGELOT	P.C.	0.0
249	1	COMPLETE		HRS	WHITTEN	C.A.	100.0
250	1	REJECTED		SMC	REIDY	J.J.	0.0
					HUTSON	R.L.	0.0
251	1	WITHDRAWN		BSA-RAD	MITCHELL	J.B.	0.0
					PARKIN	D.M.	0.0
252	1	ABSORBED	INTO 265	EPICS	KRAUSHAAR	J.J.	0.0
253	1	WITHDRAWN		ISORAD	GOLAND	A.N.	0.0
					PARKIN	D.M.	0.0
254	1	COMPLETE	FEAS STUDY	NEUTRINO-A	FIREMAN	E.L.	0.0
255	1	COMPLETE		AB	NORTHCLIFF	L.C.	0.0
256	1	COMPLETE		HRS	FRANKEL	S.	100.0
257	1	INACTIVE	PARASITE	HRS	FRANKEL	S.	0.0
258	1	COMPLETE		HRS	FRANKEL	S.	150.0
	2	REJECTED		HRS	FRATI	W.	0.0
259	1	REJECTED		SMC	REIDY	J.J.	0.0
260	1	REJECTED		HRS	HOFFMANN	G.W.	0.0
					COKER	W.R.	0.0
					IGO	G.J.	0.0
261	1	COMPLETE		HRS	RICKEY	M.E.	0.0
					SHEPARD	J.R.	0.0
					PETERSON	R.J.	0.0
262	1	COMPLETE		AB	BONNER	B.E.	112.0
263	1	COMPLETE		AB	BONNER	B.E.	150.0
264	1	COMPLETE		AB	BONNER	B.E.	216.0
265	1	COMPLETE	PARASITE	EPICS	MORRIS	C.L.	225.0
					BRAITHWAIT	W.J.	0.0
266	1	COMPLETE	WITH 297	SMC	GAUSTER	W.B.	109.0
	2	COMPLETE		SMC	HEFFNER	R.H.	210.0
	3	COMPLETE		SMC			135.0
267	1	APPROVED		ISORAD	OBRIEN	H.A.	0.0
268	1	COMPLETE		SMC	SOUDER	P.A.	42.0
					HUGHES	V.W.	0.0
269	1	COMPLETE	BY ROSEN	SWY-LABS	GREEN	W.V.	30.0
270	1	APPROVED		BIOMED	PACIOTTI	M.A.	512.0
271	1	APPROVED		BIOMED	SMITH	A.R.	900.0
272	1	APPROVED		BIOMED	DICELLO	J.F.	144.0
273	1	APPROVED		BIOMED	RICHMAN	C.	536.0
274	1	APPROVED		BIOMED	BUSH	S.	700.0
275	1	APPROVED		BIOMED	BUSH	S.	1500.0
276	1	COMPLETE		SMC	YAMAZAKI	T.	60.0
	2	COMPLETE		SMC			200.0
	3	COMPLETE		SMC			264.0
277	1	COMPLETE	PARASITE	SMC	ALLRED	J.C.	80.0
278	1	COMPLETE		EPB	HOFFMANN	G.W.	24.0
					MOORE	C.F.	0.0
279	F-S	COMPLETE	FEAS STUDY	AB	DIETERLE	B.D.	72.0
				EPB	MC FARLANE	W.K.	0.0
	1	COMPLETE		EPB			0.0
280	1	WITHDRAWN		HRS	NEFKENS	B.M.K.	0.0
281	1	WITHDRAWN		SMC	HUANG	C.Y.	0.0
					ROSENBLUM	S.S.	0.0
282	1	COMPLETE		AB-NUCCHEM	DONNERT	H.J.	20.0
	2	COMPLETE		AB-NUCCHEM			0.0
	3	COMPLETE		AB-NUCCHEM			0.0
283	1	COMPLETE		SMC	KRANE	K.S.	100.0
				P3	SHARMA	T.C.	0.0
	2	COMPLETE	CONDITIONL	SMC			60.0
284	1	COMPLETE		LEP	COOPER	M.D.	266.0
	2	APPROVED		LEP	WHITNEY	R.R.	250.0
285	1	COMPLETE		BIOMED	MAUSNER	L.F.	0.0
286	1	COMPLETE		P3	HANSON	K.M.	320.0
287	1	REJECTED		P3	LIND	V.G.	0.0
288	1	COMPLETE		SMC	NAUMANN	R.A.	150.0
289	1	COMPLETE	CONDITIONL	EPB	WHITTEN	C.A.	100.0

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PROP. NO.	PHASE	STATUS	CONDITIONS	CHANNEL	SPOKESMAN		PAC-HRS
290	1	WITHDRAWN		BSA-RAD	MADEY	R.	0.0
					GREEN	W.V.	0.0
					VEESER	L.R.	0.0
291	1	WITHDRAWN		EPICS	SWENSON	L.W.	300.0
					MOORE	C.F.	0.0
292	1	COMPLETE		SMC	HUIZENGA	J.R.	160.0
	2	COMPLETE		SMC			120.0
293	1	COMPLETE		LEP	SEGEL	R.E.	112.0
294	1	APPROVED		AB-NUCCHEM	KAROL	P.J.	50.0
295	1	APPROVED		LEP	BOWMAN	J.D.	300.0
					MOINESTER	M.A.	0.0
296	1	WITHDRAWN		EPB	BAER	H.W.	0.0
					BOWMAN	J.D.	0.0
297	1	COMPLETE	WITH 266	SMC	BROWN	J.A.	109.0
	2	COMPLETE		SMC			210.0
	3	COMPLETE		SMC			135.0
298	1	COMPLETE		NULL	SELOVE	W.	0.0
299	1	COMPLETE		LEP	ZIOCK	K.O.H.	224.0
	2	COMPLETE		LEP			220.0
	3	COMPLETE		LEP			300.0
300	1	COMPLETE		BIOMED	DANIEL	H.	0.0
					LEON	M.	0.0
301	1	COMPLETE		AB-NUCCHEM	WILSON	M.T.	0.0
302	1	COMPLETE		RADAMAGE-1	GREEN	W.V.	0.0
				PIP			0.0
303	1	COMPLETE		LEP	JACKSON	H.E.	0.0
	2	COMPLETE		LEP			200.0
	3	COMPLETE		LEP			320.0
304	1	COMPLETE	SCI-MERIT	BIOMED	LEON	M.	0.0
				P3	MAUSNER	L.F.	0.0
305	1	WITHDRAWN	FEAS STUDY	SMC	DENISON	A.B.	100.0
					HEFFNER	R.H.	0.0
					HUANG	C.Y.	0.0
306	1	REJECTED		HRS	IGO	G.J.	0.0
307	1	INACTIVE		HRS	IGO	G.J.	0.0
					WHITTEN	C.A.	0.0
308	1	APPROVED		TTA	BUTLER	G.W.	0.0
					POSKANZER	A.M.	0.0
309	1	COMPLETE		P3	REBKA	G.A.	554.0
310	1	COMPLETE		EPICS	BRAITHWAIT	W.J.	200.0
					MORRIS	C.L.	0.0
311	1	COMPLETE		HRS	HOFFMANN	G.W.	500.0
	2	COMPLETE		HRS			100.0
312	1	REJECTED		SMC	HUTSON	R.L.	0.0
313	1	WITHDRAWN		SMC	HUANG	C.Y.	88.0
314	1	REJECTED		SMC	HOWE	S.D.	0.0
					DONNERT	H.J.	0.0
315	1	COMPLETE		LEP	WHARTON	W.R.	360.0
	2	COMPLETE		LEP			300.0
	3	COMPLETE		LEP			500.0
316	1	COMPLETE		LEP	SETH	K.K.	360.0
	2	COMPLETE		LEP	BURLESON	G.R.	240.0
317	1	COMPLETE	COMB/W 368	EPICS	PETERSON	R.J.	0.0
318	1	WITHDRAWN		LEP	AMANN	J.F.	0.0
	2	WITHDRAWN		EPICS	CRAIG	J.N.	0.0
					SHERMAN	J.D.	0.0
319	1	COMPLETE		P3	LIND	V.G.	80.0
320	1	COMPLETE		P3	CHURCH	L.B.	50.0
	2	COMPLETE		P3			100.0
	3	COMPLETE		LEP			24.0
	4	APPROVED		LEP			24.0
321	1	WITHDRAWN		EPB	COLE	R.K.	0.0
322	1	COMPLETE		LEP	BERTRAND	F.E.	360.0
					GOTOW	K.	0.0
323	1	COMPLETE		EPB	BRYANT	H.C.	110.0
					GRAM	P.A.M.	0.0
324	1	COMPLETE		LEP	HALPERN	I.	50.0
325	1	COMPLETE	PARASITE	EPICS	HANSON	K.M.	0.0
326	1	APPROVED	PARASITE	BSA-RAD	HARVEY	A.	0.0
				BSA-RAD			0.0

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PROP. NO.	PHASE	STATUS	CONDITIONS	CHANNEL	SPOKESMAN		PAC-HRS
327	1	COMPLETE		PIP	WILSON	M.T.	0.0
328	1	COMPLETE	D	SMC	BOWMAN	J.D.	1020.0
					COOPER	M.D.	0.0
329	1	WITHDRAWN	FEAS STUDY	SMC	THOMPSON	P.A.	150.0
					FRANKEL	S.	0.0
					HUGHES	V.W.	0.0
330	1	COMPLETE	CONDITIONL	SMC	HUTSON	R.L.	128.0
	2	COMPLETE		SMC	YATES-WILL	M.A.	48.0
331	1	COMPLETE		SMC	ORTH	C.J.	84.0
	2	COMPLETE		SMC			42.0
332	1	WITHDRAWN		EPICS	SETH	K.K.	0.0
333	1	COMPLETE		LEP	GOTOW	K.	360.0
334	1	COMPLETE	IN PART	SMC	SHERA	E.B.	115.0
	2	COMPLETE		SMC	WOHLFAHRT	H.D.	144.0
335	1	COMPLETE		SMC	SHERA	E.B.	210.0
	2	APPROVED		SMC	YAMAZAKI	Y.	200.0
336	1	COMPLETE	W/33	EPB	MUTCHLER	G.S.	450.0
	2	APPROVED		EPB	PINSKY	L.S.	120.0
	3	DEFER		EPB			0.0
	4	APPROVED		EPB			480.0
337	1	COMPLETE		P3	REBKA	G.A.	600.0
					GRAM	P.A.M.	0.0
338	1	WITHDRAWN		EPICS	BRAITHWAIT	W.J.	0.0
339	1	COMPLETE		EPB	BRYANT	H.C.	504.0
					GRAM	P.A.M.	0.0
340	1	WITHDRAWN		EPICS	FISHER	T.R.	0.0
					MARSHAK	H.	0.0
341	1	COMPLETE		EPB	PHILLIPS	G.C.	170.0
342	1	COMPLETE	COMB/W 39	EPICS	MCCARTHY	J.S.	175.0
					KALLNE	J.	0.0
343	1	REJECTED		HRS	SETH	K.K.	0.0
344	1	COMPLETE		SMC	HUGHES	V.W.	400.0
345	1	REPLACED	BY 520	HRS	FRANKEL	S.	0.0
					FRATI	W.	0.0
					VAN DYCK	O.B.	0.0
346	1	COMPLETE		HRS	FRANKEL	S.	150.0
347	1	COMPLETE		HRS	HINTZ	N.M.	150.0
348	1	COMPLETE		LEP	CROWE	K.M.	500.0
349	1	COMPLETE		P3	PORILE	N.T.	173.0
	2	COMPLETE		LEP			16.0
				P3			0.0
	3	APPROVED		LEP			18.0
				AB-NUCCHEM			0.0
	3	APPROVED		P3			6.0
350	1	COMPLETE		LEP	SEGEL	R.E.	144.0
					SCHIFFER	J.P.	0.0
351	1	REJECTED		HRS	IGO	G.J.	0.0
352	1	COMPLETE	W/355	HRS	WHITTEN	C.A.	100.0
353	1	REJECTED		HRS	SETH	K.K.	0.0
354	1	COMPLETE		HRS	BLANPIED	G.S.	100.0
355	1	COMPLETE	W/352	HRS	HOFFMANN	G.W.	100.0
	2	COMPLETE	W/352	HRS			60.0
356	1	COMPLETE	CONDITIONA	HRS	GLASHAUSSE	C.	0.0
	2	APPROVED		HRS	BAKER	F.T.	75.0
					SCOTT	A.	0.0
357	1	COMPLETE		SMC	KNIGHT	J.D.	120.0
358	1	COMPLETE		P3	MINEHART	R.C.	450.0
359	1	REJECTED		HRS	BAUER	T.S.	0.0
360	1	COMPLETE		AB	RILEY	P.J.	150.0
					SIMMONS	J.E.	0.0
361	1	REJECTED		HRS	ADAMS	G.S.	0.0
362	1	WITHDRAWN	CONDITIONA	HRS	BAUER	T.S.	0.0
					WRIEKAT	A.	0.0
363	1	COMPLETE		P3	SADLER	M.E.	550.0
	2	COMPLETE		P3	NEFKENS	B.M.K.	0.0
364	1	COMPLETE		SMC	EGAN	P.D.	300.0
	2	COMPLETE		SMC	DENISON	A.B.	120.0
					HUGHES	V.W.	0.0
365	1	REJECTED		HRS	HINTZ	N.M.	0.0

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366	1	COMPLETE		AB	MAYES	B.W.	400.0
					MUTCHLER	G.S.	0.0
367	1	REJECTED		HRS	NANN	H.	0.0
					SETH	K.K.	0.0
368	1	COMPLETE	COMB/W 317	EPICS	MOORE	C.F.	300.0
369	1	COMPLETE	CONDITIONA	EPICS	DEHNHARD	D.	200.0
370	1	REJECTED		LEP	CRAMER	J.G.	0.0
					COOPER	M.D.	0.0
371	1	COMPLETE		SMC	HUTSON	R.L.	128.0
372	1	REJECTED		LEP	EDGE	R.D.	0.0
				BIOMED			0.0
373	1	COMPLETE		P3	REIDY	J.J.	168.0
					LEON	M.	0.0
374	1	COMPLETE		SMC	SCHILLACI	M.E.	144.0
375	1	COMPLETE		SMC	SCHILLACI	M.E.	144.0
	2	COMPLETE		SMC			150.0
	3	COMPLETE		SMC			210.0
376	1	REJECTED		HRS	PAULETTA	G.	0.0
377	1	COMPLETE		SMC	REIDY	J.J.	24.0
378	1	REJECTED	PARASITE	BSA-RAD	HARVEY	A.	0.0
379	1	WITHDRAWN		P3	ROSENBLUM	S.S.	80.0
380	1	APPROVED		BIOMED	PHILLIPS	T.L.	60.0
					GOLDSTEIN	L.S.	0.0
381	1	COMPLETE		SWY-LABS	HARVEY	A.	0.0
382	1	COMPLETE		SMC	KOSSLER	W.J.	300.0
383	1	REJECTED		ISORAD	HARVEY	A.	0.0
	2	REJECTED		AB-NUCCHEM			0.0
	3	REJECTED		PIP			0.0
384	1	APPROVED		BIOMED	GERACI	J.P.	24.0
385	1	COMPLETE		HRS	HOFFMANN	G.W.	100.0
	2	COMPLETE		HRS			100.0
386	1	COMPLETE		HRS	HOFFMANN	G.W.	200.0
	2	COMPLETE		HRS	BURLESON	G.R.	300.0
	3	APPROVED		HRS	YOKOSAWA	A.	0.0
387	1	REJECTED		AB	BONNER	B.E.	400.0
388	1	COMPLETE		LEP	HOLT	R.J.	250.0
389	1	COMPLETE		EPICS	MORRISON	G.C.	300.0
	2	COMPLETE		EPICS	ZEIDMAN	B.	330.0
	3	COMPLETE		EPICS			100.0
390	1	COMPLETE		P3	JACKSON	H.E.	360.0
391	1	COMPLETE		EPICS	PETERSON	R.J.	300.0
392	1	APPROVED		HRS	HOFFMANN	G.W.	324.0
	2	APPROVED		HRS			324.0
	3	TOBE-HEARD		HRS			0.0
393	1	APPROVED		LEP	ALSTER	J.	266.0
					MOINESTER	M.A.	0.0
394	1	COMPLETE		P3	HANSON	K.M.	250.0
395	1	COMPLETE		HRS	BAUER	T.S.	200.0
					HOISTAD	B.	0.0
					NANN	H.	0.0
396	1	COMPLETE		P3	REIDY	J.J.	60.0
397	1	REJECTED		HRS	ICO	G.J.	0.0
					THIESSEN	H.A.	0.0
398	1	REJECTED		HRS	PAULETTA	G.	0.0
399	1	COMPLETE		HRS	BERTRAND	F.E.	50.0
	2	TOBE-HEARD		HRS			0.0
400	1	APPROVED	W/445	SMC	DUONG-VAN	M.	1000.0
	2	APPRV/COMB	W/445	SMC	HOFFMAN	C.M.	0.0
	1	COMPLETE		P3			0.0
401	1	COMPLETE		LEP	BOWMAN	J.D.	210.0
	2	APPROVED		LEP	COOPER	M.D.	250.0
402	1	COMPLETE	FEAS STUDY	AB	GLASS	G.C.	50.0
	2	COMPLETE		AB	SIMMONS	J.E.	120.0
403	1	COMPLETE		AB	BONNER	B.E.	165.0
	2	COMPLETE		AB			240.0
404	1	COMPLETE		P3	HAMM	M.E.	180.0
					SWENSON	L.W.	0.0

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PROP. NO.	PHASE	STATUS	CONDITIONS	CHANNEL	SPOKESMAN		PAC-HRS
405	1	APPROVED		HRS	HOISTAD	B.	230.0
					BAUER	T.S.	0.0
					SETH	K.K.	0.0
406	1	APPROVED		BSA-RAD	HARVEY	A.	0.0
407	1	COMPLETE		AB-NUCCHEM	SOMMER	W.F.	480.0
	2	APPROVED		AB-NUCCHEM	PHILLIPS	D.S.	520.0
	3	TOBE-HEARD		ISORAD			0.0
408	1	COMPLETE		SMC	KEFFNER	R.H.	150.0
					LEON	M.	0.0
409	1	REJECTED		P3	LIND	V.G.	0.0
					GREENFIELD	M.B.	0.0
410	1	COMPLETE	BY ROSEN	AB-NUCCHEM	COST	J.R.	0.0
411	1	COMPLETE		HRS	HINTZ	N.M.	240.0
					MOSS	J.M.	0.0
412	1	COMPLETE		LEP	BAER	H.W.	266.0
	2	APPROVED		LEP	BOWMAN	J.D.	250.0
					CVERNA	F.H.	0.0
413	1	COMPLETE		EPICS	SETH	K.K.	0.0
					NANN	H.	0.0
414	1	COMPLETE		SMC	HUTSON	R.L.	64.0
					REIDY	J.J.	0.0
415	1	COMPLETE		LEP	ORTH	C.J.	65.0
				BSA-RAD			0.0
416	1	COMPLETE		P3	DROPESKY	B.J.	108.0
	2	COMPLETE		P3			36.0
	3	COMPLETE		P3			0.0
				LEP			0.0
	4	APPROVED		P3			12.0
				LEP			6.0
417	1	WITHDRAWN		SMC	HUIZENGA	J.R.	180.0
418	1	REJECTED		P3	LIND	V.G.	0.0
419	1	COMPLETE	FEAS STUDY	EPICS	BRAITHWAIT	W.J.	24.0
					MORRIS	C.L.	0.0
					MOORE	C.F.	0.0
420	1	DEFER		P3	FLYNN	E.R.	80.0
421	1	APPROVED		SMC	SOUDER	P.A.	850.0
					FRANKEL	S.	0.0
					HUGHES	V.W.	0.0
422	1	RESUBMIT		SMC	LU	D.C.	0.0
423	1	WITHDRAWN		EPICS	MORRIS	C.L.	0.0
					MOORE	C.F.	0.0
424	1	COMPLETE		AB-NUCCHEM	TURKEVICH	A.L.	0.0
					WARREN	J.	0.0
425	1	COMPLETE	W/433	HRS	SETH	K.K.	200.0
					HOFFMANN	G.W.	0.0
426	1	REJECTED		EPICS	SETH	K.K.	0.0
427	1	COMPLETE	FEAS STUDY	SMC	ESTLE	T.L.	196.0
	2	APPROVED		SMC			200.0
	3	APPROVED		SMC			150.0
428	1	WITHDRAWN	BY ROSEN	HRS	IGO	G.J.	0.0
429	1	WITHDRAWN		P3	ZIOCK	K.O.H.	120.0
430	1	REJECTED		SMC	ZIOCK	K.O.H.	0.0
431	1	COMPLETE		HRS	GLASHAUSSE	C.	175.0
					MOSS	J.M.	0.0
432	1	COMPLETE		HRS	GLASHAUSSE	C.	100.0
					MOSS	J.M.	0.0
433	1	COMPLETE	W/425	HRS	HOFFMANN	G.W.	0.0
					SETH	K.K.	0.0
434	1	REJECTED		HRS	HOISTAD	B.	0.0
					ADAMS	G.S.	0.0
					NANN	H.	0.0
435	1	WITHDRAWN		SMC	CROWE	K.M.	64.0
					KOHN	S.E.	0.0
436	1	COMPLETE		SMC	YAMAZAKI	T.	160.0
					HAYANO	R.	0.0
437	1	WITHDRAWN	FEAS STUDY	P3	JACKSON	H.E.	120.0
438	1	APPROVED		HRS	IGO	G.J.	200.0
439	1	COMPLETE		P3	LIND	V.G.	180.0
	2	APPROVED		P3			180.0

STATUS OF PROPOSALS AS OF 82/01/11.

PROP. NO.	PHASE	STATUS	CONDITIONS	CHANNEL	SPOKESMAN		PAC-HRS
440	1	REJECTED		AB	DIETERLE	B.D.	0.0
					DONAHUE	J.B.	0.0
441	1	WITHDRAWN		LEP	ADAMS	G.S.	160.0
442	1	COMPLETE		EPICS	KALLNE	J.	100.0
443	1	REJECTED		HRS	HOISTAD	B.	0.0
444	1	APPROVED		SMC	BOWMAN	J.D.	1000.0
					HOFSTADTER	R.	0.0
445	1	APPRV/COMB	W/400	SMC	MATIS	H.S.	0.0
					BOWMAN	J.D.	0.0
446	1	COMPLETE		EPICS	HALPERN	I.	72.0
					EISENSTEIN	R.A.	0.0
					THIESSEN	H.A.	0.0
447	1	INACTIVE		EPICS	THIESSEN	H.A.	200.0
448	1	COMPLETE		EPICS	BURLESON	G.R.	300.0
449	1	COMPLETE		EPB	BRYANT	H.C.	450.0
	2	COMPLETE		EPB	DONAHUE	J.B.	150.0
450	1	REJECTED	FEASTU/202	HRS	HINTZ	N.M.	0.0
451	1	APPROVED		HRS	HINTZ	N.M.	200.0
	2	REJECTED		HRS			0.0
452	1	COMPLETE		EPICS	DEHNHARD	D.	240.0
453	1	REJECTED		P3	CROWE	K.M.	0.0
454	1	WITHDRAWN	FEAS STUDY	SMC	CROWE	K.M.	50.0
	2	WITHDRAWN		SMC			150.0
455	1	APPROVED		P3	ANDERSON	H.L.	1200.0
456	1	APPROVED		EPICS	HOISTAD	B.	230.0
457	1	COMPLETE		AB	BHATIA	T.S.	220.0
					SIMMONS	J.E.	0.0
458	1	COMPLETE		P3	KAUFMAN	S.B.	60.0
459	1	COMPLETE		P3	VIEIRA	D.J.	72.0
460	1	COMPLETE		EPICS	SETH	K.K.	360.0
461	1	REJECTED		HRS	IVERSEN	S.G.	0.0
					SETH	K.K.	0.0
462	1	COMPLETE		HRS	SETH	K.K.	165.0
					NANN	H.	0.0
463	1	COMPLETE		EPICS	NANN	H.	360.0
					SETH	K.K.	0.0
464	1	DEFER		SMC	WU	C.S.	120.0
					DUGAN	G.	0.0
					HUGHES	V.W.	0.0
					LU	D.C.	0.0
					EGAN	P.D.	0.0
465	1	COMPLETE		P3	RUNDBERG	R.S.	108.0
				AB-NUCCHEM			0.0
				LEP			0.0
	2	APPROVED		P3			24.0
	2	APPROVED		LEP			44.0
466	1	COMPLETE		P3	FUNSTEN	H.O.	180.0
					PLENDL	H.S.	0.0
467	1	APPROVED		BSA-RAD	GILMORE	J.S.	0.0
468	1	COMPLETE		EPB	BECHER	J.	0.0
469	1	DEFER		P3	MCGILL	J.A.	100.0
					HOFFMANN	G.W.	0.0
470	1	COMPLETE		HRS	BARLETT	M.	150.0
					HOFFMANN	G.W.	0.0
471	1	REJECTED		HRS	HOFFMANN	G.W.	70.0
472	1	COMPLETE		HRS	WHITTEN	C.A.	70.0
473	1	COMPLETE		HRS	MOSS	J.M.	90.0
	2	COMPLETE		HRS	ADAMS	G.S.	200.0
					CAREY	T.A.	0.0
474	1	APPRV/COMB	W/540	HRS	CORNELIUS	W.D.	120.0
475	1	COMPLETE		HRS	BLANPIED	G.S.	125.0
	2	APPROVED		HRS			96.0
476	1	COMPLETE		HRS	BLANPIED	G.S.	100.0
477	1	REJECTED		HRS	IGO	G.J.	0.0
478	1	COMPLETE		EPICS	MASTERSON	T.G.	100.0
479	1	COMPLETE		HRS	IGO	G.J.	200.0
	2	TOBE-HEARD		HRS			0.0
480	1	APPROVED		P3	ZEIDMAN	B.	150.0
481	1	COMPLETE		EPICS	GEESAMAN	D.F.	130.0

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PROP. NO.	PHASE	STATUS	CONDITIONS	CHANNEL	SPOKESMAN		PAC-HRS
482	1	REJECTED		EPICS	ZEIDMAN	B.	0.0
					GEESAMAN	D.F.	0.0
483	1	COMPLETE		LEP	HOLT	R.J.	400.0
484	1	COMPLETE	FEAS STUDY	EPICS	MORRIS	C.L.	50.0
485	1	APPROVED		HRS	HOISTAD	B.	200.0
					SHEPARD	J.R.	0.0
486	1	COMPLETE		HRS	IGO	G.J.	100.0
					GLASHAUSSE	C.	0.0
					MOSS	J.M.	0.0
487	1	COMPLETE		LEP	REIDY	J.J.	180.0
					LEON	M.	0.0
488	1	REJECTED		EPICS	BLANPIED	G.S.	150.0
489	1	COMPLETE		HRS	MOSS	J.M.	60.0
490	1	REJECTED		HRS	PAULETTA	G.	0.0
491	1	COMPLETE		SMC	LEE	P.L.	288.0
	2	APPROVED		SMC			350.0
	3	TOBE-HEARD		SMC			0.0
492	1	COMPLETE		EPB	MCNAUGHTON	M.W.	325.0
				AB	WILLARD	H.B.	0.0
493	1	REJECTED		EPICS	HOLTKAMP	D.B.	0.0
					MOORE	C.F.	0.0
494	1	APPROVED		SMC	HOEHN	M.V.	160.0
495	1	COMPLETE	W/506	EPICS	MORRIS	C.L.	400.0
					BRAITHWAIT	W.J.	0.0
496	1	REJECTED		AB	BONNER	B.E.	0.0
					GLASS	G.C.	0.0
497	1	REJECTED		HRS	CORNELIUS	W.D.	0.0
498	1	COMPLETE		EPB	WAGNER	R.	650.0
	2	APPROVED		AB	BURLESON	G.R.	600.0
	3	REPLACED	BY 683	AB			0.0
499	1	COMPLETE		SMC	DODDS	S.A.	300.0
	2	APPROVED		SMC	MACLAUGHLI	D.E.	350.0
	3	TOBE-HEARD		SMC	HEFFNER	R.H.	0.0
500	1	COMPLETE		P3	RUNDBERG	R.S.	90.0
	1	TOBE-HEARD		P3			0.0
501	1	REJECTED		HRS	PAULETTA	G.	0.0
502	1	REJECTED		HRS	PAULETTA	G.	0.0
503	1	REJECTED		HRS	SETH	K.K.	0.0
504	1	COMPLETE		AB	PHILLIPS	G.C.	300.0
505	1	COMPLETE	ON 504	AB	PHILLIPS	G.C.	0.0
	2	REJECTED		AB			0.0
							0.0
506	1	COMPLETE	W/495	EPICS	COTTINGAME	W.B.	0.0
					BRAITHWAIT	W.J.	0.0
507	1	REJECTED		EPICS	KALLNE	J.	0.0
508	1	COMPLETE		HRS	SETH	K.K.	140.0
	2	APPROVED		HRS			216.0
509	1	REJECTED		EPICS	DEHNHARD	D.	0.0
510	1	COMPLETE		EPICS	DEHNHARD	D.	50.0
	2	APPROVED		EPICS			200.0
511	1	REJECTED		EPICS	GREENE	S.J.	0.0
					MOORE	C.F.	0.0
512	1	APPROVED		EPB	GREENE	S.J.	600.0
	2	RESUBMIT		EPB	IMAI	K.	0.0
	3	DEFER		EPB			0.0
	4	REJECTED		EPB			0.0
513	1	COMPLETE		P3	MCCARTHY	J.S.	0.0
	2	COMPLETE		P3	MINEHART	R.C.	300.0
514	1	WITHDRAWN	FEAS STUDY	SMC	VERGAMINI	P.J.	50.0
					COOKE	D.W.	0.0
					ESTLE	T.L.	0.0
515	1	WITHDRAWN	FEAS STUDY	P3	LEON	M.	125.0
					REIDY	J.J.	0.0
516	1	COMPLETE		EPICS	ANDERSON	R.E.	50.0
					HOISTAD	B.	0.0
517	1	APPROVED		AB	SIMMONS	J.E.	780.0
					JARMER	J.J.	0.0
					NORTHCLIFF	L.C.	0.0

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PROP. NO.	PHASE	STATUS	CONDITIONS	CHANNEL	SPOKESMAN		PAC-HRS
518	1	APPROVED		AB	SIMMONS	J.E.	450.0
					JARMER	J.J.	0.0
					NORTHCLIFF	L.C.	0.0
519	1	COMPLETE		HRS	FRANKEL	S.	96.0
520	1	COMPLETE		HRS	VAN DYCK	O.B.	96.0
521	1	REJECTED		HRS	FRANKEL	S.	0.0
522	1	COMPLETE		EPICS	KING	N.S.P.	150.0
					ANDERSON	R.E.	0.0
					PETERSON	R.J.	0.0
523	1	COMPLETE		LEP	GOODMAN	C.D.	100.0
	2	APPROVED		LEP	BAER	H.W.	250.0
524	1	APPROVED		LEP	BAER	H.W.	200.0
					BOWMAN	J.D.	0.0
					CVERNA	F.H.	0.0
525	1	APPROVED		LEP	KING	N.S.P.	50.0
					MOINESTER	M.A.	0.0
526	1	REJECTED		EPB	CVERNA	F.H.	250.0
	2	REJECTED		EPB	ANDERSON	R.E.	0.0
					KING	N.S.P.	0.0
527	1	APPROVED		LEP	BAER	H.W.	200.0
					BOWMAN	J.D.	0.0
528	1	REPLACED	BY 683	AB	SIMMONS	J.E.	0.0
					NORTHCLIFF	L.C.	0.0
529	1	COMPLETE	FEAS STUDY	SMC	WU	C.S.	100.0
	2	APPROVED		SMC	DUGAN	G.	700.0
					HUGHES	V.W.	0.0
530	1	COMPLETE		EPB	JASON	A.J.	0.0
531	1	APPROVED		HRS	GLASHAUSSE	C.	150.0
					MOSS	J.M.	0.0
532	1	INACTIVE		HRS	VAN DYCK	O.B.	150.0
533	1	APPROVED		HRS	HOISTAD	B.	120.0
					SETH	K.K.	0.0
534	1	REJECTED		HRS	PAULETTA	G.	0.0
					MCCLELLAND	J.B.	0.0
535	1	APPROVED		HRS	ANDERSON	R.E.	180.0
					HOISTAD	B.	0.0
536	1	COMPLETE		LEP	GUTBROD	H.H.	48.0
537	1	REJECTED		EPICS	ANDERSON	R.E.	0.0
					HOISTAD	B.	0.0
538	1	COMPLETE		HRS	SHEPARD	J.R.	48.0
	2	APPROVED		HRS	KING	N.S.P.	32.0
539	1	COMPLETE		EPICS	BAER	H.W.	300.0
					HOLTKAMP	D.B.	0.0
540	1	APPRV/COMB	W/474	HRS	IGO	G.J.	0.0
					BLESZYNSKI	M.	0.0
541	1	COMPLETE		LEP	COOPER	M.D.	700.0
542	1	COMPLETE	PARASITE	BSA-RAD	LU	D.C.	0.0
	2	APPROVED		BSA-RAD			0.0
543	1	APPROVED		P3	CARETTO	A.A.	120.0
				LEP			0.0
544	1	COMPLETE		LEP	WILHELMY	J.B.	30.0
	2	APPROVED		LEP			54.0
545	1	APPROVED	PARASITE	BSA-RAD	BROWN	R.D.	0.0
				RADAMAGE-1			0.0
546	F-S	COMPLETE	FEAS STUDY	EPICS	BRISCOE	W.J.	50.0
	1	COMPLETE		EPICS	NEFKENS	B.M.K.	200.0
547	1	COMPLETE		SMC	EGAN	P.D.	250.0
	2	COMPLETE		SMC	HUGHES	V.W.	150.0
	3	COMPLETE		SMC	KANE	J.R.	0.0
548	1	INACTIVE		EPICS	IVERSEN	S.G.	0.0
					SETH	K.K.	0.0
549	1	COMPLETE		EPICS	SETH	K.K.	425.0
550	1	APPROVED		EPICS	SETH	K.K.	250.0
551	1	TOBE-HEARD		EPICS	SETH	K.K.	0.0
552	1	APPROVED		SMC	HUGHES	V.W.	110.0
					EGAN	P.D.	0.0
553	1	COMPLETE		P3	RUNDBERG	R.S.	36.0
	1	COMPLETE		LEP			18.0
	2	APPROVED		LEP			18.0
	2	APPROVED		P3			24.0

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PROP. NO.	PHASE	STATUS	CONDITIONS	CHANNEL	SPOKESMAN		PAC-HRS
554	1	APPROVED		BSA-RAD	BROWN	R.D.	0.0
				BSA-RAD	COST	J.R.	0.0
	2	TOBE-HEARD		BSA-RAD			0.0
555	1	COMPLETE		P3	IMANISHI	N.	100.0
					VIEIRA	D.J.	0.0
556	1	COMPLETE	FEASTUDY	HRS	BERTOZZI	W.	48.0
557	1	APPROVED	PARASITE	LEP	COWSIK	R.	0.0
558	1	APPROVED		EPICS	BAER	H.W.	382.0
					BURLESDN	G.R.	0.0
559	1	APPROVED	PARASITE	NEUTRINO-A	DUONG-VAN	M.	0.0
					PHILLIPS	G.C.	0.0
560	1	APPROVED		BSA-RAD	HARVEY	A.	0.0
561	1	APPROVED		LEP	BLECHER	M.	500.0
					OBENSHAIN	F.E.	0.0
					HYNES	M.V.	0.0
562	1	COMPLETE		P3	JACKSON	H.E.	320.0
					SCHIFFER	J.P.	0.0
563	1	APPROVED		HRS	HOFFMANN	G.W.	150.0
564	1	COMPLETE		P3	MCKEOWN	R.D.	340.0
565	1	APPROVED		EPICS	ZEIDMAN	B.	200.0
					GEESAMAN	D.F.	0.0
566	1	REJECTED		HRS	GARELICK	D.A.	0.0
					HURST	R.B.	0.0
567	1	APPRDVED		LEP	GOTOW	K.	400.0
					MINEHART	R.C.	0.0
					RITCHIE	B.G.	0.0
568	1	REJECTED		EPICS	BURLESON	G.R.	0.0
					MORRIS	C.L.	0.0
569	1	REJECTED		EPICS	DEHNHARD	D.	0.0
					HOLTKAMP	D.B.	0.0
570	1	COMPLETE		EPICS	HOLTKAMP	D.B.	255.0
					FORTUNE	H.T.	0.0
571	1	APPROVED		SMC	DODDS	S.A.	350.0
					HEFFNER	R.H.	0.0
					SCHILLACI	M.E.	0.0
572	1	APPROVED		EPICS	GREENE	S.J.	200.0
					MOORE	C.F.	0.0
573	1	APPROVED		EPICS	BLANPIED	G.S.	279.0
574	1	REJECTED		HRS	BLANPIED	G.S.	0.0
575	1	REJECTED		HRS	BLANPIED	G.S.	0.0
					HOFFMANN	G.W.	0.0
576	1	APPROVED		LEP	ROOS	P.G.	200.0
					PREEDOM	B.M.	0.0
					CHANT	N.S.	0.0
577	1	COMPLETE		EPICS	GREENE	S.J.	250.0
					FORTUNE	H.T.	0.0
578	1	REJECTED		EPICS	MORRIS	C.L.	0.0
					FORTUNE	H.T.	0.0
579	1	APPROVED		AB-NUCCHEM	FAUBEL	W.	1.0
580	1	APPROVED		HRS	SEESTROM-M	S.J.	80.0
					DEHNHARD	D.	0.0
581	1	COMPLETE		EPICS	MASTERSON	T.G.	180.0
					BOUDRIE	R.L.	0.0
582	1	REJECTED		EPICS	COTTINGAME	W.B.	0.0
					BURLESON	G.R.	0.0
583	1	APPROVED		HRS	AULETTA	G.	240.0
					GAZZALY	M.M.	0.0
584	1	REJECTED		EPICS	DEHNHARD	D.	0.0
					FORTUNE	H.T.	0.0
585	1	COMPLETE		HRS	PAULETTA	G.	80.0
586	1	APPROVED		EPB	BRYANT	H.C.	350.0
					GRAM	P.A.M.	0.0
587	1	APPROVED		EPB	SMITH	W.W.	400.0
					DONAHUE	J.B.	0.0
588	1	APPROVED		EPB	CLARK	D.A.	350.0
					BRYANT	H.C.	0.0
589	1	APPROVED		AB	GLASS	G.C.	350.0
					NORTHCLIFF	L.C.	0.0

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PROP. NO.	PHASE	STATUS	CONDITIONS	CHANNEL	SPOKESMAN		PAC-HRS
590	1A	APPROVED		AB	SIMMONS	J.E.	330.0
	2	APPROVED		AB	NORTHCLIFF	L.C.	0.0
	1B	RESUBMIT		AB			0.0
591	1	APPROVED		EPB	DEVRIES	R.M.	270.0
					DIGIACOMO	N.	0.0
592	1	APPROVED		EPB	DEVRIES	R.M.	140.0
					DIGIACOMO	N.	0.0
593	1	REJECTED		HRS	BLESZYNSKI	M.	0.0
					MCCLELLAND	J.B.	0.0
					WHITTEN	C.A.	0.0
594	1	APPROVED		SMC	REIDY	J.J.	84.0
595	1	APPROVED		P3	ORTH	C.J.	264.0
					VIEIRA	D.J.	0.0
596	1	REJECTED		LEP	CRAMER	J.G.	0.0
					MORRIS	C.L.	0.0
					BRAITHWAIT	W.J.	0.0
					MOORE	C.F.	0.0
597	1	COMPLETE		EPICS	HALPERN	I.	126.0
					EISENSTEIN	R.A.	0.0
598	1	APPROVED		EPICS	COTTINGAME	W.B.	224.0
					KIZIAH	R.R.	0.0
599	1	REJECTED		EPICS	MOORE	C.F.	0.0
600	1	REJECTED		EPICS	MOORE	C.F.	0.0
					HINTZ	N.M.	0.0
601	1	APPROVED		EPICS	HINTZ	N.M.	174.0
602	1	APPROVED		EPICS	HARVEY	C.J.	120.0
					DEHNHARD	D.	0.0
603	1	COMPLETE		AB	TURKEVICH	A.L.	20.0
	2	APPROVED		AB			54.0
	2	APPROVED		P3			12.0
604	1	COMPLETE	BY ROSEN	EPICS	SETH	K.K.	250.0
605	1	APPROVED		EPICS	SETH	K.K.	100.0
606	1	COMPLETE		EPICS	SETH	K.K.	360.0
607	1	COMPLETE		LEP	ALSTER	J.	360.0
	2	APPROVED		LEP	BAER	H.W.	250.0
					BOWMAN	J.D.	0.0
608	1	REJECTED		EPICS	KING	N.S.P.	0.0
					ANDERSON	R.E.	0.0
					BOUDRIE	R.L.	0.0
609	1	REJECTED		NEUTRINO-A	KRUSE	H.W.	0.0
610	1	DEFER		AB-NUCCHEM	HENNING	W.	0.0
					KUTSCHERA	W.	0.0
611	1	APPROVED		P3	HOGAN	J.J.	30.0
	1	APPROVED		LEP			12.0
612	1	TOBE-HEARD		EPICS	SETH	K.K.	0.0
613	1	REJECTED		HRS	SAHA	A.	0.0
					SETH	K.K.	0.0
614	1	APPROVED		P3	FUNSTEN	H.O.	210.0
615							0.0
							0.0
616	1	COMPLETE		HRS	BLESZYNSKI	M.	225.0
	2	TOBE-HEARD		HRS	MCCLELLAND	J.B.	0.0
					HINTZ	N.M.	0.0
					MOSS	J.M.	0.0
617	1	APPROVED		P3	ZIOCK	K.O.H.	180.0
	1	COMPLETE		EPICS			140.0
618	1	REJECTED		EPICS	MORRIS	C.L.	0.0
					MOORE	C.F.	0.0
619	1	COMPLETE		EPICS	MOORE	C.F.	120.0
					FORTUNE	H.T.	0.0
					MORRIS	C.L.	0.0
620	1	REJECTED		EPICS	MOORE	C.F.	0.0
621	1	REJECTED		EPICS	DEHNHARD	D.	0.0
					FORTUNE	H.T.	0.0
622	1	COMPLETE		EPICS	HOLTKAMP	D.B.	120.0
					BAER	H.W.	0.0
623	1	APPROVED		HRS	GLASHAUSSE	C.	66.0
624	1	INACTIVE		HRS	GOODMAN	C.D.	0.0

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PROP. NO.	PHASE	STATUS	CONDITIONS	CHANNEL	SPOKESMAN		PAC-HRS
625	1	COMPLETE		EPICS	KING	N.S.P.	130.0
					ANDERSON	R.E.	0.0
					PETERSON	R.J.	0.0
626	1	TOBE-HEARD		HRS	GLASHAUSSE	C.	0.0
					MCGILL	J.A.	0.0
627	1	COMPLETE		HRS	HYNES	M.V.	30.0
					BERNSTEIN	A.M.	0.0
628	1	APPROVED		P3	ASHERY	D.	372.0
629	1	COMPLETE		AB-NUCCHEM	GREENWOOD	R.C.	48.0
	2	TOBE-HEARD		AB-NUCCHEM	BUNKER	M.E.	0.0
					TALBERT, J	W.L.	0.0
630	1	APPROVED		HRS	CAREY	T.A.	100.0
	2	APPROVED		HRS	HINTZ	N.M.	100.0
	3	TOBE-HEARD		HRS	MCCLELLAND	J.B.	0.0
					MOSS	J.M.	0.0
631	1	REJECTED		HRS	SEESTROM-M	S.J.	0.0
					CAREY	T.A.	0.0
					MOSS	J.M.	0.0
					DEHNHARD	D.	0.0
632	1	TOBE-HEARD		HRS	BARLETT	M.	0.0
					HOFFMANN	G.W.	0.0
633	1	APPROVED		EPB	PAULETTA	G.	60.0
					IROM	F.	0.0
634	1	APPROVED		EPB	CARLINI	R.D.	480.0
					TALAGA	R.L.	0.0
					YUAN	V.	0.0
635	1	APPROVED	W/194	EPB	BONNER	B.E.	628.0
	2	APPROVED		EPB	IGO	G.J.	360.0
					BLESZYNSKI	M.	0.0
636	1	APPROVED		EPB	HOLLAS	C.L.	480.0
637	1	APPROVED		EPB	BONNER	B.E.	240.0
638	1	APPROVED		NEUTRINO-A	DOMBECK	T.W.	0.0
639	1	APPROVED		SMC	BOEKEMA	C.	186.0
					DENISON	A.B.	0.0
640	1	APPROVED		SMC	DODDS	S.A.	250.0
	2	TOBE-HEARD		SMC	HEFFNER	R.H.	0.0
					MACLAUGHLI	D.E.	0.0
641	1	REJECTED		HRS	HARVEY	C.J.	0.0
					SEESTROM-M	S.J.	0.0
642	1	APPROVED		HRS	MCGILL	J.A.	120.0
					HOFFMANN	G.W.	0.0
643	1	COMPLETE		HRS	AAS	B.	80.0
	2	APPROVED		HRS	HYNES	M.V.	240.0
644	1	TOBE-HEARD		HRS	IGO	G.J.	0.0
645	1	APPROVED		NEUTRINO-A	LING	T.Y.	0.0
	2	DEFER		NEUTRINO-A	ROMANOWSKI	T. A.	0.0
646	1	APPROVED		SMC	HUGHES	V.W.	500.0
	2	TOBE-HEARD		SMC	EGAN	P.D.	0.0
647	1	DEFER		NEUTRINO-A	ELLIS	R.J.	0.0
648	1	APPROVED	PARASITE	TEST CHANN	MILLER	J.	0.0
649	1	COMPLETE	BY ROSEN	HRS	HDISTAD	B.	128.0
	2	APPROVED		HRS			126.0
650	1	COMPLETE		LEP	BOWMAN	J.D.	0.0
					MOINESTER	M.A.	0.0
651	1	TOBE-HEARD		EPICS	MORRIS	C.L.	72.0
652	1	APPROVED	PARASITE	TEST CHANN	SKUBIC	P.	0.0
653	1	APPROVED		SMC	SHERA	E.B.	0.0
					JOHNSON	M.W.	0.0
					NAUMANN	R.A.	0.0
654	1	APPROVED		HRS	HOFFMANN	G.W.	200.0
655	1	TOBE-HEARD		EPICS	HOLTKAMP	D.B.	0.0
					COTTINGAME	W.B.	0.0
656	1	REJECTED		EPICS	GREENE	S.J.	0.0
					MORRIS	C.L.	0.0
					FORTUNE	H.T.	0.0
657	1	APPROVED		EPICS	SEIDL	P.A.	160.0
					MOORE	C.F.	0.0

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PROP. NO	PHASE	STATUS	CONDITIONS	CHANNEL	SPOKESMAN		PAC-HRS
658	1	APPROVED		HRS	SEESTROM-M	S.J.	120.0
					CAREY	T.A.	0.0
					MOSS	J.M.	0.0
					DEHNHARD	D.	0.0
659	1	APPROVED		EPICS	BLAND	L.C.	150.0
					MOORE	C.F.	0.0
660	1	TOBE-HEARD		HRS	GLASHAUSSE	C.	0.0
661	1	APPROVED		EPICS	MORRIS	C.L.	200.0
					BLAND	L.C.	0.0
662	1	APPROVED		EPICS	KRAUSHAAR	J.J.	193.0
					PETERSON	R.J.	0.0
663	1	APPROVED		HRS	IGO	G.J.	160.0
					BLESZYNSKI	M.	0.0
664	1	APPROVED		AB	GLASS	G.C.	288.0
					STANEK	R.	0.0
665	1	APPROVED		AB	BURLESON	G.R.	1200.0
					WAGNER	R.	0.0
666	1	APPROVED	PARASITIC	HRS	GLASHAUSSE	C.	100.0
					WHITTEN	C.A.	0.0
667							0.0
							0.0
668							0.0
							0.0
669	1	APPROVED		HRS	SHERA	E.B.	100.0
					WOHLFAHRT	H.D.	0.0
670	1	APPROVED		HRS	MOSS	J.M.	116.0
					CAREY	T.A.	0.0
					ADAMS	G.S.	0.0
671	1	TOBE-HEARD		EPICS	SAHA	A.	0.0
					SETH	K.K.	0.0
672	1	APPROVED		EPICS	CAREY	T.A.	160.0
					MOSS	J.M.	0.0
673	1	APPROVED		P3	HOLT	R.J.	490.0
674	1	DEFER		P3	BURLESON	G.R.	0.0
					MORRIS	C.L.	0.0
675	1	APPROVED		LEP	KUNSELMAN	A.R.	90.0
676	1	APPROVED		LEP	CHANT	N.S.	288.0
					REDWINE	R.P.	0.0
					ROOS	P.G.	0.0
677	1	APPROVED		EPICS	HOLTKAMP	D.B.	100.0
					FUNSTEN	H.O.	0.0
678	1	APPROVED		EPICS	DEHNHARD	D.	200.0
					MORRIS	C.L.	0.0
679	1	APPROVED		AB-NOCCHEM	CLARK	J.L.	42.0
680	1	REJECTED		EPICS	GREENE	S.J.	0.0
681	1	APPROVED		EPICS	BURLESON	G.R.	290.0
682	1	APPROVED		P3	IMAI	K.	200.0
					GREENE	S.J.	0.0
683	1	APPROVED		AB	DITZLER	W.R.	0.0
					SIMMONS	J.E.	0.0
684	1	REJECTED		HRS	KALLNE	J.	180.0
					HOISTAD	B.	0.0
685	1	APPROVED		HRS	BLESZYNSKI	M.	240.0
					IGO	G.J.	0.0
686	1	APPROVED		HRS	HINTZ	N.M.	150.0
687	1	TOBE-HEARD		HRS	RAHBAR	A.	0.0
688	1	APPROVED		LEP	LEITCH	M.J.	230.0
					COOPER	M.D.	0.0
689	1	COMPLETE		P3	NEFKENS	B.M.K.	320.0
					FITZGERALD	D.H.	0.0
690	1	APPROVED		EPB	REEDY	R.C.	0.0
691	1	APPROVED		BSA-RAD	REEDY	R.C.	0.0
692	1	APPROVED		TTA	REEDY	R.C.	0.0
693	1	RESUBMIT		SMC	REIDY	J.J.	0.0
694	1	DEFER		EPICS	SETH	K.K.	0.0
695	1	REJECTED		SMC	REIDY	J.J.	0.0
					HUTSON	R.L.	0.0
696	1	REJECTED		EPICS	SETH	K.K.	0.0
697	1	TOBE-HEARD		SMC	BUDICK	B.	0.0

STATUS OF PROPOSALS AS OF 82/01/11.

PROP. NO.	PHASE	STATUS	CONDITIONS	CHANNEL	SPOKESMAN		PAC-HRS
698	1	TOBE-HEARD		SMC	STEFFEN	R.M.	0.0
					SHERA	E.B.	0.0
699	1	TOBE-HEARD		HRS	HINTZ	N.M.	0.0
700	1	TOBE-HEARD		EPICS	FORTUNE	H.T.	0.0
					MORRIS	C.L.	0.0
701	1	TOBE-HEARD		EPICS	MORRIS	C.L.	0.0
					FORTUNE	H.T.	0.0
702	1	TOBE-HEARD		EPICS	COMFORT	J.R.	0.0
703	1	TOBE-HEARD		EPICS	HOLTKAMP	D.B.	0.0
					SEESTROM-M	S.J.	0.0
704	1	TOBE-HEARD		EPICS	MOORE	C.F.	0.0
					FORTUNE	H.T.	0.0
705	1	TOBE-HEARD		P3	ASHERY	D.	0.0
706	1	TOBE-HEARD		EPB	MAYES	B.W.	0.0
					FURIC	M.	0.0
707	1	TOBE-HEARD		SMC	REIDY	J.J.	0.0
					HUTSON	R.L.	0.0
708	1	TOBE-HEARD		EPB	HOLLAS	C.L.	0.0
	3	TOBE-HEARD		EPB			0.0
	2	TOBE-HEARD		EPB			0.0
709	1	TOBE-HEARD		HRS	GAZZALY	M.M.	0.0
					PAULETTA	G.	0.0
					TANAKA	N.	0.0
710	1	TOBE-HEARD		HRS	BARLETT	M.L.	0.0
					HOFFMANN	G.W.	0.0
711	1	TOBE-HEARD		HRS	HOFFMANN	G.W.	0.0
712	1	TOBE-HEARD		HRS	SEGEL	R.E.	0.0
713	1	TOBE-HEARD		HRS	GLASHAUSSE	C.	0.0
714	1	TOBE-HEARD		HRS	GLASHAUSSE	C.	0.0
715	1	TOBE-HEARD		SMC	OOSTENS	J.M.	0.0
					SNOW	D.H.	0.0
716	1	TOBE-HEARD		EPICS	SETH	K.K.	0.0
717	1	TOBE-HEARD		EPICS	BLAND	L.C.	0.0
					MORRIS	C.L.	0.0
					GREENE	S.J.	0.0
718	1	TOBE-HEARD		HRS	KELLY	J.	0.0
					HYNES	M.V.	0.0
719	1	TOBE-HEARD		AB-NUCCHEM	TURKEVICH	A.L.	0.0
720	1	TOBE-HEARD		HRS	MORRIS	C.L.	0.0
					MCGILL	J.A.	0.0
721	1	TOBE-HEARD		HRS	AAS	B.	0.0
					BLESZYNSKI	E.	0.0
722	1	TOBE-HEARD		HRS	HARVEY	C.J.	0.0
					SEESTROM-M	S.J.	0.0
723	1	TOBE-HEARD		EPICS	HARVEY	C.J.	0.0
					FORTUNE	H.T.	0.0
724	1	TOBE-HEARD		SMC	EGAN	P.D.	0.0
					GLADISCH	M.W.	0.0
					HUGHES	V.W.	0.0
725	1	TOBE-HEARD		ISORAD	DAVIDSON	D.R.	0.0
					WECHSLER	M.S.	0.0
					SOMMER	W.F.	0.0
726	1	TOBE-HEARD		SMC	HIGHLAND	V.L.	0.0
					SANDERS	G.H.	0.0
727	1	TOBE-HEARD		SMC	JONES	S.E.	0.0
728	1	TOBE-HEARD		LEP	GIESLER	G.C.	0.0
	1	TOBE-HEARD		P3			0.0
729	1	TOBE-HEARD		HRS	KOVASH	M.A.	0.0
730	1	TOBE-HEARD		P3	SAGHAI	B.	0.0
					PREEDOM	B.M.	0.0
					DROPESKY	B.J.	0.0

CONTENTS BY CHANNEL

AB

EXTERNAL PROTON BEAM (EPB)

LINE X BEAM STOP (BS)

PROTON IRRADIATION PORT (PIP)

RADIATION DAMAGE A-1 (RADAMAGE-1)

STOPPED MUON CHANNEL (SMC)

SWITCHYARD LINE A BEAM STOP (SWY-LABS)

stopped π^- and K^- work is observable with in-flight reactions. Rather than survey a large number of targets, we propose to concentrate on three neighboring nuclei and to use three bombarding energies. The variation in target will show binding energy and pairing effects, while the variation in bombarding energy will indicate the role of the 3-3 resonance in the production process. We further propose to look at the gamma-ray spectrum produced in proton bombardment to ascertain whether the pion plays a special role in these reactions.

Exp. 154

ELASTIC SCATTERING OF π^+ AND π^- FROM THE HELIUM ISOTOPES

University of Virginia
R. C. Minehart and J. S. McCarthy, Spokesmen
D. Day, J. Davis, J. Källne, R. Whitney, K. O. H. Ziock

We plan to measure elastic scattering for both π^+ and π^- on the helium isotopes in the P^3 channel. The energy range will be from 250 to 500 MeV and will cover scattering angles of ~20 to 160° for ^{4}He and ~45 to 160° for ^{3}He. We also plan on measuring the inclusive quasi-free scattering on these isotopes, (π,π'). The complete kinematic region will be covered for three energies and four scattering angles for both ^{3}He and ^{4}He.

Beam requirements are 500-mA primary proton beam, 30D40 magnet plus a new support stand, and cryogenic support for helium gas and liquid targets.

Exp. 155

HIGH-PRECISION MEASUREMENTS OF PIONIC MASS WITH CRYSTAL DIFFRACTION SPECTROMETER

Yale University
D. C. Lu, Spokesman
L. A. Schaller (University of Frieberg), V. W. Hughes, R. D. Ehrlich
Lawrence Berkeley Laboratory
K. M. Crowe
Columbia University
C. S. Wu, M. Y. Chen
California Institute of Technology
P. Vogel, R. J. Powers, F. Boehm

The pion mass m_π will be determined to an accuracy of about 15 parts per million, which will represent an improvement by a factor of 4 over our current knowledge. Measurements will be made with a crystal diffraction spectrometer of pionic x rays in low-Z atoms, in particular, of the 4f-3d transitions in π-^{11}Na, π-^{12}Mg, π-^{13}Al, and π-^{14}Si. The high-energy resolution (about 10 eV at 30 keV) and the inherent stability of a crystal diffraction spectrometer make such a high-precision measurement possible with a high-intensity pion beam. For relatively low-Z atoms, theoretical uncertainties, such as orbital electron screening and nuclear-structure effects, are sufficiently small so that m_π can be determined from the measured pionic x-ray energies to the desired accuracy.

Exp. 156

SURVEY OF QUASI-ELASTIC PION SCATTERING

Oregon State University
L. W. Swenson, Spokesman
T. C. Sharma, S. A. Richert, D. M. Stupin
Florida State University
H. S. Plendl
University of Oregon
P. Varghese, D. K. McDaniels
Florida A&M University
M. Greenfield
University of Virginia
S. E. Sobottka
LASL
H. A. Thiessen

A single-counter quasi-elastic-scattering survey is proposed for the EPICS beam line. Scattered pions will be detected from (π,π'), $(\pi,\pi'N)$, $(\pi,\pi'd)$, and $(\pi,\pi'\alpha)$ reactions for incident pion momenta of 415 MeV/c (T_π = 300 MeV) and 160 MeV/c (T_π = 75 MeV). Where kinematically allowed, the p's, d's, and α's will also be detected from these reactions (but not in coincidence with the pions).

The anomalous $\pi^+:\pi^-$ ratio for $(\pi,\pi'n)$ reactions, the pion wavefunction in nuclear matter, effects due to a neutron halo, and $(\pi,\pi'd)$ and $(\pi,\pi'\alpha)$ reactions will be studied. Giant resonances and strongly excited states from (π,π') reactions will be noted.

This proposal is preliminary to experiments in which two particles will be detected in coincidence with two detectors at EPICS.

Exp. 157

MICRODISTRIBUTION OF THORIUM IN GEOLOGIC SAMPLES

Argonne National Laboratory
M. G. Seitz, Spokesman

The purpose of the experiment is to map the microscopic distribution of thorium in geologic samples. This is to be done by inducing fission of thorium and uranium with high-energy neutrons. The resulting fission fragments produce radiation-damage tracks in a solid detector such as quartz, and are made visible by chemical etching. The detector then serves as a map of the fissionable material in the sample. Using an auxiliary experiment in which the uranium is mapped by thermal neutron bombardment, the contribution of tracks from uranium can be subtracted from the map produced by high-energy neutrons to give the distribution of thorium in the samples. The technique will be used in two studies of geologic importance — one concerning the thorium distribution in ultramafic rocks, the other concerning the partitioning of thorium and uranium in meteorites.

We propose to measure the excitation function for the reaction $^{65}Cu(\pi^-,\pi^0)^{65}Ni$ over the region of the (3,3) resonance by an activation technique. The formation of ^{65}Ni implies a low-momentum transfer process, since otherwise enough nuclear excitation would be caused by the final-state neutron to result in nuclear evaporation. Distorted-wave calculations of this reaction predict a minimum in the cross section near resonance, because of the strong absorption of the pion waves. Observation of such an effect would confirm these calculations; however, if that effect is not found, it would cast doubt on the usual models for pion-nucleus reactions.

Exp. 459

CROSS-SECTION MEASUREMENTS OF THE $^{14}N(\pi^+,\pi^0)^{14}O$ (ground state) REACTION

LASL

D. J. Vieira, Spokesman

G. W. Butler, C. J. Orth, R. S. Rundberg

We propose to measure the nonanalog single-charge-exchange (SCE) reaction $^{14}N(\pi^+,\pi^0)^{14}O$(g.s.) at six different incident energies between 100 and 350 MeV using the full pion intensity available in the P^3 area. In repeated short irradiations of boron-nitride targets, the yield of ^{14}O will be measured via β^+-delayed gamma counting, while the total pion flux will be integrated using ^{27}Al monitor foils. Since the ground state is the only particle-bound state of ^{14}O, these measurements provide a good determination of the nonanalog SCE reaction cross section to an isolated final state. Comparison of these data to a variety of theoretical models, namely, optical model, fixed scatterer model, Glauber model, and isobar doorway model, will contribute to a better understanding of SCE reactions.

Exp. 460

AN INVESTIGATION OF THE STABILITY OF ^{6}H, ^{7}H, AND ^{9}He BY (π^-,π^+) REACTIONS

Northwestern University
K. K. Seth, Spokesman
S. G. Iversen, M. O. Kaletka, H. Nann
LASL
H. A. Thiessen

It is proposed to study the possible stability of the exotic nuclei ^{6}H, ^{7}H, and ^{9}He by the pion double-charge-exchange reaction (π^-,π^+) on targets of ^{6}Li, ^{7}Li, and ^{9}Be at $T(\pi) = 164$ MeV. It is expected that mass determinations can be made with an accuracy of ±200 keV if significant enhancements over phase space are observed.

Exp. 461

ELASTIC AND INELASTIC SCATTERING OF 800-MeV PROTONS FROM ^{16}O

Northwestern University
S. G. Iversen and K. K. Seth, Spokesmen
M. O. Kaletka, H. Nann

In a recent $^{16}O(\pi^{\pm},\pi^{\pm\prime})^{16}O^*$ experiment done at EPICS two very interesting results emerged:

a) the proton and neutron radii of ^{16}O are nearly equal ($\Delta r_{np} = 0.03 \pm 0.03$), and
b) the B(E2) for the 2^+_1 state has a substantial isovector component [i.e., $B(E2)_{neut.}$ is substantially larger than $B(E2)_{prot.}$]. On the other hand, the opposite is true, although to a smaller extent, for B(E3) to the 3^-_1 state.

It is proposed to study elastic and inelastic scattering of 800-MeV polarized protons to provide a more reliable measure of the results in (a) and to see to what extent result (b) can be verified.

Exp. 462

ANALYZING POWER AND DIFFERENTIAL CROSS SECTIONS FOR THE REACTIONS $p + p \rightarrow d + \pi^+$ AND $p + d \rightarrow t + \pi^+$ AT ~600 MeV AND 400 MeV

Northwestern University
K. K. Seth and H. Nann, Spokesmen
S. G. Iversen, M. O. Kaletka, H. Nann
LASL
R. L. Burman

It is proposed to study the $(\vec{p},\pi^+)$ reaction on hydrogen and deuterium at energies in the vicinity of 400 and 600 MeV. In an earlier experiment at 800 MeV it was found that analyzing powers for hydrogen and deuterium are completely dissimilar. This is in complete contrast to threshold ($E_p \approx 200$ MeV) results obtained at TRIUMF in which the elementary $p + p \rightarrow d + \pi^+$ vertex was found to dominate for a wide choice of targets. It is necessary to study the reactions at 400 and 600 MeV in order to find how this basic change between 200- and 800-MeV behaviors comes about, and what its proper explanation is.

Exp. 474

A MEASUREMENT OF SPIN DEPENDENT EFFECTS IN P + D ELASTIC AND INELASTIC SCATTERING

LASL
W. D. Cornelius, Spokesman
J. F. Amann, G. W. Hoffmann, H. A. Thiessen, R. L. York

We propose to measure the five "triple scattering" parameters in the scattering of polarized protons from deuterium. We intend to examine both elastic and inelastic scattering to the final state interaction region. The discovery of spin dependent resonances in the LAMPF energy region makes the examination of spin-dependent effects in this energy range especially timely. The inelastic scattering reaction is sensitive only to the spin-dependent parts of the nucleon-nucleon force because $\Delta S = 1$ is required by angular momentum selection rules. These measurements are intended to complement recent work in connection with Exp. 360 where D was measured in the charge analogue reaction. Unexpectedly D was very small (0.01 ± 0.01). This value is inconsistent with lower energy results and theoretical expectations. Measurements performed at HRS would have an advantage over the neutron measurements because of better energy resolution and the high efficiency of the HRS focal plane polarimeter. The HRS is also unique in that two components of the outgoing proton spin may be measured simultaneously. If this experiment is scheduled immediately following Exp. 392, no additional set-up time is required and the polarimeter calibrations will have been done. In a run of 130 h, we expect a statistical precision of ± 0.02 and an absolute accuracy of ± 0.05 over the angular region to be examined.

Exp. 475 (*Revised August 1981*)

SCATTERING OF 0.8 GeV PROTONS FROM ^{20}Ne AND ^{22}Ne

University of South Carolina
G. S. Blanpied, Spokesman
B. G. Ritchie
University of Texas, Austin
G. W. Hoffmann, M. L. Barlett, J. A. McGill
Michigan State University
B. H. Wildenthal

The originally proposed experiment was to use the HRS to measure angular distributions and analyzing powers for 800-MeV protons scattered from gas targets of ^{20}Ne and ^{22}Ne. Only the ^{20}Ne part of the experiment was approved and has been completed. Preliminary analysis of the ^{20}Ne data, along with concurrent work on the isotopic pair ^{24}Mg and ^{26}Mg, has prompted this request for additional time for ^{22}Ne. We are requesting 96 hours of beam (either polarized or unpolarized).

Exp. 476

THE ANALYZING POWER FOR $\vec{p}$ + ^{24,26}Mg AT 500 AND 800 MeV

New Mexico State University

G. S. Blanpied, Spokesman

G. R. Burleson

University of Minnesota

N. M. Hintz

University of Texas, Austin

M. Barlett, J. McGill

LASL

G. W. Hoffmann

Rutgers University

C. Glashausser

The experiment consists of using the HRS to measure the elastic and inelastic analyzing powers for 500- and 800-MeV $\vec{p}$ + ^{24,26}Mg. Particular emphasis will be placed upon studies of the ground state rotational band (0^+_1, 2^+_1, 4^+_1, 6^+_1) and the gamma band (2^+_2, 3^+_2, 4^+_2) in these nuclei. Data will be taken in such a way as to maximize the statistics for unnatural parity 3^+_2 state. We are requesting 100 h for measurements with 800-MeV polarized protons and 100 h with 500-MeV polarized protons.

Exp. 477

ROLE OF THE p + p → d + π INTERACTION IN NUCLEON TRANSFER REACTIONS AT INTERMEDIATE ENERGIES

University of California, Los Angeles

G. J. Igo, Spokesman

G. S. Adams, M. Bleszyneski, J. B. McClelland, G. Pauletta, C. A. Whitten, Jr.

The HRS will be used to measure the differential cross section ($d\sigma/d\Omega$) for neutron transfer via the (p,d) reaction on ^{7}Li, ^{12}C, ^{16}O, ^{40,42,44}Ca, and ^{90}Zr. At four fixed values of q, the momentum transfer, $d\sigma/d\Omega$ will be measured in approximately 100-MeV (smaller steps of 50 MeV would be very welcome) bombarding energy steps between 0.4 and 0.8 GeV. The values of q^2 chosen are 0.1, 0.5, 0.8, and 1.2 $(GeV/c)^2$. Selected states in these targets will be focused on in which the pp → dπ amplitudes may play a predominant role.

Exp. 478

$\pi^{\pm}$ ELASTIC SCATTERING FROM DEUTERIUM

University of Colorado

T. G. Masterson, Spokesman

J. J. Kraushaar, D. A. Lind, R. J. Peterson, R. A. Ristinen

LASL

R. L. Boudrie

these measurements represent total cross-section determinations to an isolated final state enabling straightforward comparison of these data to theory. Such comparison should elicit a better understanding of the isovector component of single-charge-exchange reactions. Furthermore, comparisons of these measurements to integrated angular distributions of ^{12}C inelastic pion scattering leading to the analog state of ^{12}N (g.s.), which resides at 15.11 MeV in ^{12}C, provide an important test of isospin symmetry.

Exp. 556

A PROPOSAL TO STUDY THE (p,p') PROCESS LEADING TO π-ATOMIC STATES

Massachusetts Institute of Technology
W. Bertozzi, Spokesman
M. Hynes, J. Kelly, S. Kowalski, W. Pugh, R. P. Redwine, W. Sapp, C. P. Sargent, and W. Turchinetz
LASL
G. W. Hoffmann

We propose to investigate the inelastic scattering of a proton from a nucleus wherein a pion in a bound mesonic orbit is created.

Exp. 557

EXPOSURE, IN A PARASITIC MODE, OF A 3 cm × 3 cm × 1 cm STACK OF SOLID TRACK DETECTORS TO A π^- BEAM

Washington University
Ramanath Cowsik, Spokesman

No summary available.

Exp. 558

MEASUREMENT OF (π^+,π^-) REACTIONS ON $^{13,14}C$ AND ^{26}Mg

Case Western Reserve University
H. W. Baer, Spokesman
LASL
J. D. Bowman, C. L. Morris, H. A. Thiessen
New Mexico State University
G. R. Burleson, Spokesman
S. J. Greene. B. Cottingame
University of Texas, Austin
W. J. Braithwaite, C. Harvey, C. F. Moore
University of Indiana
C. D. Goodman
University of Minnesota
D. B. Holtkamp

We propose to measure (π^+,π^-) DIAS angular distributions at T_π = 164 and T_π = 292 MeV on ^{14}C and at T_π = 164 MeV on ^{26}Mg. The ^{14}C data constitutes a part of the complete set of measurements of π^+ and π^- elastic, (π^+,π^0) IAS charge exchange, and (π^+,π^-) DIAS scattering on a single nucleus. The ^{26}Mg data will complete the systematics of (π^+,π^-) DIAS transitions on ^{14}C, ^{18}O, and ^{26}Mg at 164 and 292 MeV. We also propose to measure the non-DIAS $^{13}C(\pi^+,\pi^-)^{13}O$ angular distribution at T_π = 292 MeV. This will provide first data at the higher energy for an odd A nucleus, and it will constitute an important part of the isotope chain systematics $^{12,13,14}C(\pi^+,\pi^-)$. We also propose to measure the 5° excitation functions of ^{13,14}C at five additional energies between 100 and 300 MeV.

Parameters:

EPICS spectrometer with sweeping magnet installed.
T_π = 164 and 292 MeV for angular distribution.
T_π = 100 to 300 MeV for 5° excitation function.
500 h of π^+ beam.

Exp. 559 (*Revised August 1981*)

SEARCH FOR NEUTRINO OSCILLATIONS AND VIOLATION OF LEPTON NUMBER CONSERVATION

Los Alamos National Laboratory
Minh Duong-Van, Spokesman
J. C. Allred, A. A. Browman, R. L. Burman, D.R.F. Cochran, J. B. Donahue, A. J. Gjovig, M. V. Hynes, B. W. Noel
Rice University
G. C. Phillips, Spokesman
S. D. Baker, J. A. Buchanan, M. D. Corcoran, J. M. Clement, I. M. Duck, H. E. Miettinen, G. S. Mutchler, J. B. Roberts, E. A. Umland
University of Houston
A. D. Hancock, B. W. Mayes, L. S. Pinsky
University of California, Los Angeles
B. Aas, J. B. Carroll, J. Geaga, G. J. Igo, A. Shor, C. A. Whitten, Jr.
New Mexico State University
S. J. Greene
Lawrence Berkeley National Laboratory
T. A. Mulera, A. L. Sagle

We propose to search for the neutrino oscillation channel $\bar{\nu}_\mu \rightarrow \bar{\nu}_e$ and for the additive lepton-number violating reaction $\mu^+ \rightarrow e^+\bar{\nu}_e\nu_\mu$ with the highest sensitivity presently attainable at any accelerator. Using the LAMPF beam dump as a "clean" source of $\bar{\nu}_\mu$ ($\bar{\nu}_e$ contamination is negligible) and a 6.1-ton detector consisting of liquid-scintillator modules and wire chambers, we expect to achieve an oscillation parameter sensitivity δm^2 of 0.10 eV^2 for $\sin^2 2\theta = 1$ and 0.21 eV^2 for $\sin^2 2\theta = 0.25$ at a 68% confidence level. We expect to be able to set an upper limit of 1.1% (68% C.L.) on the branching ratio $\mu^+ \rightarrow e^+\bar{\nu}_e\nu_\mu/\mu^+ \rightarrow$ all.

We will search for the reaction $\bar{\nu}_e\, p \rightarrow e^+\, n$, where *both* final state particles are detected in *fast* (20 ns) coincidence. We hope to take advantage of this extra constraint to reduce the background and thus to attain a significant improvement in signal-to-noise. We believe the coincident direction will allow us to achieve the same sensitivity as that of a detector having three to four times

the mass that detects only the positron. In case the backgrounds scale more rapidly with mass than we expect, the e^+n coincident detection scheme may be the only one clean enough to permit observation of the $\bar{\nu}_\mu \rightarrow \bar{\nu}_e$ oscillation.

The detector cost, estimated at $270 000, will be shared among the collaborating institutions. We propose to use tuff as the principal shielding with an additional 200 tons of steel shielding (at about $40 000). The required tunnel or filled hole will cost about an additional $70 000.

The neutrino detector will consist of modular liquid-scintillator detectors, organized into 12 walls, 10 modules high. Each wall is separated by a 10-in. drift space to delay the neutron coincidence. In this drift space, multiwire chambers of coarse resolution will be located for charged-particle tracking. The detector will be surrounded by a 6-in.-thick steel shield as well as an active scintillator veto. This whole structure will be located below grade.

We believe that because of both the low cost and the simplicity of design, the detector can be constructed within one year (August 1982) and that results will be available one year later (August 1983). This experiment utilizes the unique, presently available, feature of LAMPF for neutrino physics: a very high flux of $\bar{\nu}_\mu$ from the beam stop with energy below μ-production threshold and a presumed minute flux of $\bar{\nu}_e$. Our proposed design takes advantage of this uniqueness to attain very important physics goals in a timely fashion: to show *definitively* whether lepton-number conservation is violated and/or whether neutrinos have mass. A positive result from this experiment would be of comparable significance to observation of the decay of the proton.

Since the Los Alamos National Laboratory is planning a major expansion of effort in neutrino physics, we believe that development of sensitive and novel neutrino detector systems should be of considerable interest to the Laboratory. The detector system that we are building will be of maximal sensitivity because it uses the best available technology to detect both the e^+ and the neutron in the reaction $\bar{\nu}_e p \rightarrow e^+ n$. The relatively large duty cycle at the LAMPF beam stop (compared to other accelerator facilities and what is expected for PSR) makes beam-stop experiments especially sensitive to cosmic-ray backgrounds. Our technique of time-delayed e^+-neutron fast coincidence is expected substantially to improve the signal-to-noise ratio, and it therefore makes our method attractive. Thus we believe that the technical contribution of successful development of our detector provides a secondary, but important, contribution to the Los Alamos efforts in neutrino science.

This proposed expriment will search for lepton number violation and/or $\bar{\nu}_\mu \rightarrow \bar{\nu}_e$ oscillations as follows:

- in a timely fashion
- at low cost
- with an advancemnt of neutrino technology
- with maximal sensitivity.

Exp. 610

USE OF LAMPF BEAM STOP TO OBTAIN ^{60}Fe

Argonne National Laboratory
W. Henning and W. Kutschera, Spokesmen

No Summary Available

Exp. 611

EXCITATION FUNCTIONS OF THE FOUR REACTIONS ^{130}Te($\pi^{\pm}$,$\pi^{\pm}$N)

McGill University
J. J. Hogan, Spokesman
LASL
K. E. Thomas, K. W. Thomas
Istituto Nazionale di Fisica Nucleare, Milan
E. W. Gadioli

It is hoped that this experiment will be the first in a series, the ultimate goal of which is to extend pre-equilibrium model calculations to reactions of fast pions on heavy, complex nuclei. In this experiment, the initial interaction of energetic pions with the nucleons of a moderatley heavy nucleus will be studied.

It is proposed that four reactions of a single target nucleus be studied, systematically, as a function of pion energy. Specifically these four possibilities of single nucleon removal, the (π^+,π^+n), (π^+,π^+p), (π^-,π^-n) and (π^-,π^-p). The target nucleus is ^{130}Te, the products ^{129}Te and ^{129}Sb. The pion energies would be expected to vary from E_π of 50 to 300 MeV. While the experiments will be designed specifically to measure the excitation functions for these reactions under optimum conditions, it is apparent that as much of the spallation yield pattern as possible will also be determined.

We propose to radiochemically isolate these products from a mixed target of tellurium and aluminum (as a beam monitor) which is being fabricated in the Department of Metallurgical Engineering of McGill University.

There are two principal advantages to the particular target-reaction system chosen. First, ^{130}Te appears to be the only reasonably abundant naturally occuring isotope for which these four reactions may be studied. This avoids the uncertainties always present in the comparison of reactions carried out on different targets. Second, the relatively short half lives of the principal products, roughly one and four hours, allow a very systematic study to be carried out with a relatively modest requirement of beam time.

The principal experimenters, Hogan, Thomas, and Williams, will always be present at LASL when experiments are performed.

The theoretician, Gadioli, has been interested in pre-equilibrium simulations of pion induced reactions for some time; however, his previous work has been entirely with stopped pions. He intends to use the data of these experiments to provide the framework for an extension of the Exciton model to fast pion reactions. Our collaboration, which has extended over the last decade, has seen the extension of the model for proton induced reactions to account for alpha particle clustering, fissionability, and the calculation of spallation yields of as many as forty reaction products simultaneously down to the microbarn level. Recently, we have successfully explored alpha particle and light heavy ion induced reactions and it is felt that similar successes in pion induced reactions are possible.

Exp. 612

MASS OF BERYLLIUM-14

Northwestern University
K. K. Seth, Spokesman
D. Barlow, S. G. Iverson, M. O. Kaletka, D. Kielczewska, A. Saha, D. Smith
Indiana University
H. Nann, Spokesman
LASL
H. W. Baer

It is proposed to measure the mass of the exotic nucleus ^{14}Be(Z = 4, N = 10) by means of the reaction $^{14}C(\pi^-,\pi^+)^{14}Be$. This mass is of fundamental importance in our study of nuclei farthest away from the valley of stability. It is conjectured that that excited 0^+_2 state will also be seen in the spectrum and that its energy and strength will shed special light on the coexistence of spherical and highly deformed 0^+ states.

Exp. 613

STUDY OF DEEPLY BOUND HOLE STATES IN THE TIN ISOTOPES VIA THE $(\vec{p}, d)$ REACTION

Northwestern University
A. Saha and K. K. Seth, Spokesmen
D. Barlow, S. G. Iversen, M. O. Kaletka, D. Kielczewska, D. Smith

Single neutron pick-up reactions, like (p,d), have been used in recent years to study the deeply bound hole states in nuclei. Most previous studies have been done at incident energies of 90 MeV or less. It would be of great interest to see what charactristics these states exhibit at higher incident energies where momentum matching would preferentially excite the high spin states. In this experiment, we therefore propose to do the $(\vec{p},d)$ reaction at 400 MeV on the Sn isotopes. Excitation to the low-lying valence states will also be investigated. These results are also of importance for this study, since they give a measure for the reliability of any reaction mechanism to describe the data.

Exp. 614

STUDIES OF SCALAR AND VECTOR PARTS OF THE π-N INTERACTION BY MEASURING NUCLEAR DEEXCITATION GAMMA RAY CORRELATION FOLLOWING INELASTIC PION SCATTERING

College of William and Mary
H. O. Funsten, Spokesman
Utah State University
E. N. Hatch, V. G. Lind, R. E. McAdams, O. H. Ottenson
George Mason University
B. J. Lieb
Florida State University
H. S. Plendl

Virginia State College
C. E. Stronach
LASL
D. J. Vieira

This experiment is a study of the role of the relative scalar to vector strengths of the π-N scattering amplitudes in producing polarized residual nuclei in inelastic pion-nucleus scattering. The polarization is to be obtained by measuring the correlation between the scattered pion and the nuclear deexcitation gamma ray. Five directional scintillation telescopes will be used for π' detection using dE/dx identification of the pions; four Ge(Li) detectors will be used for γ-ray detection.

Exp. 615

Experiment 615 was entered in error.

Exp. 616

NUCLEAR INFORMATION FROM THE SPIN ROTATION AND DEPOLARIZATION PARAMETERS IN THE ^{12}C(p,p') REACTION TO THE 1^+12.72 MeV T = 0 AND TO THE 1^+15.11 MeV T = 1 LEVELS

University of California, Los Angeles
M. Bleszynski, Spokesman
B. Aas, E. Bleszynski, G. L. Igo, G. Pauletta, C. A. Whitten, Jr.
LASL
J. B. McClelland and J. Moss, Spokesmen
T. Carey, S. J. Seestrom-Morris
University of Minnesota
N. M. Hintz, Spokesman
Rutgers University
C. Glashausser

Measurements of the final state proton polarizations resulting from the inelastic scattering of polarized proton beams to the 1^+12.72 MeV T = 0 and 1^+15.11 MeV T = 1 ^{12}C levels will be used to study the reaction mechanism for the excitation of these levels. Since these levels have unnatural parity (1^+) and two isospin values T = 0 and T = 1, they are particularly good states to use in studying the isoscalar and isovector character of the spin-dependent N-N amplitudes. This experimental proposal presents a systematic approach where measurements of three triple scattering parameters taken together with previous measurements on the unpolarized scattering cross sections and asymmetries A_y will allow a determination of the product of a specific spin dependent amplitude (absolute value) and a nuclear form factor. Comparison of the magnitudes of various spin dependent amplitudes are thus possible. In this systematic approach the axial longitudinal as well as the transverse nuclear transition form factor may be studied separately. Only one of these formfactors, the transverse one, can be extracted from (e,e') measurements, whereas the (p,p')reaction will also provide us with information on the axial longitudinal form factor.

Exp. 617

A STUDY OF THE (3/2, 3/2) RESONANCE IN LIGHT NUCLEI

University of Virginia
K. O. H. Ziock, Spokesman
J. S. McCarthy, R. C. Minehart, Y. Tzeng
LASL
C. L. Morris

No Summary Available

Exp. 618

INELASTIC $\pi^{\pm}$ SCATTERING FROM THE N $\approx$ 28 ISOTONES

LASL
C. L. Morris, Spokesman
R. L. Boudrie
University of Texas, Austin
C. Fred Moore, Spokesman
P. A. Seidl
University of S. Carolina
G. S. Blanpied

Wave function calculations are often tested by comparing Eigen energies and electromagnetic decay rates that are predicted with experimental measurements. However, often more stringent tests can be made using information gained from detailed measurements of the transition densities from inelastic scattering. Indeed, electron inelastic scattering has proven very useful in this respect. In the present experiment we hope to provide complementary data about the neutron transition densities which can be used to test wave function models.

We will measure inelastic scattering of $\pi^{\pm}$ to collective states in the neutron magic N = 28 isotones: ^{48}Ca, ^{50}Ti, ^{51}V, ^{52}Cr, and ^{54}Fe. For most of these isotones, form factors and consequently transition densities, are well known from inelastic electron scattering at momentum transfers from 0.5 to 1.7 $\hbar$ fm^{-1}. As a consequence we can compare π^{+} scattering (scattering mainly from protons) with DWIA calculations using these well known proton transition densities, and we can determine the transition densities for the neutron components in the wave function from the π^{-} inelastic scattering.

Exp. 619

INELASTIC PION SCATTERING TO 0^{+} AND 2^{+} STATES IN ^{40}Ca and ^{42}Ca

University of Texas
C. F. Moore, Spokesman
C. J. Harvey, P. A. Seidl
University of Pennsylvania
H. T. Fortune, Spokesman
G. Gunn, J. Sweet, L. Bland

LASL

C. L. Morris, Spokesman

S. J. Seestrom-Morris

We intend to measure $^{40}Ca(\pi^{\pm},\pi^{\pm\prime})\,^{40}Ca^*$ and $^{42}Ca(\pi^{\pm},\pi^{\pm\prime})^{42}Ca^*$ at angles between 15° and 50°, and at three energies, 120, 180, and 300 MeV.

Exp. 620

THE NUCLEAR REACTION π^+ vs π^- INELASTIC SCATTERING ON ^{40}Ca

University of Texas
C. F. Moore, Spokesman
C. J. Harvey, P. A. Seidl
LASL
C. L. Morris, Spokesman
S. J. Seestrom-Morris
U. S. Air Force Academy
R. Joseph

Pion-nucleon elastic scattering on the (3,3) resonance favors $\pi^+ + p$ and $\pi^- + n$ over $\pi^- + p$ and $\pi^+ + n$ by a factor of 9:1. Thus, from a shell model point-of-view, one might reasonably hope that a comparison of π^+ inelastic scattering with π^- inelastic scattering on complex nuclei would permit an extraction of the proton contribution from the neutron contribution in the description of nuclear excited states.

In doubly closed shell nuclei, there are two types of excitations of interest:

1. Natural Parity, collective in character, where the proton-neutron configurations are well correlated, but the proton and neutron configurations are not the same in nuclei with N not equal to Z.
2. Unnatural Parity, one single particle-hole in character, where one should see close to a 9:1 ratio in π^+ vs π^- cross section. Measurement of these will provide sensitivity to even small configuration mixing.

In a comparison of inelastic scattering yields, we expect to see π^+ preferentially exciting single-particle-hole proton states and π^- preferentially exciting single-particle-hole neutron states. The observation of states of pure proton or neutron configuration (bad isospin), even in self-conjugate nuclei, has been one of the most striking finds at EPICS.

We propose to measure inelastic scattering of positive and negative pions from ^{40}Ca at incident pion energies of 120, 155, and 180 MeV. This study will concentrate on particle-hole states resulting from a stretched ($1d_{5/2}$ hole, $1f_{7/2}$ particle) configuration. The identification of such states will be based on the selectivity of pion inelastic scattering a low energy for exciting unnatural parity states. Several previously obtained spectra of pion inelastic scattering on ^{40}Ca show evidence for a broad state at 14.5 MeV which is a possible condidate for the 6^- state.

Specifically, we intend to measure $^{40}Ca(\pi^\pm,\pi^{\pm\prime})^{40}Ca^*$ at momentum transfers of 181, 251, and 310 MeV/c corresponding to angles of 50, 70, and 90° at 120 MeV, and at three energies 120, 155, and 180 MeV.

Exp. 621

GOOD-RESOLUTION STUDY OF $^{18}O(\pi,\pi')$

University of Minnesota
D. Dehnhard, Spokesman
D. B. Holtkamp
University of Pennsylvania
H. T. Fortune, Spokesman
LASL
S. J. Seestrom-Morris, C. L. Morris, J. F. Amann

We propose to measure inelastic cross sections at ~160 MeV for $\pi^{\pm}$ inelastic scattering from ^{18}O with about 100-keV resolution, in order to resolve states not previously separable, and thereby to enable meaningful comparison between theory and experiment.

Exp. 622

INVESTIGATION OF THE STRONG CANCELLATIONS OF NEUTRON/PROTON TRANSITION AMPLITUDES IN ^{14}C

University of Minnesota

D. B. Holtkamp, Spokesman

D. Dehnhard

LASL

H. W. Baer, Spokesman

S. J. Seestrom-Morris, C. L. Morris

New Mexico State University

S. J. Greene

University of Texas

C. J. Harvey

We are requesting time on EPICS in order to measure excitation functions at two values of constant momentum transfer for $\pi^{\pm}$ excitations of ^{14}C. Two states at 11.67 and 17.23 MeV appear to be high-spin states (probably $J^{\pi}=4^-$) with π^+/π^- cross section ratios of 0.06 ± 0.03 and 12.83 ± 4.41, respectively. By measuring an excitation function at large q, we can determine whether these states are of natural or unnatural parity. In addition, the 2^+_2 state at 8.32 MeV exhibits a π^+/π^- cross section ratio of $33^{+\infty}_{16}$ and it would be very interesting to see if this ratio is energy dependent. This ratio exceeds the free π-N ratio of 9:1 and probably results from strong cancellations of neutron and proton transition amplitudes in π^- scattering. We also request time to measure inelastic angular distributions at 292 MeV, an energy off the (3,3) resonance, to study form factor differences in the 2^+ (and proposed 4^-) states. In order to complement the approved SCX and DCX experiments on ^{14}C, we will obtain angular distributions of elastic scattering at 292 MeV.

The total time requested for this experiment is 380 hours.

Exp. 623

MEASUREMENT OF CROSS SECTION, ANALYZING POWER AND DEPOLARIZATION PARAMETERS IN THE $^{28}Si(p,p')^{28}Si^*$ (6^- T = 0 AND T = 1) REACTION AT 400 MeV

Rutgers University

C. Glashausser, Spokesman

K. Jones, S. Nanda

University of Minnesota

N. Hintz, M. Gazzaly

The observables $d\sigma/d\Omega$, A_y, $D_{nn'}$, $D_{ss'}$, and $D_{\ell s'}$ will be measured at 400 MeV for the reaction $^{28}Si(p,p')^{28}Si$ to the stretched 6^- states at 11.58 MeV (T = 0) and 14.35 MeV (T = 1). The first two parameters will be measured over the range 10 to 28° (LAB) in 3° steps. The spin transfer

parameters will be measured at three angles each; three orthogonal polarization states of the incident beam are required. The primary aim is a consistent determination of the effective tensor interaction, particularly for isovector transfer, in the region of momentum transfer where it is largest. This requires that the other components of the interaction also be determined. The theoretical analysis will be carried out via the distorted wave impulse approximation. Form factors from electron scattering and nucleon-nucleon amplitudes from the recent Franey and Love analysis will be used in the first comparison with the data.

Exp. 624

AN ATTEMPT TO OBSERVE DIRECTLY THE COUPLING OF PARTICLE-HOLE STATES TO Δ-HOLE STATES

Indiana University
C. D. Goodman, Spokesman
University of Texas
C. A. Goulding
LASL
B. E. Bonner, M. D. Cooper, N.S.P. King

We propose to use the (p,n) reaction at 800 and 500 MeV to search for direct evidence of coupling of Gamow-Teller strength as nucleon particle-hole states to Δ-hole states. Studies with the (p,n) reaction at 200 MeV show a systematic GT strength deficit of the order of 50%. It has been suggested that Δ-hole coupling shifts the missing strength to excitations of the order of 300 MeV. We propose to excite the high excitation component directly and to attempt to associate the high excitations with missing GT strength by comparing spectra for targets with and without normal GT strength. Neutron energy spectra are to be measured by time of flight.

Exp. 625

INELASTIC SCATTERING OF PIONS TO GIANT RESONANCES

LASL
N.S.P. King, Spokesman
H. W. Baer, R. L. Boudrie, C. L. Morris
University of North Carolina
R. E. Anderson, Spokesman
University of Colorado
R. J. Peterson, Spokesman
J. J. Kraushaar, R. A. Ristinen, R. S. Raymond
Oak Ridge National Laboratory
F. E. Bertrand

This proposal is an extension of Exp. 522 which was a feasibility study to determine whether pions would strongly populate known giant resonances and if so, what problems would be encountered in using EPICS for continued study.

Results from Exp. 522 showed clear evidence for population of the LEOR and isoscaler GQR in both π^- and π^+ scattering from ^{118}Sn at 130 MeV. Weak evidence (poor statistics) was also found for the recently observed HEOR at 23 MeV with an angular dependence similar to the LEOR.

Following this experiment, a comprehensive study of the properties of pionic giant resonance excitation was proposed (Exp. 608). This included exploring their energy dependence, π^-/π^+ differences for an isotopic sequence of targets, confirmation of the HEOR and new isovector resonances, and the mass dependence of giant multipole strength. The present proposal is more modest in its goals. We wish to: 1) obtain improved statistics at some angles where data from Exp. 522 exists, 2) obtain good statistics at a few more angles to confirm observed π^-/π^+ differences on ^{118}Sn at 130 MeV, 3) while carrying out parts 1 and 2, confirm our observation of the HEOR and explore π^-/π^+ differences near ~23-MeV excitation energy, 4) measure the strength of the GQR at a few angles in ^{40}Ca to provide data on an N = Z nucleus where one expects no π^-/π^+ differences which might arise from $T_0 > 0$.

Exp. 626

MEASUREMENT OF THE DEPOLARIZATION PARAMETERS $D_{nn'}$, $D_{\ell ss'}$, AND $D_{ss'}$ IN PROTON-NUCLEUS SCATTERING AT VERY HIGH EXCITATION ENERGIES

Rutgers University
C. Glashausser, Spokesman
K. Jones, S. Nanda
University of Texas, Austin
J. McGill, Spokesman
M. Barlett, G. W. Hoffmann

The depolarization parameters $D_{nn'}$, $D_{\ell s'}$, and $D_{ss'}$ will be measured for proton scattering from ^{1}H, ^{12}C, and ^{208}Pb in the excitation region corresponding to quasi-elastic scattering and quasi-free delta production. The beam energy will be about 800 MeV; the scattering angles will range from 5 to 30° in 5° steps. The excitation region will be scanned in about 10 coarse steps corresponding to intervals of about 100 MeV/c in outgoing particle momentum. This will be the first examination of the magnetic properties of nuclei at high-excitation energies where magnetic resonances have recently been suggested. It will provide detailed data for comparison with the recent calculations of Alexander, Wallace, and co-workers which incorporate isobar production into the intermediate energy scattering formalism on an equal footing with elastic nucleon-nucleon scattering. Double spin-flip terms in the strongly spin-dependent nucleon-nucleon isobar production amplitudes will be determined for the first time. Finally, the data may provide evidence for the production of giant isobar resonances.

Exp. 627

MEASUREMENT OF THE RELATIVE SIGN OF NEUTRON AND PROTON TRANSITION MATRIX ELEMENTS IN (p,p') REACTIONS

LASL
M. V. Hynes, Spokesman
M. J. Leitch
Massachusetts Institute of Technology
A. M. Bernstein, Spokesman
R. Miskimen
University of South Carolina
G. S. Blanpied

We propose to use the High Resolution Spectrometer (HRS) facility to study 2^+ states in selected s-d shell nuclei via inelastic proton scattering. In particular, we propose to measure the relative sign of neutron and proton matrix elements for the first two 2^+ states (2^+_1 and 2^+_2) in ^{30}Si and ^{34}S. Recent shell model calculations by Brown and Wildenthal indicate that neutron and proton contributions to the cross sections for the 2^+_1 states in these nuclei have the same relative sign, while in the 2^+_2 state in ^{30}Si they have the opposite sign. Independent evidence from the BE2 values for these transitions in the mirror nuclei provide a measure of the magnitudes of the separate neutron and proton matrix elements but do not measure their relative sign. Proton scattering studies of these levels provide a unique opportunity to measure this relative sign, thus putting to a strict test our shell model understanding of their structure.

Exp. 628

STUDY OF THE (π,πp) REACTION AND QUASIFREE SCATTERING IN ^{4}He

Argonne National Laboratory

D. Ashery, Spokesman

D. F. Geesaman, R. J. Holt, H. E. Jackson, J. P. Schiffer, (also Univ. of Chicago), J. R. Specht, K. E. Stephenson, B. Zeidman

LASL

P. A. M. Gram, Spokesman

University of Oregon

J. Faucett

College of William & Mary

H. O. Funsten, D. Joyce

University of Texas, Austin

C. A. Goulding (also LASL)

Florida State University

J. Norton, H. S. Plendl

Northwestern University

R. E. Segel

Oregon State University

L. W. Swenson

A measurement of inelastic pion scattering observed in coincidence with a recoil proton is planned with 160, 220, 350 MeV π^+ on a target of ^{4}He as a function of angle. The experiment will be performed at the P^3 channel. Scattered pions will be detected in the LAS spectrometer and protons in a large solid angle counter array previously used in Exp. 404. Earlier measurements of inclusive pion scattering in ^{4}He (Exp. 390) suggest that inelastic scattering at large angles is dominated by quasifree scattering. Data resulting from the coincidence observation of pion and recoil proton should provide a clear indication of the validity of the impulse approximation in describing the scattering and the importance of contributions from higher order processes.

Exp. 629

FEASIBILITY OF He-JET TECHNIQUES FOR STUDYING SHORT-LIVED NUCLEI PRODUCED AT LAMPF

Idaho National Engineering Lab

R. C. Greenwood, Spokesman

R. A. Anderl, R. J. Gehrke, V. J. Novick, C. W. Reich

LASL

M. E. Bunker and W. L. Talbert, Jr., Spokesmen

W. Faubel, B. J. Dropesky, G. C. Giesler, J. W. Starner

University of Oklahoma

R. F. Petry

We propose to explore the feasibility of studying shortlived radionuclides far from stability, produced at LAMPF via high-energy proton-induced reactions on various nuclei, including fission of heavy nuclei. The methodology would involve He-jet transport of the reaction products to an isotope separator. The experiments described in the present proposal are concerned with preliminary on-line tests of a possible He-jet system.

The principal objectives of these experiments will be: 1) to determine optimal design and operational parameters for maximizing transport efficiencies for fission and spallation products, particularly those which cannot be isolated at other facilities employing isotope separators (for example, isotopes of the elements Mo, Tc, and various rare earths), and 2) to use the results of these studies to evaluate the viability of placing a He-jet target chamber in Line A ahead of the primary beam dump (Station A6) and connecting it via a capillary transport line to an isotope separator located in the new staging area.

The experiments will be carried out in LAMPF Area B. The target chamber will be located in the Nuclear Chemistry Cave, and the rest of the apparatus will be located in the corridor between Area B and C. Radioactive samples collected by means of the He-jet apparatus will be studied on-line or in the counting laboratory of CNC-11/LAMPF. The development and testing of the described system will be a joint effort of LASL and EG&G Idaho participants.

Exp. 630

A STUDY OF PROTON INELASTIC SCATTERING AT ZERO DEGREES AND A SEARCH FOR GIANT MONOPOLE AND GIANT MAGNETIC DIPOLE EXCITATIONS

LASL

J. B. McClelland and J. M. Moss, Spokesmen

T. A. Carey, W. D. Cornelius, S. J. Seestrom-Morris

University of Minnesota

N. M. Hintz, Spokesman

I. Cook, M. A. Franey, M. Gazzaly

The purpose of the experiment is to develop techniques for measuring inelastic cross sections at $\theta = 0^{\circ}$. This angle is of special interest since cross sections for L = 0 orbital angular momentum transfer peak at 0° while cross sections for L > 0 either vanish or are very small there. Thus, E(0)($\Delta S = 0$) and M(1)($\Delta S = 1$) modes should dominate the spectrum. Location of the GMDR in heavy nuclei (A > 60) continues to be one of the major unsolved problems of nuclear structure. Many interesting problems involving the structure of the GMR also remain to be solved.

Techniques that will be employed include careful tuning of Lines X and C using only the Line-X strippers to define the beam. Active collimators will be employed to eliminate beam halo and slit-edge and pole-face scattering within the HRS. Special 0° focal plane chambers will be employed to record inelastic spectra.

Exp. 631

STUDY OF THE SPIN-FLIP PROBABILITY FOR ELASTIC AND INELASTIC SCATTERING FROM ODD-MASS NUCLEI

LASL

S. J. Seestrom-Morris, T. A. Carey, J. M. Moss, Spokesmen

W. D. Cornelius, J. B. McClelland

University of Minnesota

D. Dehnhard, Spokesman

We propose to use the HRS focal plane polarimeter to measure the spin-flip probability in elastic scattering from ^{7}Li and ^{51}V and in inelastic scattering to three states in ^{13}C; $1/2^{+}$ (3.09 MeV), $1/2^{-}$ (8.86 MeV), and $9/2^{+}$ (9.5 MeV). The sensitivity of the spin-flip probability to the spin transferred to the nucleus will be used to investigate the relative importance of $\Delta S = 0$ and $\Delta S = 1$ amplitudes in the transitions to these states. The elastic scattering measurements are aimed at identifying contributions due to nonzero angular momentum transfer in the elastic scattering.

Exp. 632

CAN PROTON DENSITY DIFFERENCES BE EXTRACTED FROM MEDIUM ENERGY p-NUCLEUS ELASTIC SCATTERING DATA?

University of Texas, Austin

M. Barlett and G. W. Hoffmann, Spokesmen

R. Ferguson, J. Marshall, J. McGill, E. C. Milner, L. Ray, C. Sorenson

Massachusetts Institute of Technology
W. Bertozzi, S. Kowalski

Using the HRS and an 800-MeV polarized beam, we will determine accurate cross section and analyzing power ratios (as a function of scattering angle) for elastic scattering from the isotone pairs: ^{39}K-^{40}Ca, ^{56}Fe-^{58}Ni, and ^{90}Zr-^{92}Mo.

Using model-independent techniques and the KMT formalism, we will analyze the experimental ratios to obtain empirical matter density differences. According to Hartree-Fock theory, these differences are expected to be due mainly to differences in the proton distributions. Since the charge density differences are already known from electron scattering experiments, a comparison of our results with the electron scattering results will provide a test of our ability to make meaningful statements about matter density differences in general.

The HRS will be moved in increments of 1.5° to span the laboratory angular range 3.5 to 29.0°. The MBD cut will be utilized as necessary to guarantee sufficient statistical accuracy ($\lesssim$1%) of the binned ($\simeq$0.2°) elastic angular distribution data for reasonably short running times ($\lesssim$1-h total per nucleus per HRS angle setting for the larger angles). A total time of 150 h is requested.

Exp. 633

MEASUREMENT OF p-p SCATTERING IN THE COULOMB INTERFERENCE REGION BETWEEN 300 AND 800 MeV

University of California, Los Angeles
F. Irom and G. Pauletta, Spokesmen
B. Aas, S. M. Haji-saeid, G. Igo, C. A. Whitten
University of Minnesota
M. Gazzaly
LASL
J. B. McClelland

We will measure the differential cross section and analyzing power for p-p scattering at energies ranging between 300 and 700 MeV, and at angles ranging between 0 and 10° in the laboratory system.

This measurement will be performed in Line B, using the EPB channel. The experimental method for the N-N small angle has been established in the course of Exp. 289. In this method the forward angle elastic scattering cross section and analyzing power are obtained from measurements in a gas cell of the energy spectra for the recoil target particles.

A number of measurements between 300 and 800 MeV would be quite interesting. There are some available data between 300 to 800 MeV but the data is sparse and most have large errors. An exception is the data of Aebischer, et al. These authors have measured $A_y\theta$ and $d\sigma/dt$ at energies ranging between 300 to 600 MeV with better than average accuracy. However, there is a pronounced discrepancy between their values for ρ (ratio between real to imaginary part of the spin independent nuclear term) and those of the Arndt phase shift prediction and FDR calculations (Fig. 1). We feel that it is important to resolve this discrepancy. The measurements we propose will span the energy region covered by the data of Aebischer and overlap with other presently approved measurements at LAMPF.

Exp. 634

MEASUREMENT OF PARITY VIOLATION IN THE p-NUCLEON TOTAL CROSS SECTIONS AT 800 MeV

LASL

R. Carlini and R. L. Talaga, Spokesmen

J. D. Bowman, R. E. Mischke, D. E. Nagle

University of Illinois

V. Yuan, Spokesman

H. Frauenfelder, R. Harper

No Summary Available

Exp. 635

SPIN MEASUREMENTS IN pd ELASTIC SCATTERING

LASL

B. E. Bonner, Spokesman

W. D. Cornelius, J. B. McClelland, M. W. McNaughton

University of California, Los Angeles

G. J. Igo and M. Bleszynski, Spokesmen

B. Aas, E. Bleszynski, G. Pauletta, M. Hajisaeid, F. Irom, A. Rahbar

University of Texas, Austin

C. L. Hollas, R. D. Ransome, P. J. Riley

As part of the program for determining the spin dependent NN amplitudes at LAMPF energies, we are proposing to measure the spin rotation and depolarization parameters in the $\vec{p}d \rightarrow \vec{p}d$ reaction. In the context of a Glauber calculation, these measurements will yield new information on the double spin-flip parts of the T = 0 NN interaction. A rigorous check on our ability to extract this information will be obtained by measurements made at 0.5 GeV where these amplitudes are known.

One of the merits of this proposal is that for the angular range that can be covered in EPB, measurements will not be undertaken at HRS where scheduling conflicts caused by spin directions other than N-type arise. Unfortunately, the very small angles cannot be covered at EPB; hence, the HRS measurements will concentrate on these angles.

Exp. 636

A MEASUREMENT OF THE WOLFENSTEIN POLARIZATION PARAMETERS D_{LL}, D_{SL}, K_{LL}, AND K_{SL} FOR p-p ELASTIC SCATTERING

University of Texas, Austin

C. L. Hollas, Spokesman

R. D. Ransome, P. J. Riley

LASL

B. E. Bonner, W. D. Cornelius, E. W. Hoffman, M. W. McNaughton, O. B. van Dyck, R. L. York

Argonne National Laboratory

K. Imai, K. Toshioka

Rice University
J. B. Roberts, S. E. Turpin

The objective of the proposed experiment is to measure the proton-proton elastic scattering Wolfenstein observables D_{LL}, D_{SL}, K_{LL}, and K_{SL} at 650 and 800 MeV incident proton energies over a range of center-of-mass angles 30 to 90° for the depolarization parameters and 40 to 90° for the transfer parameters. The EPB beam line polarization precession system will be used to provide the polarization direction of the incident beam either longitudinally or sideways. The longitudinal polarization component of the scattered particle will be precessed 90° to sideways by a dipole magnet. This resulting sideways component will be analyzed by the recoil proton polarimeter JANUS.

Exp. 637

A MEASUREMENT OF THE VECTOR POLARIZATION OF THE DEUTERON IN THE REACTION $pp \rightarrow d\pi^+$

LASL
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University of Texas, Austin
C. L. Hollas, R. D. Ransome, P. J. Riley
Rice University
S. Turpin
TRIUMF
J. A. Niskanen

We propose new measurements for the $pp \rightarrow d\pi^+$ reaction. They consist of the vector polarization and vector polarization transfer for the deuteron using an unpolarized and polarized proton beam. The unpolarized proton beam is obtained simply by averaging over the initial states of the polarized beam. These parameters, when expressed in terms of the reaction amplitudes, probe a completely new combination of these amplitudes and therefore will test predictions of the various models of the reaction at a new level.

Exp. 638

A SEARCH FOR OSCILLATIONS USING MUON-NEUTRINOS

University of Maryland
T. W. Dombeck, Spokesman
LASL
T. J. Bowles, R. L. Burman, J. S. Frank, C. M. Hoffman, H. S. Matis

We propose to search for evidence of muon-neutrinos oscillating into electron-neutrinos using muon-neutrinos from pion decays in flight at LAMPF. The experiment will also be sensitive to the disappearance of muon-neutrino flux as a function of distance from the source due to other oscillation modes. The modular detector we propose for this experiment consists of alternating layers of liquid scintillator and proportional drift chambers with a fiducial mass of 50 tons. After

100 days of running time, we will be able to set an upper limit of $\Delta m^2 < 0.025$ eV^2 for the muon-electron neutrino mass squared difference and $\Delta m^2 < 0.20$ eV^2 in the muon-neutrino disappearance experiment with fine sensitivity to mixing parameters well below the Cabibbo angle. We discuss the requirements that this experiment places on a new neutrino beam proposed for LAMPF.

Exp. 639

MUON SPIN ROTATION STUDY OF MUON BONDING AND MOTION IN SELECTED MAGNETIC OXIDES

LASL

C. Boekema, Spokesman

R. H. Heffner, R. L. Hutson, M. Leon, C. E. Olsen, M. E. Schillaci

University of Wyoming

A. B. Denison, Spokesman

Technical University of Eindhoven, The Netherlands

V.A.M. Brabers

AERE, Harwell (UK)

A. M. Stoneham

The technique of muon spin rotation (μSR) will be used to probe the local magnetic fields in the interstitial regions of a set of magnetic oxides. One goal of this work is to understand the interaction of the muon with its atomic environment. Implied in this goal is an understanding of the muon motion at higher temperatures and the chemical bonding at lower temperatures. The manner in which the muon affects its own chemical environment is to be understood. The magnetic oxides chosen, which possess known magnetic behavior, are particularly helpful hosts in this endeavor. Our study will begin with temperature- and field-dependent measurements on ilmenite ($FeTiO_3$), erbium orthoferrite ($ErFeO_3$), and magnetite (Fe_3O_4). We feel reliable measurements can be made in 30 shifts.

Exp. 640

TRANSVERSE AND LONGITUDINAL FIELD μSR MEASUREMENTS IN SELECTED TERNARY METALLIC COMPOUNDS

Rice University
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LASL
R. H. Heffner, Spokesman
C. Boekema, R. L. Hutson, M. Leon, M. E. Schillaci, J. L. Smith
University of California, Riverside
D. E. MacLaughlin, Spokesman

The proposed work will use muon spin rotation (μSR) to examine the properties of some ternary metallic compounds which exhibit both superconductivity and magnetic order. The advantages of the μSR technique for studying these systems are: (1) the ability to measure depolarization in zero and low fields, (2) the ability to measure short relaxation times (compared to NMR) and the capability of measuring both T_1 and T_2. The first samples to be measured will be $Lu_{1-x}Ho_xRh_4B_4$, for x = 0,1 and ~0.7. $LuRh_4B_4$ has a superconducting transition at $T_c = 11.5$ K, whereas $HoRh_4B_4$ has a ferromagnetic transition at $T_M \simeq 6.8$ K. The mixed system ($x \simeq 0.7$) has a superconducting transition at $T_{c1} \simeq 7.4$ K and a ferromagnetic transition at $T_{c2} \simeq 4.2$ K. We will examine these systems using finite (transverse and longitudinal) and zero-field μSR to measure internal field inhomogeneities and rare-earth ion fluctuation rates throughout the temperature range $T \leq T_{c1} + 20$. We will specifically address important questions such as: 1) Does the onset of superconductivity affect the spin dynamics in the paramagnetic state and thus modify the magnetic ordering? and (2) To what extent does the onset of ferromagnetic order immediately suppress superconductivity (i.e., is there a spin-fluctuation regime in the superconducting state)? The μSR measurements will be compared to ^{11}B NMR and neutron scattering experiments on the same samples as is feasible. We request 250 h for these studies.

Exp. 641

MEASUREMENT OF CROSS SECTION AND ANALYZING POWERS FOR ELASTIC AND INELASTIC SCATTERING OF 400 TO 500 PROTONS FROM ^{14}C

University of Texas
C. J. Harvey, Spokesman
C. A. Goudling, P. A. Seidl
LASL
S. J. Seestrom-Morris, Spokesman
C. L. Morris
University of Minnesota
D. Dehnhard, D. B. Holtkamp
U. S. Air Force Academy
R. J. Joseph

We propose to measure cross sections and analyzing powers for elastic and inelastic scattering of 500-MeV polarized protons from ^{14}C for excitation energies up to 25 MeV. The nucleon-nucleon interaction is well known at this energy and the impulse approximation is probably still valid. The spin-dependent terms in the nucleon-nucleon interaction are more pronounced in this energy region, abetting the observation of two interesting spin-flip transitions: the two 4^- states at 11.7

and 17.3 MeV which have been seen in pion inelastic scattering. Data will be taken from 6° out to 36° in 2° steps. Among other states, we will measure angular distributions for the aforementioned 4^- states and the low-lying 2^+ states which appear to share the p-shell strength and are expected to have significant spin-flip components also. We plan to measure a cross section for the low-lying 0^- state at 6.9 MeV in ^{14}C which is separated by 100 keV from the nearest excited state and should be well resolved.

Exp. 642

REACTIVE CONTENT OF THE OPTICAL POTENTIAL - PHASE II

University of Texas, Austin
G. W. Hoffmann, T. McGill, Spokesmen
M. Barlett, R. Ferguson, J. Marshall, E. C. Milner, L. Ray, C. Sorenson
Rutgers University
C. Glashausser, K. Jones, S. Nanda
University of Maryland
E. F. Redish, S. J. Wallace

No Summary Available

Exp. 643

STRUCTURE OF STATES IN THE OXYGEN ISOTOPES VIA MEASUREMENTS OF THE SPIN DEPOLARIZATION AND SPIN ROTATION OBSERVABLES

University of California, Los Angeles
B. Aas, Spokesman
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LASL
M. V. Hynes, Spokesman
Lawrence Livermore Laboratory
B. Berman
University of Virginia
B. Norum
Massachusetts Institute of Technology
W. Bertozzi, J. Kelly, B. Murdock

We propose to measure elastic observables for the oxygen isotopes; for ^{16}O we also propose to measure observables for the low-lying isoscalar excitations. We will measure: 1) with a precision of 1.5% and 0.015, the differential cross section $d\sigma/d\Omega$ and analyzing power AP, respectively, for ^{17}O and ^{18}O from 2-30° lab, and 2) the spin rotation observables R, A, R', A' for ^{16}O, ^{17}O, and ^{18}O and D for ^{17}O from 5-25° with statistical accuracy of 0.015 at the smaller angles and absolute uncertainty of ≤ 0.04. The deduced observables

$$D\sigma/d\Omega\ ,\ AP(=P),\ Q,\ \text{and}\ \frac{|F^2| - |G^2|}{|F^2| + |G^2|}$$

will be analyzed using multiple scattering theory to deduce isotopic neutron mass distributions (INMD) for the oxygen isotopes. We anticipate that the INMD will be considerably better defined than was possible before because of the inclusion of spin rotation observables in the analysis. In the case of the low-lying isoscalar excitations in ^{16}O, we will deduce the Coulombic density. A subsequent phase of our plan of investigation of the oxygen isotopes is also briefly outlined.

Exp. 644

TESTS OF THE POLARIZATION-ANALYZING POWER EQUALITY IN ELASTIC SCATTERING OF INTERMEDIATE ENERGY PROTONS FROM NUCLEI

University of California
G. J. igo, Spokesman
B. Aas, E. Bleszynski, M. Bleszynski, M. Hajisaeid, F. Irom, G. Pauletta, R. Rahbar

We propose the following measurements to test for time reversal invariance in elastic scattering: D (depolarization parameter) in p + ^{2}H elastic scattering near t = -0.4 $(GeV/c)^2$, D in p + ^{209}Bi and p + ^{49}Ti elastic scattering for $0.2 \leq -t \leq 0.6$ $(GeV/c)^2$, A (asymmetry) and P (polarization) in p + ^{2}H elastic scattering near t = -0.4 $(GeV/c)^2$, and A and P in p + ^{209}Bi, p + ^{49}Ti, p + ^{208}Pb and p + ^{48}Ca at a t value where 1 - D is maximal for the first two. We propose to make these investigations at a bombarding energy of ≤400 MeV and at 800 MeV. Our objective is to measure P - A in p-d elastic scattering with experimental uncertainty of the order of 0.03. In p-^{209}Bi and p-^{39}Ti, we anticipate uncertainties below 0.03.

Exp. 645

A SEARCH FOR NEUTRINO OSCILLATIONS AT LAMPF

Ohio State University
T. Y. Ling and T. A. Romanowski, Spokesmen
Argonne National Laboratory
L. G. Hyman, B. Musgrave
Louisiana State University
R. Imlay, W. J. Metcalf
California Institute of Technology
R. B. McKeown

We propose a program at LAMPF to search with highest sensitivity for neutrino oscillations in three different channels $\nu_e \rightarrow \nu_e$, $\bar{\nu}_\mu \rightarrow \bar{\nu}_e$ and $\nu_\mu \rightarrow \nu_\mu$ and wish to achieve our objective in the stages as follows.

I. Construction of neutrino detector and a shielding culvert at the existing beam Line-A. In this phase we will search for ν_e disappearance and the process $\bar{\nu}_\mu \rightarrow \bar{\nu}_e$. This experiment can be performed at LAMPF with high sensitivity unmatchable elsewhere. In order to suppress the background we plan to investigate the detection of neutrons in the reaction $\bar{\nu}_e + p \rightarrow e^+ + n$ as suggested by the PAC. LAMPF at this time is the only existing source of intense ν_e and $\bar{\nu}_\mu$ beams with some unique characteristics as compared to the neutrino beams at reactors or other accelerators which make our program competitive and complementary to other experiments on this important subject. The early construction of the culvert should not interfere with the present

neutrino experiments E-225 and E-609. It will also allow another series of timely experiments to take data soon and run concurrently, thus, enhancing the utilization of the LAMPF proton beam.

II. At the time of completion of the experiments E-225 and E-609, about two years from now we propose to rearrange present beam stop to accommodate an in-flight ν_μ beam. This would become the most intense source in existence of low-energy ν_μ which would enable us to pursue search for ν_μ disappearance with high sensitivity and excellent background rejection. Such a facility will use all of the available proton flux at LAMPF with least impact on the scheduling of the accelerator. The construction of such a facility is technically feasible and will be cost effective as compared to other possible alternatives.

III. The Neutrino Detector — The proposed neutrino detector with capabilities for tracking particle velocity, range and ionization measurements, as well as the active cosmic ray shield will enable us to sharply identify the required neutrino events. The detector does not require development of any novel techniques and its construction is relatively straight forward and it is modular.

IV. Future Neutrino Program at the Proton Storage Ring (PSR) — The use of the microstructure of the PSR will virtually eliminate the cosmic ray background in a neutrino experiment performed there. We suggest several neutrino experiments for which PSR neutrino beams and our detector would be particularly suitable. Our detector could be readily installed at a PSR neutrino facility.

V. We feel that the proposed program for the search of neutrino oscillations is timely and an important physics which we are prepared to pursue with total commitment. Our time and cost estimates for building the neutrino detector shows that it could be possible to start equipment testing and assembly of the experiment in about 12 months from the approval of the experiment. As the detector modules are built we plan to progressively assemble the modules at LAMPF, thus reducing the installation time. Preliminary data taking with a partially completed detector should commence in the fall of 1982. We will interact with the LAMPF staff in construction of a new neutrino facility in Beam A and could provide some of the required engineering expertise from our home institutions.

Exp. 646

HYPERFINE STRUCTURE OF MUONIC HELIUM-3 AND MUONIC HELIUM-4 ATOMS

Yale

V. W. Hughes and P. O. Egan, Spokesmen

We propose two measurements on hyperfine structure intervals of muonic helium atoms:

Part I. The first measurement of $\Delta\nu$ for the $^3He\mu^-e^-$ atom with an expected accuracy of 50 ppm or better.

Part II. Additional measurements using different transitions for the $^4He\mu^-e^-$ atom to determine $\Delta\mu$ to about 5 ppm and μ_{μ^-}/μ_p to about 30 ppm. These measurements test the theory of atomic hyperfine structure to high accuracy and also provide the most precise direct measurement of the ratio of the negative muon to proton magnetic moments.

Exp. 647

A NEUTRON OSCILLATION EXPERIMENT AT LAMPF

LASL
R. J. Ellis, Spokesman
J. D. Moses, A. Taylor

It is proposed to search for neutron oscillations at the 135° neutron port at the LAMPF beam stop. A novel detector is proposed which is simple to construct and moderate in cost. It has a detection efficiency of 47%. The charged cosmic-ray background rate is of order 10^{-8} per day. The main source of backgrounds is from neutral cosmic rays. With reasonable amounts of shielding this amounts to five 10^{-2} counts per day. It is possible to put a limit of 10^6 s on the neutron mixing time τ, in 100 days running.

LAMPF is a unique facility to do this experiment because it is the most intense pulsed neutron source in the world. The experiment has been designed to exploit the pulsed structure of the beam to reduce backgrounds.

No civil engineering is required. No structures to be moved. No modifications to the machine are required. No change in the mode of operation of the machine are requested.

The limit on τ could be extended to 10^7 s in a second phase of the experiment if a cold moderator is added.

Exp. 648

TEST OF EQUIPMENT FOR THE MEASUREMENT OF THE Σ^- FOR THE MAGNETIC MOMENT AT BNL

Boston University
J. Miller, Spokesman

This experiment will use the Test Channel in a parasitic mode.

Exp. 649

ASYMMETRY MEASUREMENTS OF THE (p,$\pi^{\pm}$)REACTIONS ON ^{6}Li and ^{9}Be AT 650 MeV

University of Texas, Austin
B. Hoistad, Spokesman
M. Barlett, G. W. Hoffmann
Massachusetts Institute of Technology
G. S. Adams
University of Minnesota
M. M. Gazzaly

We propose to use the HRS spectrometer facility to study the asymmetry in positive and negative pion production from the (p,π) reaction on nuclei, induced by polarized protons of about 650 MeV. New (p,$\pi^{\pm}$) data indicate that the analyzing power is sensitive to the incident proton energy, the nuclear structure involved, as well as the charge state of the pion. It is therefore likely that such measurements should give important information about the reaction process. This is also suggested by current theories of the (p,π) reaction.

Exp. 650

A SEARCH FOR NEUTRINO MIXING VIA NONEXPONENTIAL $\pi \rightarrow \mu\nu$ DECAY

Los Alamos National Laboratory
J. D. Bowman, Spokesman
Tel Aviv University/Los Alamos National Laboratory
M. A. Moinester

We propose to search for neutrino mixing via measurements of a modulation of the exponential time dependence of the appearance probability of muons in the decay $\pi \rightarrow \mu\nu$. The muon appearance probability at a point x and a time t from a pion stopped at x = 0, t = 0 is given by:

$$|A(x,t)|^2 = \frac{1}{\tau} e^{-t/\tau}\left[1 + \sin 2\delta \cos 2\pi\left(\frac{t}{T} - \frac{x}{\lambda}\right)\right] .$$

For neutrino mass splittings of the order of hundreds of $(ev)^2$, T and λ have laboratory sizes. Furthermore, the fraction of oscillation is *first-order* in sin 2δ, allowing previously nonaccessible regions of (δ, mass) space to be studied.

Exp. 651

MEASUREMENT OF A LOWER LIMIT FOR THE SUBTHRESHOLD PRODUCTION OF KAONS WITH 800-MeV PROTONS

Los Alamos National Laboratory
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University of Texas, Austin
B. Hoistad

We intend to use the EPICS channel and spectrometer to look for delayed muons arising from stopped kaon decays in the A-1 production target, and consequently to place limits on the p + ^{12}C subthreshold kaon production cross section. This measurement should provide a useful bound for current models of this rare process and will be useful in designing future experiments to investigate hypernuclear levels and reaction mechanisms for subthreshold kaon production. In a preliminary run we were able to show the feasibility of the experiment, and we established an upper limit of 10 pb/sr for the angle averaged $d\sigma/d\omega$ for kaon production (see progress report attached to proposal). Data from this preliminary run shows that this upper limit can be improved by at least a factor of 10. Consequently we are requesting additional running time.

Exp. 652

TEST OF PROTOTYPE SEMICONDUCTOR DETECTORS

University of Oklahoma
P. Skubic
G. Kalbfleisch
Fermi National Laboratory
M. Johnson, C. Nelson

Ohio State University
J. Kalen, S. Kuramata, N. W. Reay, K. Reibal, R. Sidwell, N. R. Stanton

No summary available.

Exp. 653

MUONIC X-RAY STUDY OF ^{241}Am AND ^{243}Am

Los Alamos National Laboratory
E. B. Shera and M. W. Johnson, Spokesmen
M. V. Hoehn, M. W. Johnson, H. D. Wohlfahrt
Princeton University
R. A. Naumann, Spokesman
Oak Ridge National Laboratory
C. E. Bemis, Jr.

We propose to measure the energy levels of muonic ^{241}Am and ^{243}Am with a high-precision Ge(Li) spectrometer system. The primary objectives of this work are to measure nuclear charge distribution parameters for these nuclides, which will be the heaviest ever studied with muonic-atom techniques, and in particular to determine the shift in mean-square radius $\delta(r^2)_{243\text{-}241}$ between the isotopes. The latter quantity is of great importance in its implications for an optical isomer-shift study of the ^{240f}Am fission isomer. The experiments will be done at the SMC with the P^3 apparatus used on the previous proposals 334 and 495.

Exp. 654

MEASUREMENT OF THE SPIN-ROTATION PARAMETER Q FOR 800 MeV p + ^{16}O, ^{40}Ca AND ^{208}Pb ELASTIC SCATTERING

University of Texas, Austin
G. W. Hoffmann, Spokesman
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Los Alamos National Laboratory
J. F. Amann, J. B. McClelland
University of California, Los Angeles
G. J. Igo

Using the HRS and an 800-MeV L- and S-type polarized beam, we will measure the spin-rotation parameter, Q, for p + ^{16}O, ^{40}Ca and ^{208}Pb over the laboratory angular range 2 to 15.5° (^{40}Ca and ^{208}Pb) [2 to 23° (^{16}O)]. These data will be used to test medium energy scattering theories which employ medium corrections to the impulse approximation.

Exp. 655

$\pi^{\pm}$INELASTIC SCATTERING FROM ^{4}He: AN EXAMINATION OF ISOSPIN-SYMMETRY BREAKING

University of Minnesota
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D. Dehnhard
New Mexico State University
W. B. Cottingame, Spokesman
G. R. Burleson, S. J. Greene
Florida State University
D. Halderson
Los Alamos National Laboratory
M. V. Hynes
University of Colorado
E. R. Siciliano

For the last 15 years, the comparison between photo-proton and photo-neutron disintegration of ^{4}He has provided startling evidence of large isospin mixing in the A = 4 system. Recently, Calarco and Berman have concluded from an exhaustive, global data comparison that the isospin mixing needed to explain the data is far in excess of that attributed to the Coulomb force, which is small for the Z = 2 nucleus.

We propose to use π^+/π^- comparison in inelastic scattering from ^{4}He to test the hypothesis that there is large isospin mixing in this nucleus. Such comparisons have proved to be a very sensitive and accurate measure of isospin mixing in ^{12}C and ^{16}O.

As a simultaneous goal, we also would search for evidence of Δ-hole admixtures in low-lying excited states, as has been recently proposed by Bohr and Mottelson.

The total time requested for this experiment is 336 hours.

Exp. 656

PION DOUBLE CHARGE EXCHANGE ON SELF-CONJUGATE NUCLEI

New Mexico State University
S. J. Greene, Spokesman
G. R. Burleson, W. B. Cottingame
Los Alamos National Laboratory
C. L. Morris, Spokesman
University of Minnesota
D. B. Holtkamp
University of Pennsylvania
H. T. Fortune, Spokesman
L. Bland, M. Carchidi
University of Texas
C. F. Moore

We propose to measure DCX excitation functions from the T = 0 nuclei ^{28}Si and ^{40}Ca, at EPICS. We have several uses for the data, complementary to previous data. The ^{28}Si data will be used in conjunction with our previous ^{26}Mg data to extend our two-amplitude analysis of DCX. Similarly, the ^{40}Ca data will be used with previous ^{42}Ca data.

Of all π-nuclear reactions, only nonanalog DCX resembles strongly the (3,3) resonance energy dependence. This may indicate that the reaction proceeds simply through Δ formation in the intermediate state, or that the final states involve a Δ-hole component in their wave functions.

Exp. 657

INELASTIC $\pi^{\pm}$ SCATTERING FROM THE N = 28 ISOTONES

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Los Alamos
C. L. Morris
University of S. Carolina
G. S. Blanpied

Wave function calculations are often tested by comparing Eigen energies and electromagnetic decay rates that are predicted with experimental measurements. However, often more stringent tests can be made using information gained from detailed measurements of the transition densities from inelastic scattering. Indeed, electron inelastic scattering has proven very useful in this respect. In the present experiment we hope to provide complementary data about the neutron transition densities that can be used to test wave function models.

We will measure inelastic scattering of $\pi^{\pm}$ to collective states in the neutron magic N = 28 isotones: ^{48}Ca, ^{50}Ti, ^{51}V, ^{52}Cr, and ^{54}Fe. For most of these isotones, form factors and consequently transition densities, are well known from inelastic electron scattering at momentum transfers from 0.5 to 1.7 $\hbar$ fm^{-1}. As a consequence we can compare π^{+} scattering (scattering mainly from protons) with DWIA calculations using these well known proton transition densities, and we can determine the transition densities for the neutron components in the wave function from the π^{-} inelastic scattering.

Exp. 658

STUDY OF THE SPIN-FLIP PROBABILITY FOR ELASTIC AND INELASTIC SCATTERING FROM ODD-MASS NUCLEI

Los Alamos National Laboratory
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W. D. Cornelius, J. B. McClelland
University of Minnesota
D. Dehnhard, Spokesman

We propose to use the HRS focal plane polarimeter to measure the spin-flip probability in elastic scattering from ^{7}Li and ^{51}V and in inelastic scattering to three states in ^{13}C; 1/2^{+} (3.09 MeV), 1/2^{-} (8.86 MeV), and 9/2^{+} (9.5 MeV). The sensitivity of the spin-flip probability to the spin transferred to the nucleus will be used to investigate the relative importance of $\Delta S = 0$ and $\Delta S = 1$ amplitudes in the transitions to these states. The elastic scattering measurements are aimed at identifying contributions due to nonzero angular momentum transfer in the elastic scattering.

Exp. 659

SPIN-FLIP GIANT RESONANCE EXCITATION

University of Pennsylvania
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H. T. Fortune, M. Carchidi
University of Texas
C. F. Moore, Spokesman
P. A. Seidl, R. Kiziah, S. Elston, G. Nelson, C. J. Harvey
Los Alamos National Laboratory
S. J. Seestrom-Morris, C. L. Morris
New Mexico State University
S. J. Greene

In inelastic pion scattering from ^{12}C and ^{12}O, one of the strongest peaks in the spectra corresponds to a level or group of levels at 25.5 MeV (Γ = 5 MeV) in ^{12}C, and at $\simeq$22 MeV ($\Gamma \simeq$ 2 MeV) in ^{16}O. Cross section angular distributions in both ^{12}C and ^{16}O, as well as an excitation function measured at q = 165 MeV/c in ^{16}O, suggest a spin-flip mechanism and a spin assignment of 1^- or 2^- for this complex of states. A comparison with DWIA calculations, using simple particle-hole form factors, indicates this state must contain a large fraction of the T = 0, $J^\pi = 1^-$, $\Delta L = 1$, $\Delta S = 1$ (isoscalar dipole spin flip) strength in both nuclei. In order to establish this state as a new giant resonance, we propose to search for it in the nuclei ^4He, ^{40}Ca, ^{90}Zr. In order to establish its $\Delta S = 1$ character in these nuclei as well as in ^{12}C, we also wish to measure excitation functions.

Exp. 660

MEASUREMENT OF POLARIZATION PARAMETERS FOR M1 TRANSITIONS IN THE $^{90}Zr(p,p')^{90}Zr^*$ AND $^{116}Sn(p,p')^{116}Sn^*$ REACTIONS AT 500 MeV

Rutgers

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J. McGill, K. Jones, S. Nanda

Michigan State University

G. Crawley

Los Alamos National Laboratory

J. B. McClelland, J. M. Moss

The observables Ay, D_{nn}, $D_{ss'}$, and $D_{\ell s'}$ will be measured at 500 MeV for the reaction $^{90}Zr(p,p')^{90}Zr^*$ and $^{116}Sn(p,p')^{116}Sn^*$ at small angles. A recent experiment carried out at Orsay at 200 MeV has tentatively identified strong M1 strength in the $^{90}Zr(p,p')^{90}Zr$ reaction at an excitation energy of about 8.9 MeV. We will attempt to confirm this identification by measuring the spin-flip probabilities for this resonance. We will also look for evidence of a similar resonance in ^{116}Sn where results from the previous experiment are not conclusive. In addition, the measurements should yield information about the isospin transfer.

Exp. 661

GOOD RESOLUTION STUDY OF $^{16}O(\pi,\pi')$

Los Alamos National Laboratory

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University of Pennsylvania

L. C. Bland, Spokesman

R. Gilman, H. T. Fortune

University of Minnesota

D. Dehnhard, D. B. Holtkamp

We propose to measure cross sections at ~160 MeV for $\pi^{\pm}$ inelastic scattering from ^{16}O with about 130-keV resolution, in order to resolve states not previously separable, and thereby to enable meaningful comparison between theory and experiment. We will also attempt to locate the high-lying 4^- stretched states arising from $1p_{3/2} \rightarrow 1d_{5/2}$ and $1d_{5/2} \rightarrow 1f_{7/2}$ excitations, respectively. We will search for population of T = 2 final states which should be excited, but which have not previously been observed in pion inelastic scattering on a T = 1 target. The new cooled gas target system will remove the problem of hydrogen contamination and hence make accessible the region of high excitation.

Exp. 662

ELASTIC AND INELASTIC π^- AND π^+ SCATTERING FROM ^{32}S, ^{31}P AND ^{90}Zr, ^{89}Y

University of Colorado

J. J. Kraushaar and R. J. Peterson, Spokesmen

T. G. Masterson, R. A. Ristinen, M. A. Rumore, E. R. Siciliano, J. L. Ullman

Los Alamos National Laboratory
R. L. Boudrie

It is proposed that the EPICS system be used to measure the π^- and π^+ elastic and inelastic cross section on two pairs of targets: ^{32}S, ^{31}P and ^{90}Zr, ^{89}Y at 140 MeV. Using good $\pi^\pm$ elastic data on ^{32}S and ^{90}Zr and the proton distributions as determined by electron scattering, optical model calculations will be used to help determine the neutron distributions for these two nuclei as well as the odd members of the pairs, where a proton has been removed.

The low-lying states of ^{31}P and ^{89}Y excited by $\pi^\pm$ will be examined in terms of the proton hole coupling with the excitations of the ^{32}S and ^{90}Zr cores. In the case of ^{89}Y and ^{90}Zr, the inelastic cross sections will also be compared to microscopic distorted wave calculations.

Exp. 663

ELASTIC SCATTERING OF POLARIZED PROTONS FROM ^{3}H AND ^{3}He AT INTERMEDIATE ENERGIES

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University of Minnesota
M. Gazzaly
Los Alamos National Laboratory
J. B. McClelland, M. V. Hynes

The objective of this experiment is to measure the neutron densities of ^{3}H and ^{3}HE. A second objective is to extract information about the double spin flip components of N-N amplitudes at small momentum transfers, which are especially important to know in connection with proton-nucleus elastic and inelastic scattering analysis on intermediate and heavy nuclei. The spin rotation and depolarization parameters will be measured out to 25°. The differential cross section and asymmetry will be measured out to momentum transfers of approximately 1.1 GeV/c. From the experience with the measurement of Q during the last cycle on ^{40}Ca and ^{206}Pb, we have the capability to make realistic evaluations of the time required to complete a measurement on two targets at one bombarding energy. Furthermore, we will present to the PAC at the meeting some examples of what kind of statistical and systematic uncertainties we can anticipate. We will compare these with predictions of the observables calculated using multiple scattering theory. In this way we can illustrate our sensitivity to the parameters of the neutron densities and the double spin-flip parts of the N-N amplitude.

Exp. 664

THE MEASUREMENT OF THE POLARIZATION TRANSFER COEFFICIENTS A_t^l AND D_t AT 500, 650 AND 800 MeV FOR THE REACTION $d(\vec{p},\vec{n})2p$

Texas A&M University
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T. S. Bhatia, J. C. Hiebert, R. A. Kenefick, L. C. Northcliffe
Argonne National Laboratory
R. Stanek, Spokesman
W. R. Ditzler, D. Hill, K. Imai, H. Spinka, K. Toshioka, R. Wagner, A. Yokosawa

Los Alamos National Laboratory
J. J. Jarmer, J. E. Simmons
New Mexico State University
G. R. Burleson, W. B. Cottingame, S. J. Greene

A series of neutron-proton scattering experiments utilizing a polarized neutron beam is being proposed by a collaboration of physicists from Argonne National Laboratory, Los Alamos National Laboratory, New Mexico State University, and Texas A&M University. The polarized neutron beam is to be produced via the reaction $d(\vec{p},\vec{n})2p$ at 0°. Initial experiments seek to measure $\Delta\sigma_L(np)$, $C_{LL}(np)$, and $C_{SL}(np)$ at 500, 650, and 800-MeV kinetic energies. Knowledge of the proton-to-neutron polarization transfer is required so that the neutron beam polarization may be inferred from polarization measurements of the primary H^- beam. One also wants to choose the spin direction for the proton beam that gives rise to the largest neutron polarization at 0°. Hence, we propose here to measure the spin transfer coefficients $A_t^l(0°)$ and $D_t(0°)$ for the $d(\vec{p},\vec{n})2p$ reaction.

Both $A_t^l(0°)$ and $D_t(0°)$ have been previously measured at LAMPF at 800 MeV (E-360). In order to verify the results and check our experimental technique we would like to remeasure at least one, and preferably both, of the parameters at 800 MeV Both A_t^l and D_t must be measured at 500 and 650 MeV since no 0° production data exists here.

Exp. 665

THE MEASUREMENT OF THE INITIAL STATE SPIN CORRELATION PARAMETERS C_{LL} AND C_{SL} IN n-p ELASTIC SCATTERING AT 500, 650 AND 800 MeV

New Mexico State University
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Argonne National Laboratory
R. Wagner, Spokesman
R. Ditzler, D. Hill, K. Imai, H. Spinka, R. Stanek, K. Toshioka, A. Yokosawa
Los Alamos National Laboratory
R. Damjanovich, J. J. Jarmer, J. E. Simmons
Texas A&M University
T. S. Bahtia, G. Glass, J. C. Hiebert, R. A. Kenefick, L. C. Northcliffe

As part of a program to determine the isospin zero nucleon-nucleon phase shifts at 500, 650, and 300 MeV, we propose to measure the elastic scattering initial state spin correlation parameters $C_{LL}(np)$ and $C_{SL}(np)$ at these three energies. By using a large solid angle spectrometer to detect and momentum analyze the recoil proton we will collect in a single setup enough data to provide greater than 10 points for each parameter, at each energy, over the c-m angular range of 80 to 135°. The experimental setup will be identical for the two parameters since only precession of the neutron spin direction by 90° is required to change from one parameter to the other. The experiment may be performed in line B using the 0° unchopped neutron beam or combined with the measurement of $\Delta\sigma_L(np)$ being proposed by the same collaboration.

Exp. 666

THE $^{12}C(p,p'\pi)^{12}C^*$ REACTION AND THE SEARCH FOR COHERENT ISOBAR-HOLE RESONANCES

Rutgers University
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University of California, Los Angeles
C. A. Whitten, Spokesman
Los Alamos National Laboratory
J. B. McClelland, H. A. Thiessen

The $^{12}C(p,p'\pi)^{12}C^*$ reaction will be studied at 800 MeV for small p' angles (5, 10 and 15°) and a fixed large pion angle (~170°). The HRS magnet field will be set to observe scattered protons corresponding to excitation energies between 200 and 300 MeV in ^{12}C, the so-called "delta" region. The aim of the experiment is to determine whether collective delta-hole nuclear resonances are excited. To distinguish between such resonances and ordinary quasi-free delta production, the pion counter will be sensitive only to pions of energy greater than about 70 MeV. Pions from the decay of quasi-free deltas will have energies smaller than 70 MeV, because of the large forward momentum of the deltas, whereas pions from the decay of a nuclear delta resonance should have energies corresponding to delta decay at rest.

Exp. 667

This experiment was entered in error.

Exp. 668

This experiment was entered in error.

Exp. 669

INVESTIGATION OF THE N = 28 NEUTRON SHELL CLOSURE BY ELASTIC SCATTERING OF 800 MeV POLARIZED PROTONS

Los Alamos National Laboratory
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L. Ray

We propose to use the High Resolution Spectrometer (HRS) facility to measure the elastic scattering of 0.8-GeV polarized protons from the chromium isotopes, $^{50,52,54}Cr$ in order to investigate the neutron shell closure at N = 28. The proton radius and distribution differences for the Cr isotopes are already known precisely from combined model-independent analyses of elastic electron scattering and muonic atom data.

In the simplest shell model configuration the neutron distribution of the ground state of the Cr isotopes consists of two neutron holes in the $1f_{7/2}$ shell (^{50}Cr), a closed $1f_{7/2}$ shell (^{52}Cr) and two neutrons in the $2p_{3/2}$ shell (^{54}Cr). Elastic electron scattering and muonic x-ray measurements for the Z = 28 proton shell closure indicate that such simple configuration assignments for the protons are consistent with the deduced charge distribution differences of the ground states.

The existing charge distribution data for the Cr isotopes will enable us to extract reliable neutron radius and neutron distribution differences from the proton scattering data. A detailed comparison of the distribution of both neutrons and protons with the predictions of calculations will therefore be possible.

Exp. 670

CONTINUATION OF GIANT RESONANCE STUDIES AT HRS

Los Alamos National Laboratory
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Massachusetts Institute of Technology
G. S. Adams, Spokesman
Texas A&M University
U. Garg
University of Minnesota
M. Gazzaly

We will continue to study the isoscalar giant resonances at the HRS. The time requested will be used to continue the survey of the newly discovered high-energy octupole giant resonance in light nuclei (^{16}O, ^{28}Si, and ^{40}Ca). We will also search for a possible isoscalar giant dipole resonance, believed to have been seen in ^{208}Pb with 172 MeV alphas. Additionally, a detailed study will be made of the giant quadrupole-monopole resonance region in ^{40}Ca in order to search for $\ell = 0$ strength and determine the distribution of $\ell = 2$ strength. Finally, our studies of the continuum underlying the giant resonance region will continue with the aid of polarized beam.

Exp. 671

EXPERIMENTAL INVESTIGATIONS OF ISOVECTOR PROPERTIES OF COLLECTIVE TRANSITIONS

Northwestern University
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D. Barlow, M. O. Kaletka, D. Kielczewska, O. Scholten, D. Smith

We propose to measure cross-sections for π^+ and π^- inelastic scattering to the low-lying collective states in the Pd isotopes. Van Isacker and Puddu have recently constructed a proton-neutron IBA model Hamiltonian, the parameters of which have been determined to give an excellent description of the properties of Pd and Ru isotopes. Using the wavefunction for the Pd isotopes, one finds that the ratio of the π^- to π^+ strengths, for the first excited 2^+ state, is predicted to increase from 2:1 to 3:1 as one goes from ^{104}Pd to ^{110}Pd. These ratios are approximately twice as large as those predicted from the hydrodynamic model. This indicates a rather large isovector component in the IBA wavefunction for the first 2^+ state, which if verified experimentally, would be an important and crucial test of the new microscopic IBA model.

Exp. 672

STUDY OF GIANT RESONANCES IN ^{90}Zr, ^{116}Sn, AND ^{208}Pb WITH π^+ AND π^- INELASTIC SCATTERING

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C. L. Morris
Massachusetts Institute of Technology
G. S. Adams

University of Minnesota
D. Dehnhard

We plan to measure cross sections for the excitation of giant resonances near 22 MeV in ^{208}Pb with 162 MeV π^+ and π^-. Angular distributions for π^+ will be measured in 3° steps from 15 to 45° in order to determine the multipolarity of the resonances excited. Three additional points will be measured with π^- to determine a ratio of $\sigma(\pi^+)/\sigma(\pi^-)$ for studying the isospin composition of these transitions. We also plan to measure cross sections for π^+ and π^- scattering from the well-known LEOR and low-lying 3^- state(s) in ^{90}Zr and ^{116}Sn. Their comparison will enable us to measure the effects of the N = 50 (^{90}Zr)) and Z = 50 (^{116}Sn) shell closures on the neutron and proton contributions to the $1\hbar\omega$ octupole strength distribution.

Exp. 673

MEASUREMENT OF THE ANGULAR DEPENDENCE OF TENSOR POLARIZATION IN THE $^2H(\pi^+,\pi^+)^2\vec{H}$ REACTION AT T_π = 180 AND 256 MeV

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J. S. Frank, M. J. Leitch, J. D. Moses
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E. J. Stephenson

We propose to measure the angular and energy dependence of the tensor polarization t_{20} in π-d elastic scattering in the angular range θ_{cm} = 90 to 145° and at $T_{\pi+}$ = 180 and 256 MeV. In Experiment 388, we demonstrated the feasibility of observing tensor polarization in π-d elastic scattering by measuring t_{20} at 180°. In addition, in Experiment 483 we measured the angular distribution of t_{20} at $T_{\pi+}$ = 142 MeV for angles θ_π = 98, 122, and 145°.

The purpose of studying the polarization in this reaction is to provide more information on the π-nucleus reaction which is most amenable to theoretical solution. Moreover, the tensor polarization is believed to be sensitive to the effects of true pion absorption. This sensitivity to absorption is not reflected in the differential cross section for π-d elastic scattering. The measurement at T_π = 256 MeV should be particularly interesting since the vector polarization data show rapid oscillations in the angular distribution. At present there is a controversy over whether these oscillations are produced by the presence of a dibaryon resonance or an absorption effect. Hopefully, the proposed tensor polarization measurements would resolve this issue.

The experiment should be performed at the P^3 area, where a π^+ beam would be directed onto a liquid deuterium target. A quadrupole doublet would be used to focus the recoil deuterons from the $^2H(\pi,\pi)^2\vec{H}$ reaction onto the polarimeter. An additional quadrupole doublet would be used to focus the elastically scattered pions into an array of scintillators.

Exp. 674

MEASUREMENTS OF PION-NUCLEUS ELASTIC AND DOUBLE CHARGE EXCHANGE SCATTERING AT ENERGIES ABOVE 300 MeV

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University of Texas, Austin
C. F. Moore
Argonne National Laboratory
B. Zeidman
University of Minnesota
D. B. Holtkamp

Nearly all high-quality measurements of pion-nucleus elastic, inelastic and double-charge-exchange (DCX) scattering have been made at energies below 300 MeV, largely because of the presence of the (3,3) resonance in the 100- to 300-MeV energy region, as well as the limitations of the existing instrumentation. As a result, much has been learned about the pion-nucleus interaction at these energies. For elastic scattering, theoretical models that have been used have been tailored somewhat to the features of this energy region, dominated by the (3,3) resonance, and they have given good fits to the data. With data at higher energy, near the next higher resonance, which is different in character from the (3,3) resonance, the validity of these models can be tested further. For (π^+,π^-) DCX scattering, the systematics of the reaction have shown an apparent simplicity in angular distributions, excitation functions, and variation with A. Since these features are not yet adequately understood, we believe that studies of this process over the region of the next higher resonance should help improve our understanding of it.

To begin such studies, we propose to make measurements on both of these processes at energies above 300 MeV, using the same experimental setup. For DCX scattering, we propose to measure (π^+,π^-) excitation functions at 5° for a T = 1 nucleus (^{14}C or ^{18}O) and a T = 0 nucleus (^{12}C or ^{16}O) for pion energies between 300 and 550 MeV. For elastic scattering, we propose to measure angular distributions for $\pi^\pm$ scattering on ^{14}C at 500 MeV, near the peak of the next higher resonance. Both of these measurements would involve the use of the large angle spectrometer in P^3.

Exp. 675

NUCLEAR DISTRIBUTIONS FROM THE STUDY OF THE 2P STATES OF PIONIC ATOMS

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California Institute of Technology
R. J. Powers

The experiment involves measurement of the 3d-2p x-ray transitions of pionic atoms for the isotopes ^{54,56,57,58}Fe and ^{58,60,62}Ni. The measurements will allow determination of the strong interaction shifts and line broadenings for the 2P states in these nuclei. The new results will be combined with previous measurements and the known proton distributions of these isotopes to extract information concerning neutron distributions. The study will also improve our knowledge of the optical model potential for the pion-nuclear interaction. Five days of beam time are requested to perform the measurements.

Exp. 676

STUDY OF PION ABSORPTION ON ^{58}Ni AT T_π = 160 MeV

University of Maryland

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Massachusetts Institute of Technology

R. P. Redwine, Spokesman

W. Burger

University of South Carolina

G. S. Blanpied, B. M. Preedom, B. G. Ritchie

Particle-particle correlations for $\pi^+ + {}^{58}$Ni at T_π = 160 MeV will be measured with 10 detector telescopes, in order to examine in detail the pion absorption process. The detector telescopes will provide a missing mass resolution of better than 5 MeV and a proton energy dynamic range from 9 MeV to the maximum energy. Furthermore, two telescopes will be capable of detecting charged particles down to energies as low as the evaporation peak. Although the system will measure the correlation at 45 coplanar angle pairs, primary emphasis has been placed on the examination of symmetry about the direction of the second proton emitted in the capture on an n-p pair, and symmetries about the beam direction. Additionally, coincidences of higher order (3-fold, etc.) will be measured simultaneously to provide information on the charged particle multiplicity in the absorption process. In order to examine the absorption process in detail a sufficiently long running time is requested to obtain well-defined energy spectra for all emitted hadrons with $Z \leq 2$ to be compared to p + ^{58}Ni inclusive spectra.

Exp. 677

A DETERMINATION OF $\Delta S = 1$ CONTRIBUTIONS IN INELASTIC PION SCATTERING FROM ODD-A NUCLEI

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D. Dehnhard

College of William & Mary

H. O. Funsten, Spokesman

D. Joyce

New Mexico State University

W. B. Cottingame, S. J. Greene, G. R. Burleson

Los Alamos National Laboratory

S. J. Seestrom-Morris, C. L. Morris, H. A. Thiessen

In inelastic transitions both values of spin transfer to the target ($\Delta S = 0,1$) are often allowed. There is great theoretical interest in determining the relative magnitude of the $\Delta S = 0$ and $\Delta S = 1$ contributions to natural parity transitions. However, determinations of spin-flip probabilities are difficult.

The measurements of excitation functions of pion inelastic scattering at constant momentum transfer between 100 and 200 MeV offers a new method of separating $\Delta S = 1$ contributions from the (often) larger $\Delta S = 0$ cross sections.

Using the wavefunctions of Brown, Chung, and Wildenthal, we select four good candidates for such a study in $^{27}Al(1/2^+$, 0.842 MeV), $^{35}Cl(1/2^+$, 1.22 MeV), $^{37}Cl(1/2^+$, 1.73 MeV), and $^{39}K(1/2^+$, 2.53 MeV). We propose to measure $\pi^{\pm}$ excitation functions for these nuclei at energies between 100 and 200 MeV.

Exp. 678

STUDY OF THE M1 TRANSITION IN ^{48}Ca BY INELASTIC SCATTERING OF π^+ AND π^-

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We propose a measurement of differential cross sections for π^+ and π^- inelastic scattering from ^{48}Ca at T_π = 116, 148, and 180 MeV. Special emphasis will be placed on a study of the neutron-proton composition of the quenched M1 transition to a 1^+ state at 10.23 MeV. This transition has recently been observed in (e,e') and its analog transition was seen in (p,n). It may play a crucial role in studies of the relation of the quenching of magnetic transitions and the role of $\Delta(1232)$ degreees of freedom in nuclei.

Exp. 679

A RADIOCHEMICAL STUDY OF THE $^{209}Bi(p,\pi^0)^{210}Po$, $^{209}Bi(p,\pi^-xn)^{210-x}At$, AND $^{209}Bi(p,p2\pi^-xn)^{209-x}$ At PION PRODUCTION REACTIONS AT 500 TO 800 MeV

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Recent activation studies of the $^{209}Bi(p,\pi^0)^{210}Po$ reacton, done by an IUCF-TRIUMF collaboration, at proton energies of 62 to 480 MeV suggest that pion production processes have significant cross sections at energies well below the free nucleon pion production threshold at $E_p \simeq 300$ MeV. Similar observations have been made in preliminary studies of the $^{209}Bi(p,\pi^-xn)^{210-x}At$ reaction

at BNL, IUCF, and TRIUMF. We propose to utilize radiochemical techniques to extend the $^{209}Bi(p,\pi^0)^{210}Po$ cross section measurements to LAMPF proton energies. Such techniques will be specifically designed to facilitate the evaluation of and correction for the large number of secondary reactions which typically plague such inclusive cross section measurements. Since some of the proton energies to be utilized in these experiments will exceed the threshold for multiple pion production ($E_p \simeq 600$), a survey of the $^{209}Bi(p,p2\pi^- xn)^{209-x}At$ reaction will also be attempted. Such measurements will serve to complement $^{209}Bi(p,\pi^- xn)^{210-x}At$ studies recently proposed at TRIUMF and the IUCF.

Exp. 680

ANGULAR DISTRIBUTIONS FOR $^{24,26}Mg(\pi^+,\pi^-)$ $^{24,26}Si$

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We propose a direct continuation of the (π^+,π^-) experiments initiated in Experiments 310/448. Double-charge-exchange (DCX) research should now look to see if various assumptions and ensuing ideas are verifiable. These experiments with $^{24,26}Mg$ targets will complement previous research, and seek to determine 1) whether anomalous minima are characteristics of below resonance DCX angular distributions from T = 1 targets, 2) whether a newly developed phenomenological picture of DCX is applicable to more than one case, and 3) additional evidence for and/or systematics of a second-order optical potential for π-nucleus interactions.

The experiment utilizes the EPICS facility with the small-angle DCX apparatus we have previously developed, the installation of which appears fairly routine.

Exp. 681

MEASUREMENTS OF LARGE-ANGLE PION-NUCLEUS SCATTERING WITH EPICS

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We propose to set up a modification of the EPICS system that would extend its range in angle from its present maximum of ~125 to 180°. There is good evidence that effects will be seen in this angular region that are not accounted for by current theories, which, nevertheless, fit the existing data very well over the present "normal" angular regions. Because of this, we desire to make it possible to extend measurements with EPICS, for both elastic and inelastic scattering as well as for situations corresponding to large pion energy loss, into the backward region, to explore the general character of interactions there, as well as to study the specific behavior of certain reactions. Our proposed modification involves inserting a circular magnet in the region of the present pivot point of the spectrometer, in a manner similar to what was done to allow for small-angle double-charge-exchange (DCX) scattering measurements. We also propose to check out and debug the system and make an initial set of measurements of backward elastic and inelastic scattering which we feel should reveal some of the general characteristics of cross sections in this region. These proposed measurements would check the only published data (for A > 4) in this

angular region, study some of the systematics of backward scattering for N = Z nuclei as a function of energy and A (over a limited range), investigate Coulomb effects, and study the effect of different neutron and proton distributions in a single nucleus, as seen in backward scattering. As with the DCX setup, this would become a general facility that could be used again for further measurements, as interest warrants.

Exp. 682

SEARCH FOR DIBARYON RESONANCES IN THE REACTION $\pi D \rightarrow p\pi n$ AT P_L^{π} = 200 to 600 MeV/c

Argonne National Laboratory

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New Mexico State University

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Recent experiments have provided evidence for the existence of dibaryon resonances. Most of this has centered about the two lowest mass resonances, the $^1D_2$ at 2.17 GeV/c and the $^3F_3$ at 2.22 GeV/c. Most efforts have involved the pp and γD elastic channels, however, the inelasticity of these resonances is believed to be large. Recently, a narrow anomaly was observed in the $\gamma D \rightarrow p\pi^- p$ channel, though it has an unresolved ambiguity in the T = 0,1 isospin assignment. This indicates the importance of measuring the $NN\pi$ channels.

We propose a kinematically complete set of measurements for the $\pi D \rightarrow p\pi n$ (T = 1) reaction channel. We will look for excess yield, versus invariant mass (compared to current theory), concentrating on the three lowest resonances, $^1D_2$, $^3F_3$, and the possible $^1G_4$ at 2.42 GeV/c. Observing the $^1G_4$ in the N-N channels is not possible at LAMPF energies. In particular, the same momentum range as in the γD experiment will be studied extensively with fine momentum steps (12 MeV/c) to eliminate possible ambiguity in the isospin assignment, as occurs in the γD channel.

We will utilize the P^3 beam line with the LAS pion spectrometer and a recoil proton arm. The pion and proton will be detected in coincidence. This apparatus will allow us to investigate the $N\Delta$ decay channel, as well as measuring the quasi-free scattering channel.

Exp. 683

MEASUREMENT OF $\Delta\sigma_L$ IN FREE NEUTRON PROTON SCATTERING AT 500, 650, AND 800 MeV

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The measurement of the total cross section difference for longitudinally parallel and antiparallel initial spin states in free neutron-proton scattering [$\Delta\sigma_L$(np)] at 500, 650, and 800 MeV kinetic energies is proposed. This will be the first measurement of this quantity at intermediate energies with a neutron beam and will check the quasi-free measurement made at the Argonne ZGS with a polarized proton beam and a deuterated polarized target. The experiment proposes to produce the neutron beam by collisions of the 40-ns-chopped, polarized proton beam in a liquid deuterium target. This will give the neutron beam a microstructure that will allow time-of-flight identification of neutron energy. The possibility of performing the experiment with an unchopped beam of 5-ns microstructure is also discussed.

Exp. 684

POLARIZATION EFFECTS IN THE DEUTERON PRODUCTION BY PROTON-NUCLEUS COLLISIONS

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We propose to measure the deuteron spectra from the nuclear A($\vec{p}$,d) reactions with HRS for forward angles. The regions of interest are those where the quasi-free processes $pd_A \rightarrow dp$ and $PP_A \rightarrow d\pi$ dominate the inclusive A(p,d) spectrum and are an identifiable part thereof. The purpose of the experiment is to study the origin of polarization effects in nucleon-nucleus interactions utilizing reactions for which the dynamics of the interactions are limited to one or two of the target nucleons.

Exp. 685

SPIN CORRELATIONS IN THE REACTION $\vec{p}(\vec{d},d)\vec{p}$ AT 500 MeV

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We propose to measure spin correlations in the reaction $\vec{p}(\vec{d},d)\vec{p}$ with the vector polarized deuterium target at 500 MeV in the angular range 2-30° in the deuteron laboratory system using the newly developed proton polarimeter at HRS. Such measurements will provide new selective information on the p-d collision matrix at intermediate energy. We shall be able to extract quantities sensitive to the spin components of the N-N amplitude, in particular those depending on the double spin-flip terms and the relative phases between the central, spin orbit and double spin-flip amplitudes. Our experiment will also provide a useful test of the multiple scattering theory at 500 MeV where the recent Q experiment in p-^{40}Ca has revealed an interesting disagreement between the data and the theory based on the NN input taken from the recent phase shift analysis.

Exp. 686

DETERMINATION OF NEUTRON TRANSITION DENSITIES IN ^{16}O AND ^{208}Pb BY INELASTIC SCATTERING OF ~400 MeV PROTONS

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We propose to measure cross sections for proton inelastic scattering at HRS for ^{16}O and ^{208}Pb at some energy between 300 and 500 MeV, which we believe to be the optimum range for the quantitative determination of inelastic transition densities. The main purpose of the experiment is to obtain neutron transition densities, by comparison of (p,p') with (e,e'), for a number of states in both nuclei, with special interest in the 1^-_1, 2^-_1 states of ^{16}O and the high spin (~1p - 1h) "stretched" states in ^{208}Pb ($I = 10^+, 12^+, 12^-, 14^-$). A secondary objective is to study the projectile energy dependence of the density dependent corrections to the free N-N force in nuclear matter (^{16}O).

Exp. 687

MEASUREMENT OF THE SPIN ROTATION PARAMETERS IN ^{208}Pb AND IN ^{40}Ca AT 400 MeV

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We propose to measure the spin-rotation parameters A, R, A' and R' in elastic scattering with 400-MeV polarized protons off ^{208}Pb and ^{40}Ca.

The measurement is to be performed with the focal plane polarimeter at HRS in the laboratory range of 4-16° for ^{208}Pb (i.e., momentum transfer 55-260 MeV/c in the CM-system) and of 6-25° for ^{40}Ca (i.e., 10-390 MeV/c in CM). The deduced observables P, Q, and S will be obtained with an accuracy of ≤ 0.03 over the whole angular range.

Together with data on $d\sigma/d\Omega$ an A_y obtained at TRIUMF, Q and S will be analyzed using multiple scattering theories. The comparison of these measurements on ^{208}Pb and ^{40}Ca with the same measurements at 500 MeV is important from a theoretical point of view, because the multiple scattering theories fail to describe the data taken at 500 MeV. At 400 MeV, one is below threshold for meson production in the measurement of the NN phaseshifts, used as input to the multiple scattering theories, whereas at 500 MeV one is not.

Exp. 688

STUDY OF THE MASS AND ENERGY DEPENDENCE OF LOW-ENERGY PION SINGLE CHARGE EXCHANGE

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A recent measurement of the reaction $^{15}N(\pi^+,\pi^0)$ at 50 MeV shows an angular distribution which is strongly backward peaked. This is qualitatively similar to the free nucleon charge-exchange angular distribuion, which is also strongly backward-peaked at 50 MeV. This suggests that the nucleus is extremely transparent. Standard theoretical calculations require large second-order terms for even a rough qualitative resemblance to the data. The aim of this experiment is to investigate the A-dependence and the energy-dependence of this behavior. To do this we propose to measure the angular distributions for pion single charge exchange on ^{40}Ca and ^{39}K at 50 and 80 MeV.

Exp. 689

A. NEUTRON COUNTER CALIBRATION USING TAGGED NEUTRONS FROM THE REACTION $\pi^-d \rightarrow nn$
B. FEASIBILITY STUDY: MEASUREMENTS OF THE DIFFERENTIAL CROSS SECTION FOR $\pi^-d \rightarrow nn$ TO TEST CHARGE SYMMETRY AND ISOSPIN INVARIANCE

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We propose to measure the detection efficiency of the UCLA neutron counters, used earlier in Exp. 58/120 [$d\sigma(\pi^-p \rightarrow \gamma n)$ and $d\sigma(\pi^-p \rightarrow \pi^0 n)$]. The expected precision of the measurement is 3 to 5% for neutrons with energies between 80 and 300 MeV. The calibration technique involves the use of a spatially well-defined, tagged neutron beam produced in the reaction $\pi^-d \rightarrow nn$.

The second part of the proposed experiment is a measurement of the differential cross section for $\pi^-d \rightarrow nn$ at four angles for T_π = 120-250 MeV. This measurement yields a test of charge symmetry by comparison to $pp \rightarrow d\pi^+$ and a test of isospin invariance by comparison to $np \rightarrow \pi^0 d$.

Exp. 690

SIMULATIONS OF COSMIC-RAY-PRODUCED GAMMA RAYS FROM THICK TARGETS

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This experiment will study the gamma rays emitted from the front surfaces of various thick targets bombarded by 800-MeV protons. The experiment will simulate the bombardment of a planet's surface by cosmic-ray particles. The results will help to plan for and to analyze data from future space missions that will determine the chemical compositions of the surfaces of the moon, planets, comets, or asteroids by measuring the cosmic-ray-produced gamma-rays that escape into space. LAMPF's external proton beam will simulate the energetic particles in the galactic cosmic rays. A target, which is sufficiently thick and wide, containing almost all primary and secondary particles, will simulate a planetary surface.

Different materials (iron, aluminum, calcium carbonate, magnesium, and granite) will be placed in a large steel sleeve. Two high-resolution germanium detectors will measure the gamma rays emitted from the thick target in the energy ranges of 50 to 600 keV and 0.6 to 12 MeV. Monitor foils will be placed at various positions inside each thick target. Polyethylene slabs will be inserted into these thick targets to study the effects of hydrogen on the fluxes of secondary neutrons inside the target and on the relative intensities of various emitted gamma-ray lines. Separate, high-proton flux runs will be made with foils that have lunar or meteoritic compositions and the depth-versus-activity profiles of cosmic-ray-produced radionuclides measured in extraterrestrial samples will be compared with profiles measured for the same radionuclides in the thick target.

Exp. 691

SIMULATION OF COSMIC-RAY PRODUCTION OF NUCLIDES BY SPALLATION-PRODUCED NEUTRONS

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Cosmic-ray-produced nuclides measured in lunar samples and meteorites are used to study the history of these objects and also of the cosmic radiation. Most nuclides made by cosmic rays are made by secondary neutrons. The cascade of secondary neutrons produced in extraterrestrial objects by cosmic rays is similar to that made at the LAMPF main beam stop. Determination of both absolute and relative cross sections for the production of nuclides by spallation neutrons

would help in interpreting the concentrations of these nuclides measured in extraterrestrial objects.

The irradiations would be performed in the rabbit line or stringers near the main LAMPF beam stop. The targets would be the elements from which the more interesting cosmic-ray produced nuclides are produced. The nuclides to be studied include ^{10}Be, ^{22}Na, ^{26}Al, ^{36}Cl, ^{53}Mn, ^{54}Mn, and most stable noble-gas nuclides (especially Ne and Xe). Packages of foils will be used to determine the fluxes of neutrons and the neutron energy spectra.

Exp. 692

Ge DETECTOR LOW-LEVEL RADIATION DAMAGE EQUILIBRATION EXPERIMENT

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Radiation damage produced in high-resolution Ge detectors in space by cosmic-ray or radiation-belt particles can seriously degrade their performance. In an experiment using high fluxes (~10^4 protons/cm s) of protons, the threshold for radiation damage in high-purity Ge detectors was for a proton fluence of about 10^8 protons/cm^2. This proton-induced damage was removed partially by annealing at room temperatue and was readily removed by thermal annealing at 100°C. We would like to see whether maintaining a Ge detector at room temperature or a slightly warmer temperature is a low flux of protons for a long period of time would cause a low equilibrium level of radiation damage. The proposed experiment would involve several long irradiations of high-purity Ge detectors with a low flux of energetic protons. The irradiations would occur at the end of the beam pipes in the Thin Target Area. Some absorbers will be used in the beam pipe to remote low-energy particles produced in the thin target The flux and energy spectrum of particles at the detector position will be determined. During the long irradiation of a detector, several simple paddles will be used to monitor the proton flux. The resolution of the detector will be measured several times a month and compared with its pre-irradiation resolution.

Exp. 693

INVESTIGATION OF THE TWO-PHOTON DECAY RATE FROM THE $(\mu^4He)^+_{2S}$ STATE AS A FUNCTION OF PRESSURE

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Negative muons at SMC (Cave A) will be stopped in helium gas targets of 1, 5, 10 and 20 atm. The photons from the two-photon decay of the $(\mu^4He)^+_{2S}$ state will be detected in delayed coincidence with the stopped muon. From this data we shall extract the lifetime of the state as a function of pressure. In addition, the fraction of stopped muons, which ultimately reach this state, shall be determined. These measurements will provide further information about this system,

which may give additional insights into the apparent lack of significant quenching of this state. Presently there are about three orders of magnitude discrepancy between the experimental and theoretical lifetime values for this state. Jim Cohen, T-12, Los Alamos, is currently doing some calculations on this system. In addition, we shall also attempt to determine, for the first time, the angular distribution between the two photons. This would serve as a further check that the photons we are observing are indeed coming from two photon decay.

Exp. 694

ISOSPIN MIXING IN ^{4}He

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The photoneutron and photoproton cross sections for ^{4}He differ by almost a factor of two in the region of the giant dipole resonance. If this observation is correct, it implies large isospin mixing. It is claimed that the required mixing is so large that it cannot be explained in Coulomb terms alone; one may need to invoke charge dependent nuclear forces.

It is proposed to measure π^+ and π^- inelastic scattering cross sections at $T(\pi) = 180$ MeV to independently verify the reported isospin mixing. The claimed mixing should lead to a ratio $\sigma(\pi^-)/\sigma(\pi^+) \simeq 3$, and permit an accurate analysis of the energy variation of isospin mixing in the entire excitation region 20-50 MeV.

Exp. 695

STUDY OF TRANSFER EFFECTS IN MUON CAPTURE IN GAS TARGETS

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Negative muons at SMC will be stopped in a 20 atm $^1H_2$ target containing dilute concentrations of other gases. The transfer of muons captured by the hydrogen to the dilute component will be studied by measuring the characteristic muonic Lyman x-ray intensities from these dilute components. In some cases, the electrons from the muon decaying in the 1S muonic state of the dilute atom will also be detected. Studies are proposed on $H_2 + N_2$, $H_2 + O_2$, $H_2 + Ne$ and $D_2 + O_2$ in order to test predictions of two different theories — due to Gershtein and Hoff et al. — for transfer from μp and μd to low-Z atoms. In addition, $H_2 + NO$ and $D_2 + NO$ will be studied in order to compare the transfer rates in binary gases. This may allow more definitive constraints to be placed on the magnitude of the effects due to electron shielding. Furthermore, delayed x-ray spectra from these low-Z elements will be acquired in order to get a better understanding of the Z-dependence effect and mesoatom transfer effect on characteristic muonic x-ray spectra. Studies are proposed on the $H_2 + Kr$ system for the same reason. Finally, we propose to study the $H_2 + Ar$ case in an attempt to resolve a reported discrepancy in the transfer rate at 26 atm and an unexplained relatively long-lived x-ray component in the Ar muonic Lyman series.

Exp. 696

THE ANGULAR DISTRIBUTION ANOMALY IN PION DOUBLE CHARGE EXCHANGE

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One of the most dramatic discrepancies between experimental data and conventional double-charge-exchange (DCX) theories is in the location of the deep minimum observed in the angular distribution of the analog DCX transition in the reaction $^{18}O(\pi^+,\pi^-)^{18}Ne$ at 162 MeV. It is pointed out that this discrepancy has been observed only in this one case so far, and it is not at all clear whether it represents a general feature of analog DCX transitions or whether it is a peculiarity of this one transition. It is proposed to settle this question by measuring differential cross sections for the g.s. analog transition in the reaction $^{26}Mg(\pi^+,\pi^-)^{26}Si$ at 180 MeV. It is shown that if the displacement of the minimum turns out to be a general feature, its explanation most likely lies in the isotensor $\rho^2(r)$ term in the pion-nucleus optical potential.

Exp. 697

NUCLEAR EXCITATION FOLLOWING MUON CAPTURE ON MEDIUM AND HEAVY NUCLEI

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Recent experimental and theoretical work has shown that muon capture on complex nuclei may leave the nucleus with as much as 80 MeV of excitation energy. This high-energy tail in the nuclear energy distribution (the average energy is 15-20 MeV) is required to explain the observed rate of proton emission, and to account for the presence of nucleons with energies in excess of 30 MeV. Within the last year, neutron multiplicities of six or more have been observed to accompany muon capture on bismuth and lead. Events of this type occur for nuclear excitations of 50 MeV or greater.

The puzzle presented by these findings has evoked three very different theoretical responses. In a recent Physical Review Letter it was suggested that two processes with high thresholds, high multiplicity neutron emission and preactinide fission, could serve to investigate the high-energy tail of the nuclear response function. Predicted rates for these processes are strongly model dependent.

In the proposal we describe how we would extend our previous work on muon capture gamma rays and make a systematic study of high multiplicity neutron emission. As a second component of our proposed program we discuss how an earlier experiment on actinide fission by muons and pions would be modified to investigate preactinide fission.

Results for zero neutron emission following muon capture in heavy nuclei have been somewhat confusing. Evidence from delayed gamma-ray studies in support of the scanty radiochemical findings has appeared only in recent work of our own. The experimental results are generally lower than the theoretical predictions. The proposed program, involving six medium-to-heavy nuclei, should clarify this situation.

Exp. 698

GROUND-STATE QUADRUPOLE MOMENTS OF DEFORMED NUCLEI

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It is proposed to determine the ground-state quadrupole moments of ^{151,153}Eu, ^{159}Tb, ^{167}Er, ^{177,179}Hf and ^{191,193}Ir with a precision of about 1%. The quadrupole moments will be measured by observing the hyperfine splittings of muonic M- and N- lines. The new data, of interest to nuclear structure theory, will also provide badly needed calibration points for the measurement of quadrupole moments of very rare or radioactive isotopes of these elements through Laser spectroscopy and atomic beam experiments.

Exp. 699

MEASUREMENTS OF SPIN FLIP AND DEPOLARIZATION PARAMETERS FOR ^{58}Ni(p,p')^{58}Ni* (6^+,T = 0) — A TEST OF THE SPIN-ORBIT FORCE IN NUCLEI AT 500 MeV

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We propose to measure the spin flip and rotation parameters $S_{\ell\ell'}$, $S_{ss'}$, $D_{\ell s'}$, and $D_{s\ell}$, (as well as A_y) at 500 MeV for ^{58}Ni (p,p') to the 6^+ T = 0 (5.13 MeV) state, at three lab angles. The state is a nearly pure (94%) 1p-1h, $(f^{-1}_{7/2}, f_{5/2})$ configuration and so uncertainties in the nuclear wave function are minimal. The purpose of the experiment is to determine the strength of the spin-orbit part of the N-N t-matrix (t_{Ls}) in nuclear matter. Current calculations using the free (Love-Franey) t-matrix in the DWIA are in agreement with experiment at 800 MeV (where the central force, t_o, dominates) but in disagreement at 500 and 333 MeV (where the spin-orbit force, t_{Ls} dominates).

Exp. 700

DOUBLE CHARGE EXCHANGE ON ^{40}Ar

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For pion energies near the Δ_{33} resonance, all theories of pion-induced double charge exchange (DCX) fail to explain any of the observed features of the data, other than a rapid decrease in cross section with target mass number, which is predicted and observed. On T = 1 targets of ^{18}O and ^{26}Mg, the forward-angle excitation function has a minimum near 180 MeV whereas theoretical calculations are roughly monotonic. On ^{18}O, calculations predict a minimum in the angular distribution at an angle of 34°, while the observed minimum is at 21°. Finally, all theories fail to account for the large cross sections observed for T = 0 targets. Thus, calculations fail in predicting energy, angular, and isospin dependence of the DCX cross sections.

A two-amplitude model has been used to describe the ^{18}O amplitude as the sum of a double-analog DCX amplitude and one arising from DCX on the ^{16}O core. That model uses the experimental ^{16}O cross section as input, rather than attempting to calculate it. It is possible to understand the energy and angular dependence of the ^{18}O DCX data within this simple model. And it is a challenge to theorists to arrive at a mechanism that will account for the DCX data on T = 0 targets.

A severe test of the two-amplitude model would be to measure the double-analog and non-double-analog (i.e., ΔT = 0 and 2, respectively) cross sections in the same nucleus. The lightest possible case involves an ^{40}Ar target, from which (π^+,π^-) goes to ^{40}Ca. The ΔT = 2 process will populate the ^{40}Ca(g.s.), whereas the ΔT = 0 amplitude leads to the analog 0^+ T = 2 state at 11.98 MeV.

For this experiment, we propose to use a liquid argon target with an effective areal density of about 2 gm/cm^2. We want to measure an angular distribution at 164 MeV and single-angle (5°) cross sections at two additional energies — 110 and 210 MeV. Our run-time estimates are based on one data point we have for DCX on ^{40}Ca at 164 MeV and 5°.

Exp. 701

PION DOUBLE CHARGE EXCHANGE ON SELF-CONJUGATE NUCLEI

Los Alamos National Laboratory
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H. T. Fortune, Spokesman
L. C. Bland, R. Gilman

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S. J. Greene
University of Texas, Austin
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No summary available.

Exp. 702

NUCLEAR STRUCTURE EFFECTS IN PION SCATTERING FROM $^{92\text{-}100}$Mo

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C. L. Morris, R. L. Boudrie
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J. McGill

It is proposed to measure the differential cross sections for π^+ and π^- elastic scattering and inelastic scattering to the low-lying collective states of the even isotopes $^{92\text{-}100}$Mo. The objective is to search for the explicit influence of nuclear structure as evidenced by residual shell effects on the scattering process. As the neutron number increases from N = 50 to N = 58, the valence neutrons fill out the $g_{9/2}$, $d_{5/2}$, and $s_{1/2}$ orbits. Meanwhile, the $(g_{9/2})^2$ proton configuration of the molybdenum isotopes remains relatively unaffected. Since π^- interacts primarily with valence neutrons and π^+ interacts primarily with valence protons, plots of the elastic cross sections against the neutron asymmetry $\epsilon = (N - Z)/A$ should have a smooth behavior for π^+ scattering and should show shell effects for π^- scattering. The data will be analyzed in terms of a recent model that incorporates a full treatment of isospin effects. They should also be useful for interpretations of neutron distributions in medium-mass nuclei.

Exp. 703

STUDY OF M4 STRENGTH IN ^{15}N BY π^+ AND π^- INELASTIC SCATTERING

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S. J. Greene

We propose to use π^+ and π^- inelastic scattering to identify M4 transitions in ^{15}N and to determine the neutron/proton character of these transitions. Angular distributions will be measured at

164 MeV to determine the multipolarity of the observed transitions. Cross sections will also be measured at 120 MeV to confirm that the candidates for M4 transitions have the energy dependence expected for a $\Delta S = 1$ transition. These data will be compared with existing data on M4 transitions in the p-shell to determine the systematics of the M4 strength within the p-shell. We will also obtain data on the low-lying states in ^{15}N for comparison with microscopic DWIA calculations.

Exp. 704

PION INELASTIC SCATTERING FROM ^{20}Ne

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University of South Carolina
G. S. Blanpied

We propose to measure inelastic π^+ and π^- scattering on ^{20}Ne at one incident energy of 164 MeV, using a cooled gas target containing enriched ^{20}Ne gas. The experiment will test the Brown-Fortune conjecture and should provide valuable information about the nature of the (π,π') reaction mechanism, in a nucleus whose structure is reliably known.

Exp. 705

STUDY OF PION ABSORPTION IN ^3He ON AND ABOVE THE (3,3) RESONANCE

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Argonne National Laboratory
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University of Virginia
R. Minehart, R. R. Whitney, G. Das
Kent State University
R. Madey, B. D. Anderson, J. Watson

Proton-proton angular correlation from the $^3He(\pi^+,2p)p$ reaction will be studied to determine the two-body ("quasi-deuteron") and three-body absorption cross sections. For each detection angle of one proton, the coincident proton will be detected over a large solid angle, and the measurement will be done for 4-5 detection angles. Proton-neutron angular correlation from the $^3He(\pi^-,pn)n$ reaction will be studied to determine the two-body absorption on the $^1S_0$ $T = 1$ proton pair. This measurement is complementary to the absorption studies on the ($^3S_1$ $T = 0$) deuteron and bears upon the nucleon-nucleon interaction, role of the Δ in the absorption process

and pion absorption in nuclei. The measurements will be done in the P^3 area utilizing the LAS spectrometer and four 40-in. by 10-in. by 4-in. plastic scintillators. The measurements will be done at 165-, 245-, and 315-MeV bombarding energies. Auxiliary measurements of the $^3He(\pi^+,\pi^+p)$ and $^3He(\pi^-,\pi^-n)$ will be done at one energy and one pion scattering angle in order to compare the relative momentum of a proton with respect to the p-n pair and of a neutron with respect to the p-p pair in ^3He. This is relevant for the absorption measurement where the momentum of the absorbing pair with respect to the third nucleon determines the width of the two nucleon angular correlation.

Exp. 706

UNPOLARIZED p-p DIFFERENTIAL CROSS SECTIONS AT $90°_{c.m.}$

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University of Zagreb, Yugoslavia

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Rice University

J. M. Clement, M. D. Corcoran, G. S. Mutchler, G. P. Pepin, G. C. Phillips, J. B. Roberts, S. E. Turpin

Recent theoretical speculation on the existence of dibaryon resonances has still not ruled out the possibility that much of what is seen as unusual behavior in p-p collisions at momenta between 1 and 3 GeV/c is an interference effect. In order to be definite about resonances or interference effects one needs to separate spin singlet and spin triplet behavior in p-p systems. This experiment proposes to measure $d\sigma/dt$ at $90°_{c.m.}$ in more finely spaced energy steps than currently existing data have been measured in order to unravel spin dependence. Since the behavior of this quantity is drastically different for non-smooth behavior in the singlet and triplet parts of interaction, this should be of help in isolating whether the unusual behavior is in the singlet or triplet part. The energies were chosen to span the region where the most interesting deviations from smooth behavior occur.

Exp. 707

STUDY OF TRANSFER EFFECTS IN MUON CAPTURE IN GAS TARGETS

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Princeton University

R. A. Naumann, J. Zumbrow

Negative muons at SMC will be stopped in a 20 atm $^1H_2$ target containing dilute concentrations of other gases. The transfer of muons captured by the hydrogen to the dilute component will be studied by measuring the characteristic muonic Lyman x-ray intensities from these dilute components. In some cases, the electrons from the muon decaying in the 1S muonic state of the dilute atom will also be detected. Studies are proposed on $H_2 + N_2, H_2 + O_2, H_2 + Ne$ and $D_2 + O_2$

in order to test predictions of two different theories — due to Gershtein and Hoff et al. — for transfer from μp and μd to low-Z atoms. In addition, H_2 + NO and D_2 + NO will be studied in order to compare the transfer rates in binary gases. This may allow more definitive constraints to be placed on the magnitude of the effects due to electron shielding. Furthermore, delayed x-ray spectra from these low-Z elements will be acquired in order to get a better understanding of the Z-dependence effect and mesoatom transfer effect on characteristic muonic x-ray spectra. Studies are proposed on the H_2 + Kr system for the same reason. Finally, we propose to study the H_2 + Ar case in an attempt to resolve a reported discrepancy in the transfer rate at 26 atm and an unexplained relatively long-lived x-ray component in the Ar muonic Lyman series.

Exp. 708

A MEASUREMENT OF THE DEPOLARIZATION, THE POLARIZATION AND THE POLARIZATION ROTATION PARAMETERS AND THE ANALYZING POWER FOR THE REACTION $\vec{p}p \rightarrow \vec{p}\pi^+n$

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The objective of the proposed experiment is to measure the depolarization parameter D_{NN}, the polarization parameter P, and the analyzing power A, and the polarization rotation parameters D_{SS}, D_{SL}, D_{LS}, and D_{LL} as a function of the scattered proton momentum for the pion production reaction $\vec{p}p \rightarrow \vec{p}\pi^+n$ at 800 and 650 MeV for detection of the final proton and π^+ at several angle pairs. The scattered proton will be momentum analyzed in a magnetic spectrometer, then will have its polarization determined with the recoil proton polarimeter JANUS. The associated π^+ will be detected on the opposite side of the beam using wire chambers and scintillators. The results will place severe tests upon models of single pion production.

Exp. 709

MEASUREMENTS OF A_{NN}, A_{SS}, and A_{SL} IN THE COULOMB INTERFERENCE REGION AT 650 AND 800 MeV

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J. Amann, J. J. Jarmer, J. B. McClelland, O. B. van Dyck
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K. Imai, H. Spinka

We will measure A_{SS}, A_{NN}, and A_{SL} at angles ranging between 1.5° and 20° (lab) for two beam momenta at 1.28 and 1.46 GeV/c. The measurements will be performed in Line C using the HRS spectrometer, and polarized targets. It is ideal to perform this type of experiment using the HRS spectrometer because, good momentum resolution is essential to discriminate against proton scattering off the heavier target components (^{3}He, ^{12}C, and ^{16}O) down to small angles, and good beam handling conditions in Line C are necessary to ensure a stable, small-phase space beam.

Exp. 710

A MEASUREMENT OF THE TRIPLE SCATTERING PARAMETERS D, R, A, R', AND A' FOR QUASI-ELASTIC SCATTERING AT 800 MeV

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Los Alamos National Laboratory
J. F. Amann, J. B. McClelland
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J. McGill

Using the HRS and 800-MeV polarized beams (n-type, l-type, and s-type), we will measure the triple-scattering-parameters, D, R, A, R , and A' for inclusive (p,p') scattering from ^{2}H and ^{12}C or ^{40}Ca in the small momentum transfer quasielastic region. The angular range 5° to 15° will be covered and the anticipated statistical error on the triple-scattering parameters will be approximately ±0.01 (absolute).

The motivation for the experiment is to observe nuclear medium modifications to the spin-dependent quasielastic observables. These data will be coupled with the cross section and analyzing power data obtained by Exps. 470 and 642, and the entire data set will be used to obtain medium modified amplitudes for microscopic analyses of the 800-MeV p^{+}-nucleus elastic and inelastic scattering data obtained at HRS over the years.

Exp. 711

REACTIVE CONTENT OF THE OPTICAL POTENTIAL AT 500 MeV

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Using the HRS and a 500-MeV polarized beam (n-type), we will measure the inclusive $(\vec{p},p')$ analyzing powers for targets LH_2, LD_2, and ^{12}C (or ^{40}Ca) for quasielastic scattering over the laboratory angular range between 4° and 20°.

The motivation for this experiment is, in part, the same as that for Exps. 470/642: to investigate whether quasifree mechanisms account for the bulk of the reaction cross section at this energy. Additionally, nuclear medium modifications to quasielastic scattering will be investigated and we anticipate that these data can be used to directly obtain the medium-modified nucleon-nucleon amplitudes that are required for the microscopic KMT analyses of the 500-MeV elastic-scattering data.

Exp. 712

INELASTIC PROTON SCATTERING ON ^{48}Ca AND ^{50}Ti: AN ATTEMPT TO IDENTIFY MESONIC EFFECTS AS THE CAUSE OF M1 QUENCHING

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A study of polarized-proton scattering to states in ^{48}Ca and ^{50}Ti is proposed, with particular emphasis on scattering to 1^+ states. The HRS spectrometer is to be used with an incident proton energy below 500 MeV. Angular distributions will be taken and compared to DWIA calculations. The comparison will give insight into possible mesonic effects such as virtual $\Delta(1232)$-hole excitations on inelastic proton scattering populating unnatural parity states. Data on high-spin states will also be obtained.

Exp. 713

M1's, DELTAS, AND MEDIUM EFFECTS IN CROSS SECTIONS FOR ^{88}Sr(p,p')^{88}Sr* AT 400 MeV

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H. P. Blok
University of New Hampshire
J. Heisenberg
University of Georgia
F. T. Baker, A. Scott

Cross sections for the (p,p') reaction to states in ^{88}Sr will be measured with the HRS at 400 MeV over the angular range corresponding to 0.25-2.3 fm^{-1} momentum transfer. The primary states of interest are the first two 2^+ states, the 1^+ state at 3.49 MeV, and the giant M1 resonance. All except the giant M1 have been thoroughly examined recently in electron scattering. The low-lying 1^+ state is a pure proton transition; the shape of the (e,e') angular distribution seems to require the participation of the delta resonance in the transition. The transition densities ρ_{tr} for the two 2^+ states can be explained as orthogonal combinations of two single-particle transitions. The differences between these ρ_{tr}, and the fact that one peaks in the nuclear interior, provide a good testing ground for the recently proposed density-dependence in the effective NN interaction at LAMPF energies.

Exp. 714

A SEARCH FOR THE GIANT ISOVECTOR MONOPOLE RESONANCE IN INELASTIC PROTON SCATTERING AT ZERO DEGREES

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Methods for obtaining zero-degree inelastic spectra relatively free of nonphysical background have recently been developed at HRS. They now permit a search for the elusive giant isovector monopole resonance which is supposed to be responsible for most Coulomb mixing effects in nuclei. The expected excitation energy, about 30 MeV, requires a beam energy of about 650-800 MeV. Three targets, ^{40}Ca, ^{90}Zr, and ^{120}Sn, and 100 hours are requested for this search.

Exp. 715

ANALYSIS OF CHEMICAL COMPOSITION OF ARCHEOLOGICAL ARTIFACTS BY WAY OF MUONIC X RAYS

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It is proposed to use the unique nondestructive character of muonic x-ray analysis to investigate two types of archeological objects: majolica earthenware and turquoise.

The very samples we intend to use have already been investigated by other scientific methods (including x-ray fluorescence, neutron activation and flame absorption). Muonic x-ray analysis, which emphasizes the low-Z elements, will nicely complement the information already obtained by these other methods.

Exp. 716

PION DOUBLE CHARGE EXCHANGE ON HEAVY NUCLEI

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It is proposed to measure analog transitions for the pion double-charge-exchange reaction (π^+,π^-) on ^{52}Cr, ^{90}Zr, and ^{138}Ba. It is suggested that measurement of forward-angle cross sections on these nuclei will shed new light on the physics behind the anomalous cross sections just measured for the ^{48}Ca$(\pi^+,\pi^-)^{48}$Ti (17.4 MeV) analog transition. It is proposed that isotensor contributions to DCX are most likely responsible for the observed behavior of the cross sections.

Exp. 717

PION SCATTERING TO COLLECTIVE STATES IN Se ISOTOPES

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The pion has proven to be a very useful probe in determining isospin admixtures in particle-hole states in light nuclei. The techniques for determining the different contributions of neutrons and protons to transition densities are well established from such studies. There exist other such uses, though, for these techniques. One of these uses is the determination of the proton and/or neutron contributions to *collective* transition densities as a function of neutron number in a region of known collectivity. From this information one can deduce the effect of additional valence neutrons on the nuclear collective motion.

The difficulty with such an endeavor is that generally a chain of isotopes displaying collective motion can only be found with A > 100. This means that the available resolution of the EPICS system (~150-200 keV) is not adequate to extract yields for any excited states, except perhaps for the first. There does exist a region of known collective behavior near N = 40. In particular, a number of theoretical and experimental studies of selenium isotopes have shown that this region has collective characteristics. Fig. 1 compares the low-lying spectra of six isotopes of selenium. It is clear that the spectra are characteristic of a vibrator or coupled rotor-vibrator. Table I shows the electromagnetic transition data available for these isotopes. The size of the B(E2) strengths indicates the collectivity of the excited states. Also, the fact that the second 2^+ state in these isotopes preferentially decays to the first 2^+ state indicates that the collective behavior, to first order, is that of a vibrator. As the neutron number approaches the closed $1g_{9/2}$ shell value (N = 50) there is a definite transition away from this collective behavior.

Experimentally, selenium isotopes display sufficient separations of the one- and two-phonon levels so as to enable the extraction of yields for *all* of these states. There also exist four even-even isotopes of selenium available for use as targets.

Exp. 718

ENERGY DEPENDENCE OF THE TWO-NUCLEON EFFECTIVE INTERACTION

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University of California, Los Angeles
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We propose to study the energy dependence of the two-nucleon effective interaction between 200 and 500 MeV by measuring cross sections and analyzing powers at HRS for proton scattering to states of ^{16}O below about 20-MeV excitation. We have previously found that the isoscalar spin-independent central component of the two-nucleon effective interaction between 100 and 200 MeV is strongly dependent on density and can be well described by nuclear matter effective interactions. The application to finite nuclei uses the local density approximation. These medium effects are expected to remain important in the 200- to 500-MeV regime. We propose to measure five energies (250, 300, 350, 400, 450 MeV). The 300- and 400-MeV measurements constitute our first priority. Particular attention will be paid to those states, such as inelastic monopole and dipole states which are expected to be most sensitive to medium corrections.

Exp. 719

PRODUCTION OF NEUTRON RICH RADON ISOTOPES AND DETERMINATION OF THEIR CROSS SECTIONS AND HALF LIVES BY A RADIOCHEMICAL TECHNIQUE

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The properties of neutron-rich isotopes of the heaviest elements are important in defining the nuclear-mass surface in this region and in predicting the detailed course of neutron-capture processes in stars and nuclear explosions. It is proposed to produce and determine the half-lives of ^{227}Rn and ^{228}Rn by 800-MeV proton irradiations of thick targets (~360 g) of ThO_2. The expected cross sections are low (0.1-10 nb). The half lives (30-100 sec) of the radons will be established by charged-wire collection of daughter products.

A preliminary experiment is proposed that will use ^{226}Rn (360 sec) to establish the magnitudes of yields of such neutron rich species and to test the experimental technique.

Exp. 720

RECOILLESS DELTA PRODUCTION IN THE REACTION $^{13}C(p,d)^{12}C_{\Delta}$

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Rutgers University
J. A. McGill, Spokesman
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University of Texas
G. W. Hoffmann, C. F. Moore

We propose to measure the recoilless production of the $\Delta_{3,3}$ resonance by scattering 800-MeV protons from a ^{13}C target and detecting a 500-MeV deuteron at a small angle ($3° < \theta_{lab} < 12°$). In order to reduce backgrounds from quasifree p-d scattering and other processes, we will detect the delta-decay products in a pair of coincidence counters placed in the scattering chamber. Two options for this second arm are large plastic scintillators or a superconducting solenoid spectrometer. We are requesting 60 hours of time for initial measurements at 800 MeV.

Exp. 721

MEASUREMENT OF THE PROTON POLARIZATION OBSERVABLES IN THE $^7Li(\vec{p},\vec{p}')^7Li$ AND THE TEST OF THE REACTION THEORY AT INTERMEDIATE ENERGIES

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M. Bleszynski, G. J. Igo, G. Pauletta, A. Rahbar, C. A. Whitten

We propose to measure the proton-spin observables in the reaction $^7Li(\vec{p},\vec{p})^7Li$ to the low-lying excited states. Our measurements will include: the differential cross sections, polarization, asymmetry and spin-rotation parameters at 500 MeV in the angular range 10° to 30° with the statistical accuracy of 5% or better for the polarization and spin rotation parameters. The deduced observables will be used to test the information on the nuclear form factors which enter into the (p,p') transition amplitudes.

Exp. 722

MEASUREMENT OF CROSS SECTIONS AND ANALYZING POWERS FOR ELASTIC AND INELASTIC SCATTERING OF 400- TO 500-MeV PROTONS FROM ^{14}C

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Kirtland Air Force Base
R. J. Joseph
Rutgers University
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Tel Aviv University, Israel
M. A. Moinester, J. Alster
EG&G
C. A. Goulding

We propose to measure cross sections and analyzing powers for elastic and inelastic scattering of 500-MeV polarized protons from ^{14}C for excitation energies up to 25 MeV. The nucleon-nucleon interaction is well known at this energy and the impulse approximation is probably still valid. The spin-dependent terms in the nucleon-nucleon interaction are more pronounced in this energy region, abetting the observation of two interesting spin-flip transitions: the two 4^- states at 11.7 and 17.3 MeV which have been seen in pion inelastic scattering. Data will be taken from 6° out to 36° in 2° steps. Among other states, we will measure angular distributions for the aforementioned 4^- states and the low-lying 2^+ states which appear to share the p-shell strength and are expected to have significant spin-flip components also. We plan to measure a cross section for the low-lying 0^- state at 6.9 MeV in ^{14}C which is separated by 100 keV from the nearest excited state and should be well resolved.

Exp. 723

MEASUREMENT OF THE NEUTRON AND PROTON CONTRIBUTIONS TO EXCITED STATES IN ^{39}K BY π^+ AND π^- INELASTIC SCATTERING

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L. C. Bland, R. Gilman
University of Minnesota
D. B. Holtkamp
New Mexico State University
W. B. Cottingame, S. J. Greene

Special interest has been generated by hole nuclei in the p-shell due to the nuclear structure information derived from the large π^+/π^- asymmetries found in these nuclei. Since most p-shell nuclei have been studied at EPICS, it would now be interesting to study the s-d shell nuclei based on our p-shell experience. We propose to measure π^+ and π^- inelastic cross sections to the proton-hole nucleus ^{39}K in 10° steps from 20° to 110° at 140 MeV and one point at a higher energy to separate natural and unnatural parity transitions. The first four levels of ^{39}K are cleanly resolved and are expected to exhibit large π^+ and π^- asymmetries. A stretched 6^- transition is also expected at 7.14 MeV.

Exp. 724

MEASUREMENT OF THE LAMB SHIFT IN MUONIUM

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H. Orth, G. zu Putlitz
College of William & Mary
M. Eckhause, J. Kane

We propose to measure the Lamb shift in the first excited state (n = 2) of muonium (μ^+e^-). We have observed ground (1S) state muonium in vacuum, produced when a low-energy μ^+ beam impinges on a thin foil target at LAMPF. Similarly, we expect 2S muonium will be formed when an extremely low-energy μ^+ beam (~500 keV) traverses a foil target. Microwave transitions from $2S_{1/2} \rightarrow 2P_{1/2}$ (Lamb shift) will quench the metastable 2S state with emission of a 1221 Å (2P → 1S) photon. By observing the UV photon rate as a function of microwave frequency we will measure the Lamb shift.

Exp. 725

THE EFFECT OF RARE EARTH ADDITIONS ON RADIATION DAMAGE IN ALLOY HT-9 (FERRITIC/MARTENSITIC ALLOY STEEL)

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Los Alamos National Laboratory
W. F. Sommer, Spokesman
R. D. Brown

The ferritic/martensitic alloy HT-9 is a candidate material for application in fusion reactors and as cladding and structural material for Liquid Metal Fast Breeder Reactors. This alloy has shown microstructural stability, swelling resistance and creep resistance under irradiation. On the other hand, it has also shown an increase in the ductile to brittle transition temperature.

The addition of up to 1% of a rare-earth element such as ytterium has, in a very limited number of investigations, been observed to further enhance the favorable alloy's properties and also to lower the ductile to brittle transition temperature. The purpose of this investigation is to perform a systematic study of the microstructural evolution of this alloy, with and without rare-earth additions, and to relate the microstructure to the observed changes in its mechanical properties. Information of both basic and practical importance will be realized.

A large part of this work is planned to constitute the thesis for Ph.D. in Nuclear Engineering by D. R. Davidson at the Iowa State University.

Exp. 726

SEARCH FOR THE C-NONINVARIANT DECAY $\pi^0 \rightarrow 3\gamma$

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This experiment is a search for the decay $\pi^0 \rightarrow 3\gamma$, a strong/electromagnetic reaction that would violate charge-conjugation invariance. The experiment is designed to be sensitive to a branching ratio of about 1×10^{-9}, which would improve on the existing experimental information by two orders of magnitude. This improvement will be made possible by using the LAMPF Crystal Box as the detector for the three gamma rays.

Exp. 727

MEASUREMENT OF THE EFFICIENCY OF MUON CATALYSIS IN DEUTERIUM-TRITIUM MIXTURES AT HIGH DENSITIES

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We propose to measure the efficiency of the muon-catalyzed fusion reaction

$$\mu^- + d + t \rightarrow \mu^- + {}^4He + n + 17.6\ MeV$$

That is, we will determine the average number of reaction cycles a muon will catalyze, as a function of deuterium-tritium mixture density, temperature, and tritium concentration. We will, in addition, measure the probability of muon retention by the helium ion created during fusion along with other quantities affecting the efficiency of muon catalysis.

An understanding of muon catalysis gained by the proposed experiment will provide answers to recurring questions regarding the usefulness of muon-catalyzed fusion as a source of energy. Definitive answers require that the experiment be conducted at elevated mixture densities and tritium concentrations.

Exp. 728

STUDY OF PION CHARGE-EXCHANGE MECHANISMS BY MEANS OF ACTIVATION TECHNIQUES

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We propose to determine by activation techniques the excitation functions for the following pion single-charge-exchange (SCE) reactions:

a) $^{11}B(\pi^+,\pi^0)^{11}C$ (20.4 min)
b) $^{11}B(\pi^-,\pi^0)^{11}Be$ (13.8 s)
c) $^{23}Na(\pi^+,\pi^0)^{23}Mg$ (11.3 s)
d) $^{23}Na(\pi^-,\pi^0)^{23}Ne$ (37.5 s)
e) $^{44}Ca(\pi^+,\pi^0)^{44}Sc$ (3.9 h)
f) $^{44}Ca(\pi^-,\pi^0)^{44}K$ (22 min)

and explore the feasibility of studying the following double-charge-exchange reactions:

g) $^{127}I(\pi^+,\pi^-)^{127}Cs$ (6.2 h)
h) $^{127}I(\pi^-,\pi^+)^{127}Sb$ (91 h).

The cross sections of the SCE reactions will be measured at energies below, at, and above the (3,3) resonance and the results for reaction b (2 bound states in ^{11}Be) will be compared with detailed calculations using appropriate wave functions, while those for reactions a, c, d, e, f, g, and h (to many bound states in the the residual nucleus) will be compared with theoretical predictions by W. R. Gibbs employing his new Fermi gas model.

Exp. 729

RADIATIVE CAPTURE OF POLARIZED PROTONS BY DEUTERONS AT 500 to 800 MeV

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Precise measurements of the angular distributions of the cross section and analyzing power for the radiative capture reaction $^2H(\vec{p},\gamma)^3He$ are proposed, over the range of incident proton energies from 500 to 800 MeV. The High Resolution Spectrometer is used to detect the recoil ^3He, and a time coincidence with the radiated gamma ray is required to improve the event signal-to-noise ratio. High-energy gamma rays from π^0 production and the associated recoil ^3He are kinematically segregated from the radiative capture events. Results of these measurements will provide a strong test of the reaction mechanism for the intermediate energy capture process, and an accurate measure of time reversal invariance, when compared with the corresponding two-body photodisintegration data.

Exp. 730

PION PRODUCTION IN PION-NUCLEON AND PION-NUCLEUS INTERACTIONS

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This proposal describes our intent to measure the $(\pi,2\pi)$ reaction on the proton and on nuclei by three different detection techniques. Because of the need to construct detection systems specific to π^0 and $\pi^\pm$, we are requesting approval for beam time in two stages.

The first stage is for measurement of the cross sections (or set upper limits) by activation techniques of the reactions: $^{31}P(\pi^+,2\pi^+)^{31}Si$ (2.67 h); $^{44}Ca(\pi^+,2\pi^+)^{44}K$ (22 min); $^{51}V(\pi^+,2\pi^+)^{51}Ti$ (5.75 min); $^{11}B(\pi^-,2\pi^-)^{11}C$ (20.4 min); $^{18}O(\pi^-2\pi^-)^{18}F$ (110 min); and $^{45}Sc(\pi^-,2\pi^-)^{45}Ti$ (3.08 h). After making these measurements, we plan to present a progress report to the LAMPF PAC along with the detailed parameters of the π^0 and $\pi^\pm$ detection systems to demonstrate the feasibility of making the threshold measurements described in this proposal. These threshold measurements are the second stage of this proposal.

Exp. 731

Fission Probability of the Giant Quadrupole Resonance in Actinides

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The object of this experiment is to determine the fissionability of the GQR. Previous experiments have produced contradictory results probably due to large background and random corrections, poor statistics or ambiguous methods of analysis. We intend to use the High Resolution Spectrometer to identify the GQR in the $^{238}U(p,p')$ reaction with 500-MeV protons.

Parallel plate avalanche counters (PPAC) will be used to detect fission fragments in coincidence with the inelastically scattered protons; the fission probability is determined by the ratio of fission coincidences to proton singles. The PPAC are position-sensitive enabling the determination of the fission-fragment angular distribution. This can provide information on the degree of K-mixing during the fission process.

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