21

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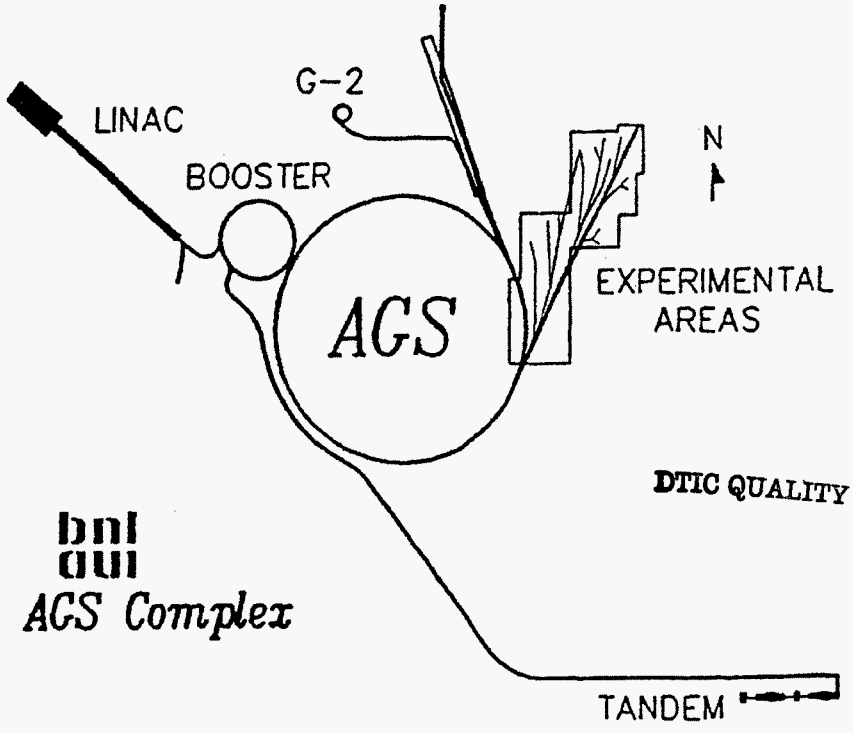
Fourteenth Edition
Informal Report

BROOKHAVEN NATIONAL LABORATORY
Upton, Long Island
New York 11973-5000



bnl
dui
The AGS Complex

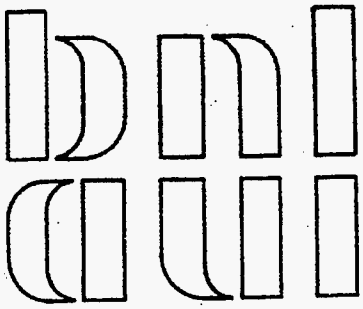
AGS *Experiments 1995 • 1996 • 1997*

BNL 34518
Fourteenth Edition
Informal Report

AGS Experiments - 1995 • 1996 • 1997

J.C. Depken and P. Lo Presti

December 1997



AGS Department
Experimental Planning and Support Division

Brookhaven National Laboratory
Associated Universities, Inc.
Upton, New York 11973-5000
United States of America

DISCLAIMER

AGS Experiments - 1995, 1996 and 1997

This report contains:

This is the *fourteenth*. Please forward suggestions and changes for future editions to:

Division Head, EP&S Division
Brookhaven National Laboratory
Building 911B
Upton, New York 11973-5000 U.S.A.

The CUTOFF DATE FOR APPROVED EXPERIMENTS INCLUDED IN THIS EDITION IS DECEMBER 1997.

AGS Schedule– As Run, FY1995

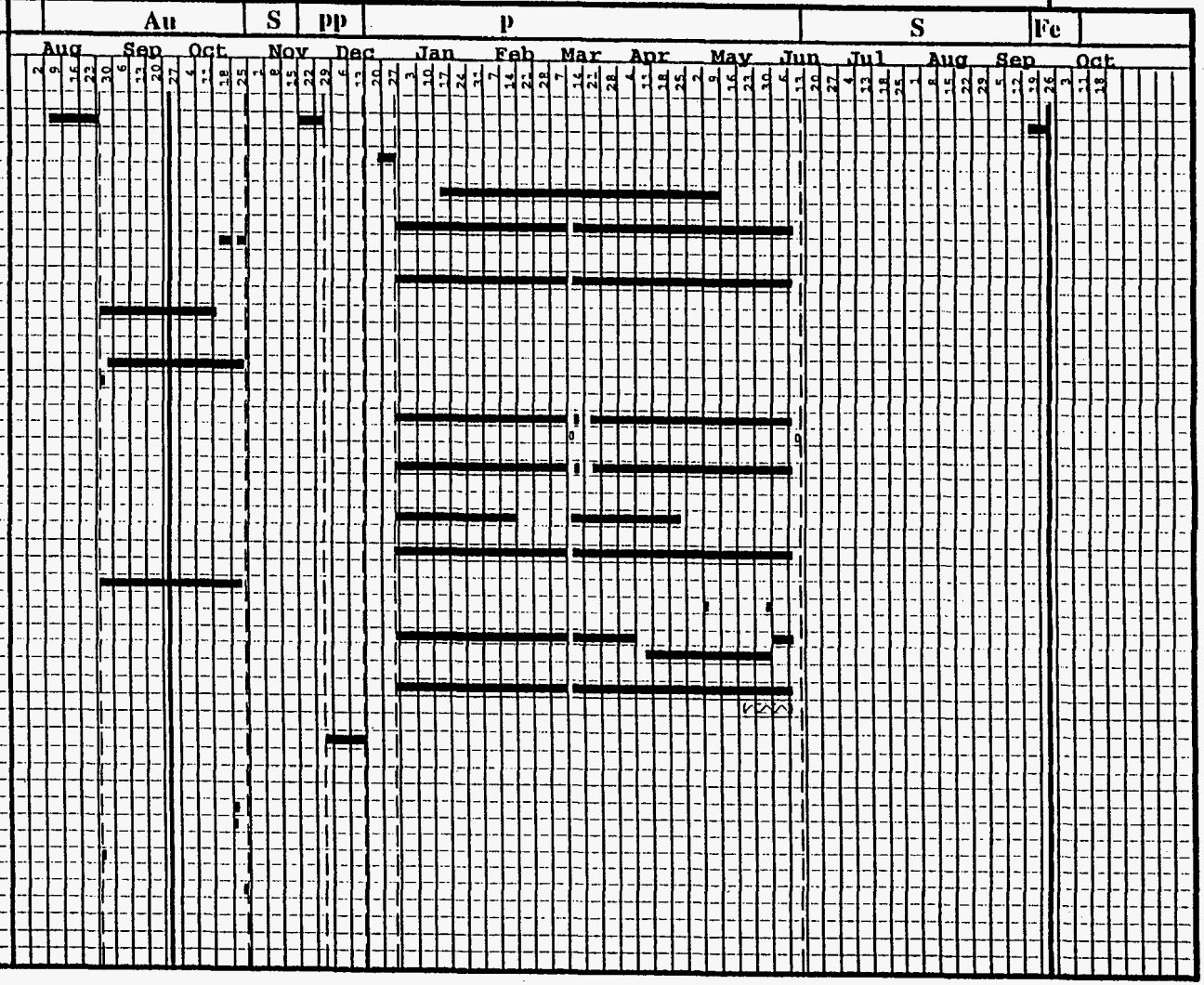
Single Bunch Extraction
Parasitic
Running

By: K.Gardner Date: 10–1–95

FY95

AGS Mode

Beam	Exp #	Experiment	Hours
		AGS Startup	
		AGS Booster Studies	
		BLIP	
A1	852	Chung/Cason	4470/3900
AL	891	Platner	184/1000
A2	865	Zeller	2528/3500
A3	864	Sandweiss	560/3500
B1	866	Chasman/Hamagaki	1529/2600
BL	892	Gould (test)	8/600
B2		Test Beam	1765
B2	821	Mouse/Hughes/Roberts	131/2100
B5	871	Molzon/Ritchie/Wojcicki/ Kane	4512/7000
C1	850	Carroll/Heppelmann	2777/4000
C4	787	Littenberg/Smith/Bryman	10129/13500
C5	877	Braun-Munzinger	1795/2600
C5	900	Viola	11/600
C8	890	Nelkens/Chiren/Peng	1842/1519
C8	909	Briscoe/Tippens	727/600
D6	813	Franklin/Barnes	4416/3679
D6	885	May/Franklin/Davis	67/2000
AGS	880	Roser/Lee	259/320
		Small/Heavy Ion Experiments	
A	882D	Price	25/50
A	903	Finnemore/Snead	1/24
B1	882C	Price	33/50
C5	NRL	Adams	8



AGS_AS_RUN_FY95.BW

AGS As Run Schedule, FY1996

Detector Tests

Single Cycle Fast Extracted Beam

Slow Extracted Beam

By: M. Blaskiewicz Date: 10-1-96

FY96

Beam	Exp #	Experiment	Hours
		AGS Startup	
		BLIP	1309
		RHIC Injection Studies	190
A1	895	Rai	430/1688
A1	910	Cole	1592/1000
A1	P920	Zumbro	197
A2	865	Zeller	4336/4500
A3	864	Sandweiss	1343/3500
A3	898	Miller/Kronenberg/Nelson	138/240
B1	866	Chasman/Steadman	2698/2600
B1	917	Seto/Mignerey	0/1600
B1		Test Beam	133
B2		Test Beam	1068
B5	871	Molzon/Ritchie/Wojcicki/ Kane	6178/7000
C1	850	Carroll/Heppelmann	2844/4000
C4	787	Littenberg/Smith/Bryman	11915/13500
C5	877	Braun-Munzinger	2708/2600
C5	900	Viola	927/900
C5	896	Crawford/Hallman	42/1000
C6	905	Nagae	751/500
C8	907	Hungerford/Peng	649/1450
D6	885	May/Franklin/Davis	1617/2000
D	892	Gould	169/600
V1	821	Morse/Hughes/Roberts	196/2100
AGS	880	Roser/Lee	343/320
		Small Heavy Ion Experiments	
B1	868	Waddington	29/47
B1	869	Waddington	163/107
B1	893	Thompson	10/1
B1	T915	Westphal	20/5
B1	916	Ile	2/2

AGS As Run Schedule, FY1997

Normal Running
Detector Tests
Single Cycle on Demand
Facility Commissioning

By: Ralf Prigl Date: 9-11-97

FY97

Beam	Exp #	Experiment Spokespersons	AGS Beam/Mode Charged Hours	Approved Hours
		AGS Startup		
		AGS/Booster Studies		
		BLIP		
		RHIC Sextant Test		
A1	852	Chung/Cason	5309	6109
A1	895	Rai	870	1688
A2	865	Zeller	5181	6500
A3	864	Sandweiss	2191	3500
A3	898	Miller/Kronenberg/Nelson	338	300
B1	917	Seto/Mignerey	1401	1600
B1	925	Makdasi/Yokosawa	129	384
B1	926	Littenberg/Bryman/Zeller	193	8000
B1	PHENIX	Guryn	90	
B2		Test Beam		
B5	935	Kuang	786	1300
C1	850	Carroll/Heppelman	2844	4000
C4	787	Littenberg/Smith/Bryman	12831	13500
C5	922	Culpepper	36	48
C5	896	Crawford/Hallman	428	1000
C5	934	Binns	16	24
C6	913	Tippens/Sadler	320	500
C6	914	Nefkens/Kycia/Krugtov	72	500
C8	907	Hungerford/Peng	1093	1450
D6	906	Fukuda/Chrien	663	1200
D6	937	Peterson	16	48
D6	929	Kishimoto	38	400
U	938	Hastings/Bauer/Watanabe/Haine	38	
U	939	King/Hanson	51	
V1	821	Morse/Hughes/Roberts	742	2100
AGS	880	Roser/Lee	446	320
AGS	932	Norem	35	

Wednesays

Legend	
S	Scheduled Shutdown
p	proton beam (25 GeV/c)
pp	polarized proton beam
SEB	slow extracted beam
FEB	fast extracted beam
Lo E Au	6 & 8 GeV/nucleon gold beam

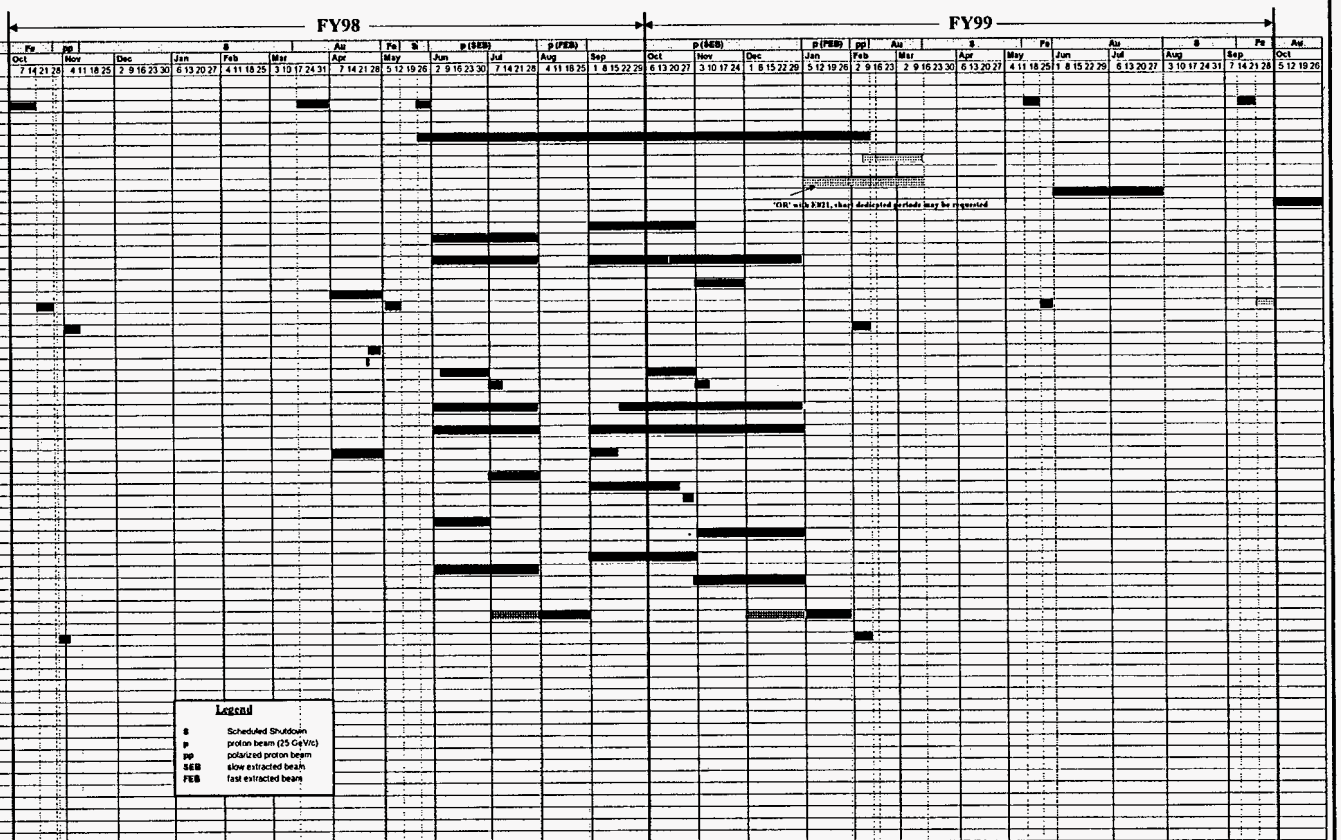
AGS Schedule, FY1998-99 (Working Copy)

Normal Running
Subject to Approval
Cycle on Demand
Facility Commissioning
Not In Present Financial Plan
Parasitic tests

Based on 100 hours per week -- subject to change

Schedule subject to appropriate funding

By: Phil Pile, Date: 24 Mar 98



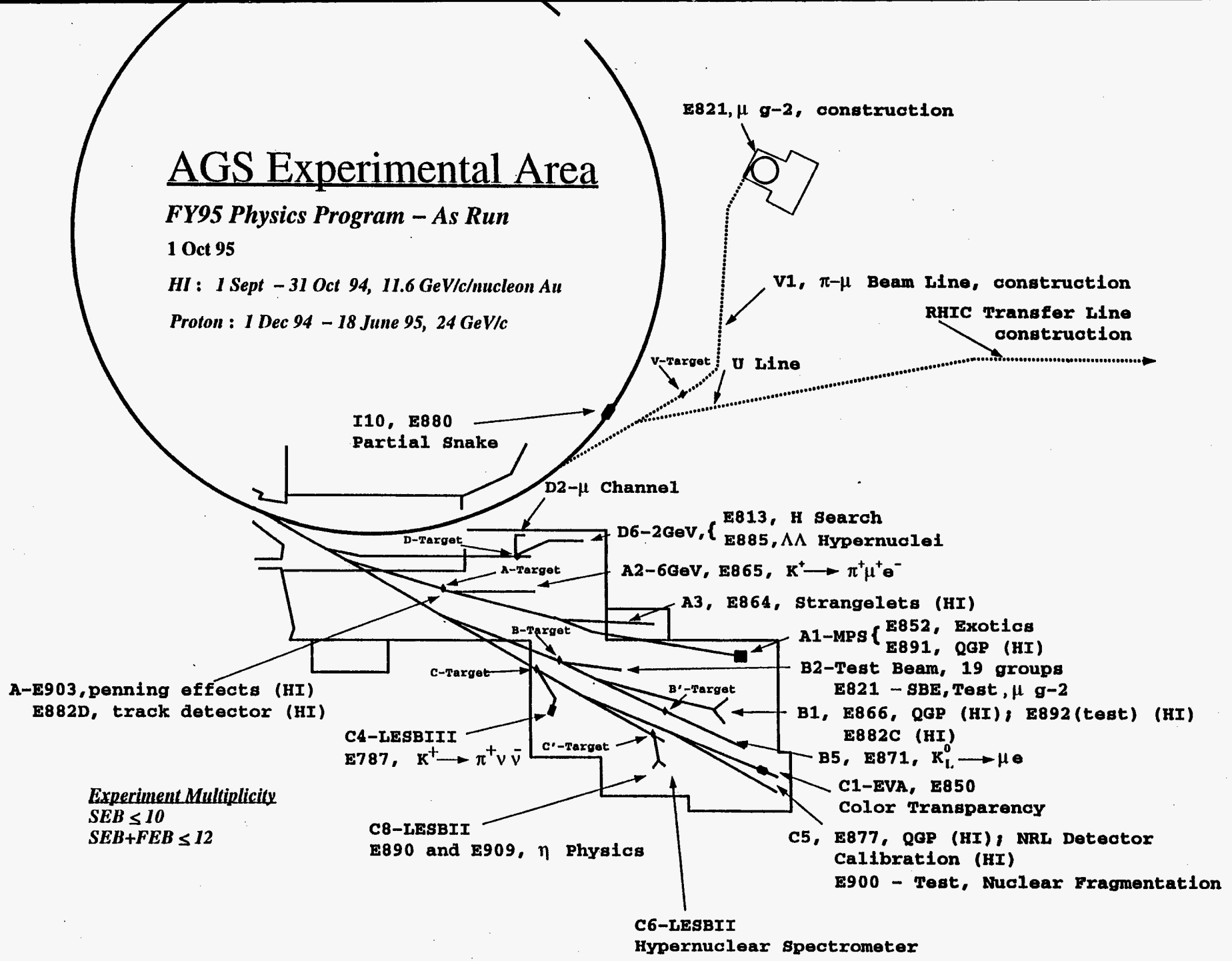
Beam	Exp #	Experiment Spokespersons or Activity	AGS Beam/Mode Charged Hours	AGS Beam/Mode Approved Hours
		AGS Startup		
		AGS/Booster Studies	as required	
		BUP		
		RHIC/AGS Studies		
		RHIC Injection Studies		
		RHIC Test Run		
		RHIC Commissioning		
		RHIC Full Program		
A1	852	Chung/Cason	5309	6109
A1	900	Viola/Kwiatkowski	927	1827
A2	865	Zeller	5181	6500
A3	941	Huang/Majka	0	400
A3	864	Sandweiss	2191	3500
A3	919	Vazquez	176	300
B1	925	Makdisi/Yokosawa	317	384
B1		Test Beam		
B1	944	Binns	0	100
B1	P946	Westphal	0	7
B2		Test Beam		
B2	943	Dietrich/Harfoum	0	200
C1	850	Carroll/Heppelman	2844	4000
C4	787	Letenberg/Smith/Bryman	12831	15500
C5	896	Crawford/Hallman	428	1000
C6	913	Tippens/Sadler	320	700
C6	914	Nelkens/Kycia/Kruglov	72	700
C6	927	Kycia/Nelkens	0	2200
C8	907	Hungerford/Peng	1093	1450
C8	931	Hungerford/Zeps	0	800
D5	906	Fukuda/Chinen	663	1600
D5	929	Kishimoto	38	800
D5	930	Tamura	0	1040
V1	821	Morse/Hughes/Roberts	742	2100
AGS	880	Roser/Lee	729	320
		Experiments Not Scheduled		
B5	926	Letenberg/Bryman/Zeller	0	8000
C2	936	Imazato	0	3000
D6	923	Dwan/Mai/Adair	0	2000
D6	924	Hertzog	0	1400
U	938	Hastings/Bauer/Watanabe/Haines	38	
U	939	King/Hanson	51	
	904	Weinstein	0	35
	940	Molzon	0	4000
		Proposed Experiments		
U	P933	Harfoum/Morris	0	200
U	P945	Hanson		

IV

AGS Beams, March 97

Beam	GeV/c	δp/p (% fwhm)	Prod. Angle (deg)	ΔΩ (msr)	Flux / 10^{13} 24 GeV/c protons on target K^+	K^-	p	$\bar{p}$	π^+	π^-	GeV/c	Purity	Remarks
Separated Charged Particle Beams													
C4	≤ 0.83	4	0	12.0	4.6×10^6	1.5×10^6	1.5×10^9	1.0×10^6	6.0×10^9	6.0×10^9	0.80	$\pi^+/K^+ = 0.4$	L = 18 m – "LESBIII" ~ 1×10^6 stopped $K^+/10^{13}$ protons
C6,C8	≤ 0.75	5	5	10.0	1.0×10^6	3.3×10^5	3.3×10^8	4.6×10^4	2.0×10^9	2.0×10^9	0.70	$\pi^-/K^- = 5$ $\pi^+/K^+ = 1$	L = 15 m – "LESBII"
D6	≤ 1.9	6	5	1.6	5.5×10^6	2.3×10^6	3.0×10^8	1.1×10^6	4.9×10^8	4.1×10^8	1.80	$\pi^-/K^- = 0.8$ $\pi^-/\bar{p} = .07$	L = 31 m – "2GEV"
Unseparated Charged Particle Beams													
A1*	5–28	3	0	0.2	1.9×10^6	2.9×10^4	5.0×10^9	2.3×10^3	3.0×10^7	1.0×10^7	18		L = 130 m to MPS – "HEUB"
A2	< 6.5	5	3.5	0.75	5.8×10^7	1.9×10^7	6.9×10^8	6.3×10^6	1.3×10^9	8.8×10^8	6		L = 34 m – "6GEV"
A3*	1–28	4	0	0.1			6.0×10^8		1.0×10^8	4.0×10^7	14		Primarily HI "OR" with A1
B1*	5–28	3	0	0.05			3.0×10^8		3.0×10^7	2.0×10^7	14		Primarily HI "OR" with B5
B1'	0.5–28	8	3	.001			3.0×10^4		6.0×10^4	4.0×10^4	5		L = 56 m – Test Beam
B2	< 9	5	6	0.5	3.4×10^5	1.2×10^5	8.5×10^6	9.5×10^4	1.2×10^7	9.0×10^7	4		L = 40 m – Test Beam
C1	1–20	5	0	0.8	3.0×10^7	3.5×10^6	1.0×10^9	0.7×10^6	3.5×10^8	1.6×10^8	13		L = 100 m – "OR" with C5
C5*	1–28	2	0	0.15			1.0×10^8				13		L = 81 m – "OR" with C1
Neutral Beam													
B5	2–20		1–4.5	0.1			K^0_L flux = 1.3×10^8 @ 3.75°				2–20	n/ $K^0_L = 20$	L = 10 m – "OR" with B1
Muon Channel													
D2	0.025–0.15	9 (π) 30 (μ)	135 (π)	24 (π)			μ^+ flux = 2.0×10^6 Surface μ^+ flux = 2.0×10^6						L = 12 m Inactive, not yet commissioned
Neutrino Beam													
U							ν flux = $2.0\times10^{10}/m^2$ (Wide Band) $\bar{\nu}$ flux = $1.4\times10^{10}/m^2$ (Wide Band)						Not Presently Available FEB Flux avg. over 1.5 m R. <E> = 1.4 GeV/c^2 Wide Band
g–2 π–μ Transfer Line													
V1	< 3.0	0.6	0				π^+ flux = 1.7×10^8 μ^+ flux = 7×10^5				3.0		L = 120, for injection to g–2 ring commissioned in 1996

* These 0° beam lines can be used for full energy polarized protons and/or heavy ion beams


AGS Experimental Area
FY95 Physics Program – As Run
1 Oct 95
HI : 1 Sept – 31 Oct 94, 11.6 GeV/c/nucleon Au
Proton : 1 Dec 94 – 18 June 95, 24 GeV/c
E821, μ g-2, construction
V1, π–μ Beam Line, construction
RHIC Transfer Line construction
V-Target
U Line
I10, E880
Partial Snake
D2–μ Channel
D6–2GeV, { E813, H Search
E885, ΛΛ Hypernuclei
D-Target
A-Target
A2–6GeV, E865, K+ → π+μ+e-
A3, E864, Strangelets (HI)
B-Target
A1-MPS { E852, Exotics
E891, QGP (HI)
C-Target
B2-Test Beam, 19 groups
E821 – SBE, Test, μ g-2
B'-Target
B1, E866, QGP (HI); E892(test) (HI)
E882C (HI)
A-E903, penning effects (HI)
E882D, track detector (HI)
C4-LESBIII
E787, K+ → π+ν ν̄
C'-Target
B5, E871, K0L → μe
C1-EVA, E850
Color Transparency
Experiment Multiplicity
SEB ≤ 10
SEB+FEB ≤ 12
C8-LESBII
E890 and E909, η Physics
C5, E877, QGP (HI); NRL Detector Calibration (HI)
E900 – Test, Nuclear Fragmentation
C6-LESBII
Hypernuclear Spectrometer
AGS_floor_as_run_fy95.bw

AGS Experimental Area

FY96 Physics Program – As Run

30 Sep 96

NASA: 1 Oct – 13 Oct 95, 1 GeV/nucleon Fe

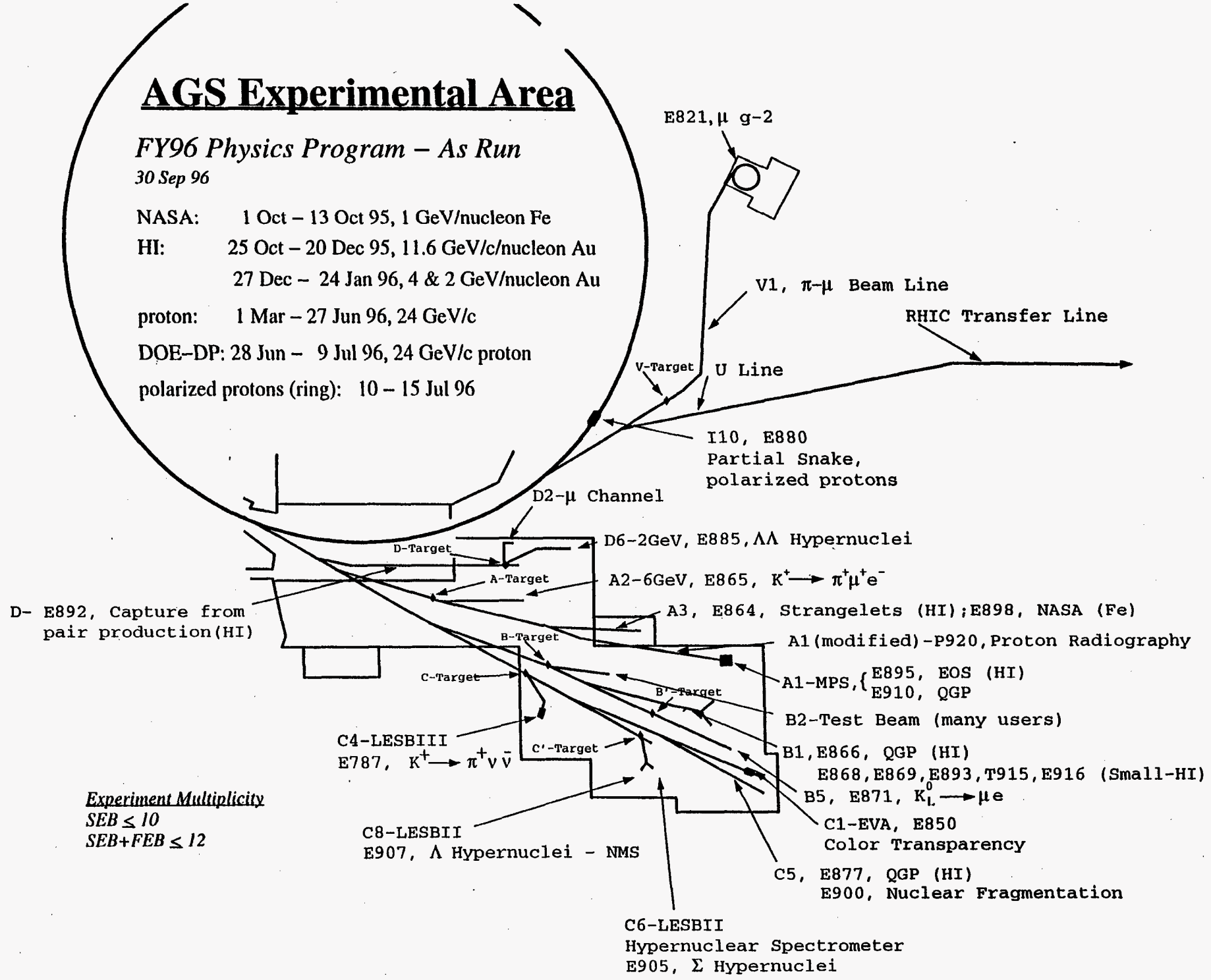
HI: 25 Oct – 20 Dec 95, 11.6 GeV/c/nucleon Au

27 Dec – 24 Jan 96, 4 & 2 GeV/nucleon Au

proton: 1 Mar – 27 Jun 96, 24 GeV/c

DOE-DP: 28 Jun – 9 Jul 96, 24 GeV/c proton

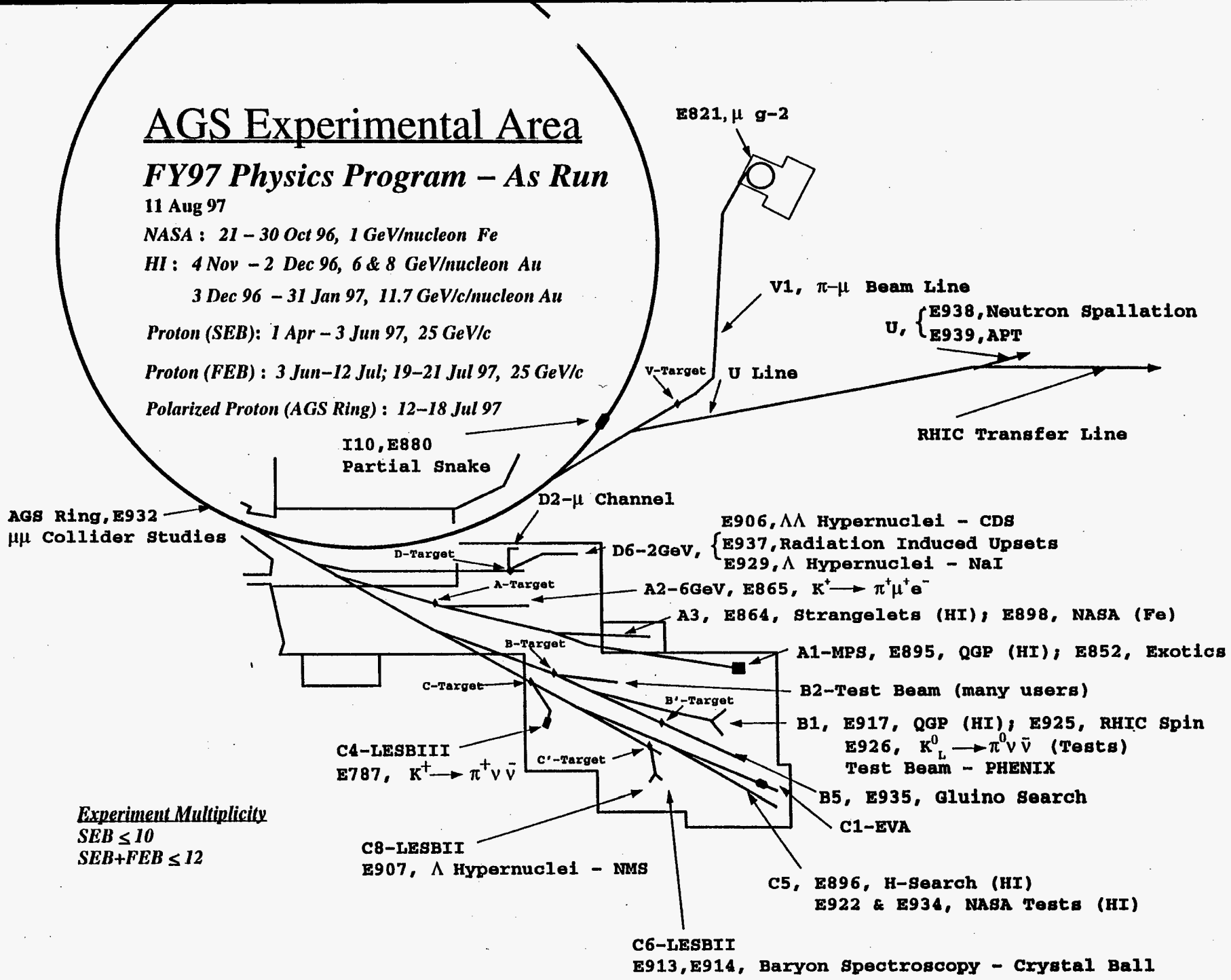
polarized protons (ring): 10 – 15 Jul 96



Experiment Multiplicity

SEB ≤ 10

SEB+FEB ≤ 12


AGS Experimental Area
FY97 Physics Program – As Run
11 Aug 97
NASA : 21 – 30 Oct 96, 1 GeV/nucleon Fe
HI : 4 Nov – 2 Dec 96, 6 & 8 GeV/nucleon Au
3 Dec 96 – 31 Jan 97, 11.7 GeV/c/nucleon Au
Proton (SEB): 1 Apr – 3 Jun 97, 25 GeV/c
Proton (FEB) : 3 Jun–12 Jul; 19–21 Jul 97, 25 GeV/c
Polarized Proton (AGS Ring) : 12–18 Jul 97
E821, μ g-2
V1, π–μ Beam Line
U, E938,Neutron Spallation
E939,APT
V-Target
U Line
RHIC Transfer Line
I10,E880
Partial Snake
AGS Ring,E932
μμ Collider Studies
D2-μ Channel
E906,ΛΛ Hypernuclei - CDS
D6-2GeV, E937,Radiation Induced Upsets
E929,Λ Hypernuclei - NaI
D-Target
A-Target
A2-6GeV, E865, K+ → π+μ+e-
A3, E864, Strangelets (HI); E898, NASA (Fe)
B-Target
A1-MPS, E895, QGP (HI); E852, Exotics
C-Target
B2-Test Beam (many users)
B'-Target
B1, E917, QGP (HI); E925, RHIC Spin
E926, K0L → π0ν ν̄ (Tests)
Test Beam - PHENIX
C4-LESBIII
E787, K+ → π+ν ν̄
C'-Target
B5, E935, Gluino Search
C1-EVA
Experiment Multiplicity
SEB ≤ 10
SEB+FEB ≤ 12
C8-LESBII
E907, Λ Hypernuclei - NMS
C5, E896, H-Search (HI)
E922 & E934, NASA Tests (HI)
C6-LESBII
E913,E914, Baryon Spectroscopy - Crystal Ball

AGS Experimental Area

FY98–99 Physics Program – Planned

19 Nov 97

Proton : 25 weeks 24 GeV/c SEB

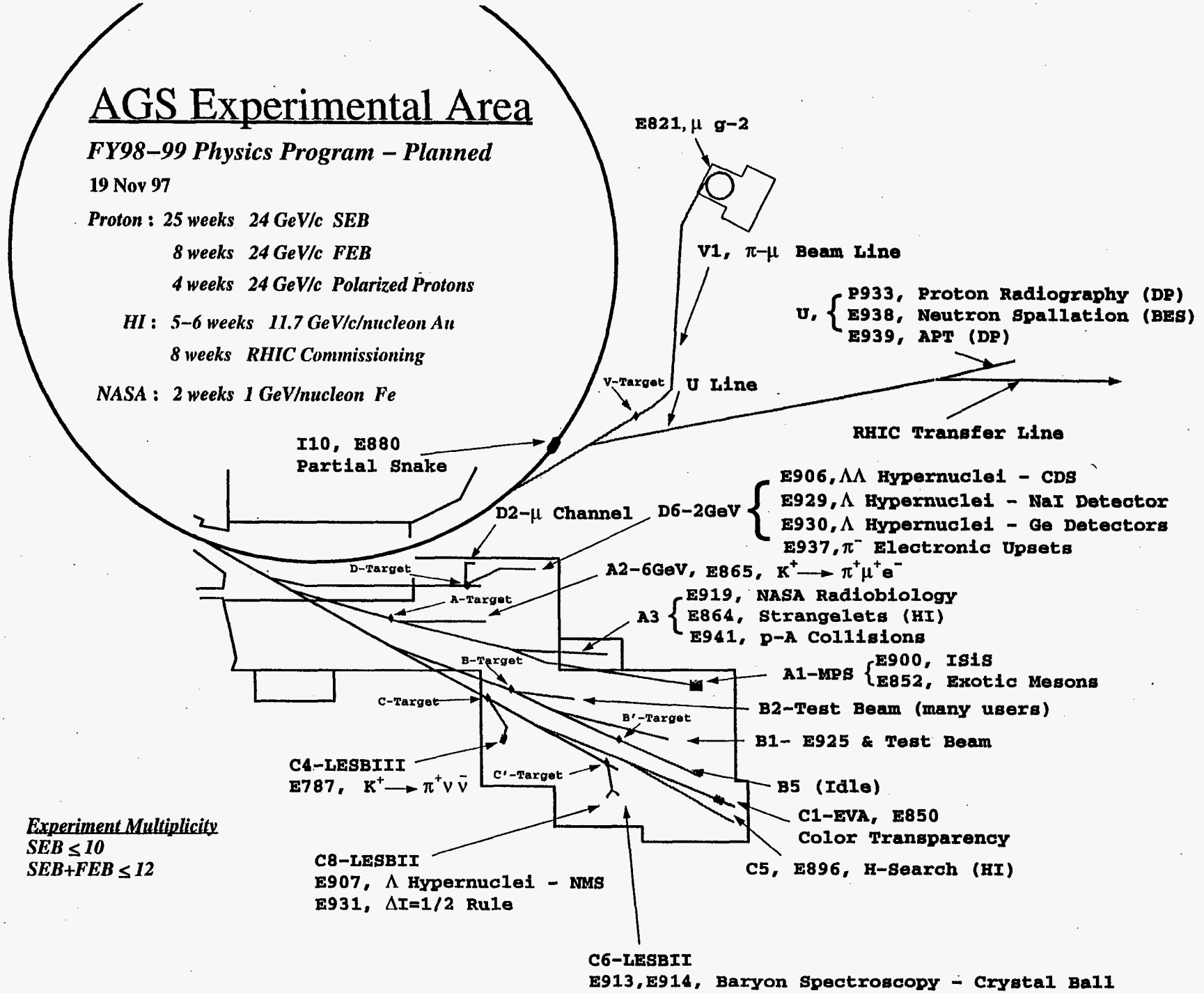
8 weeks 24 GeV/c FEB

4 weeks 24 GeV/c Polarized Protons

HI : 5–6 weeks 11.7 GeV/c/nucleon Au

8 weeks RHIC Commissioning

NASA : 2 weeks 1 GeV/nucleon Fe



Experiment Multiplicity

SEB ≤ 10

SEB+FEB ≤ 12

AGS_floor_plan_fy98-99.work

LIST OF EXPERIMENTS

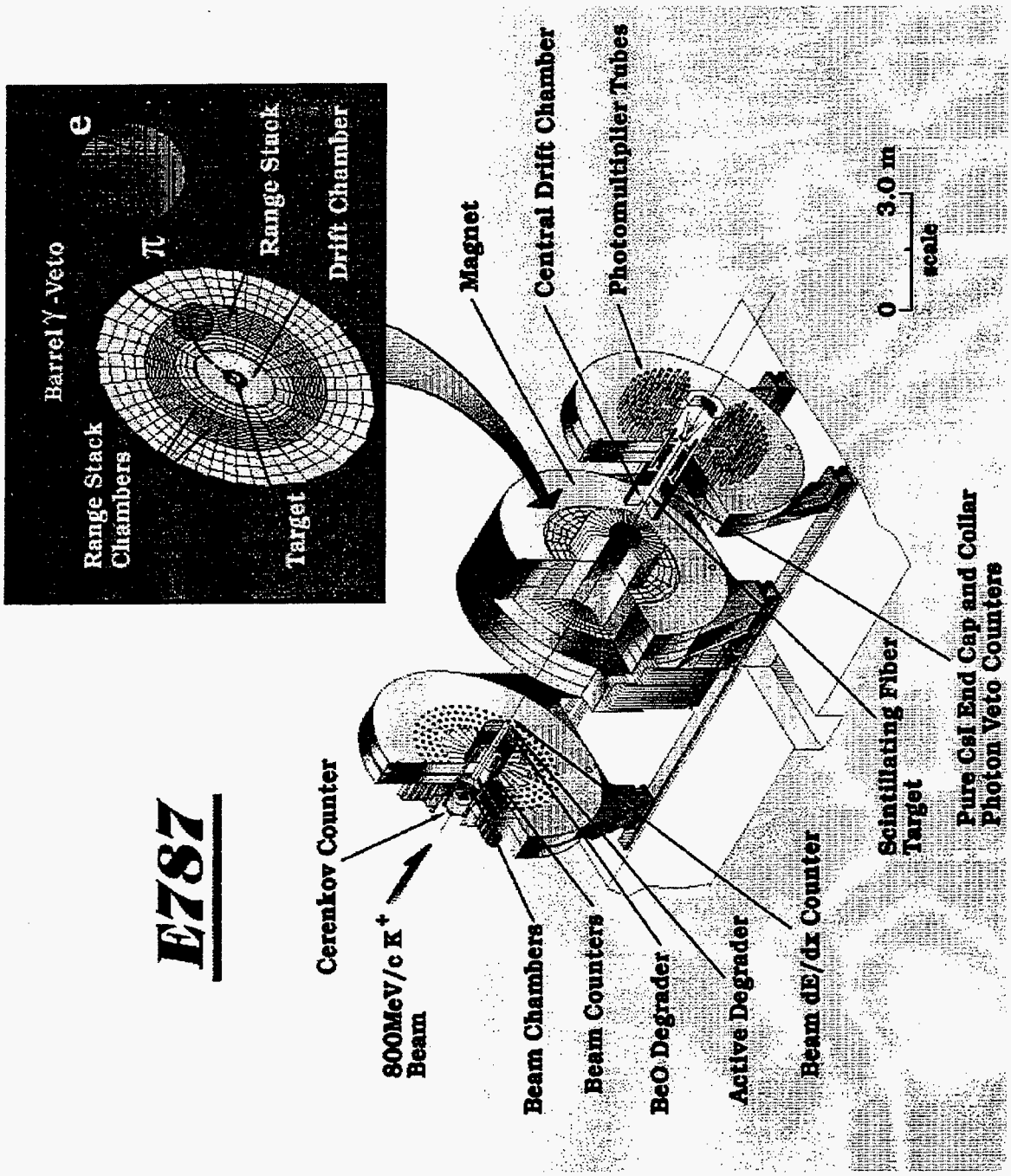
Summaries

of

Experiments

EXPERIMENT 787

Home Page • http://www.phy.bnl.gov/e787/e787.html



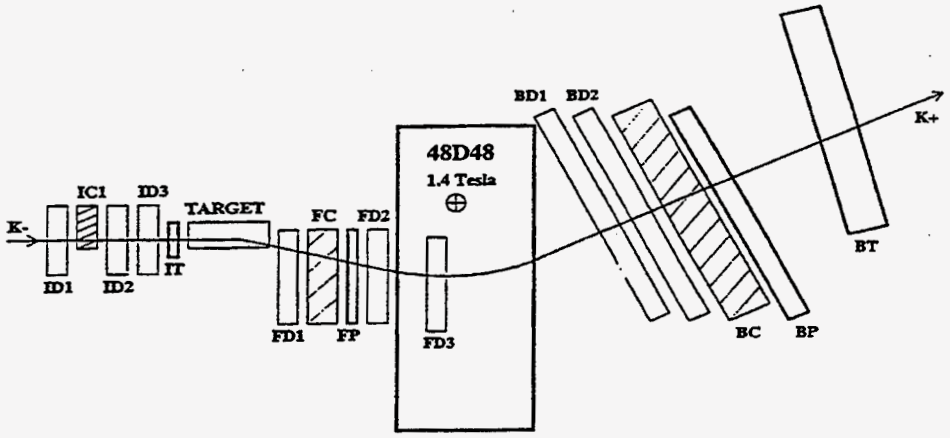
Beam: C4
Status: In progress
Hours Charged/Approved: 12831/15500

EXPERIMENT 787 - A STUDY OF THE DECAY $K^+ \to \pi^+ \nu\bar{\nu}$

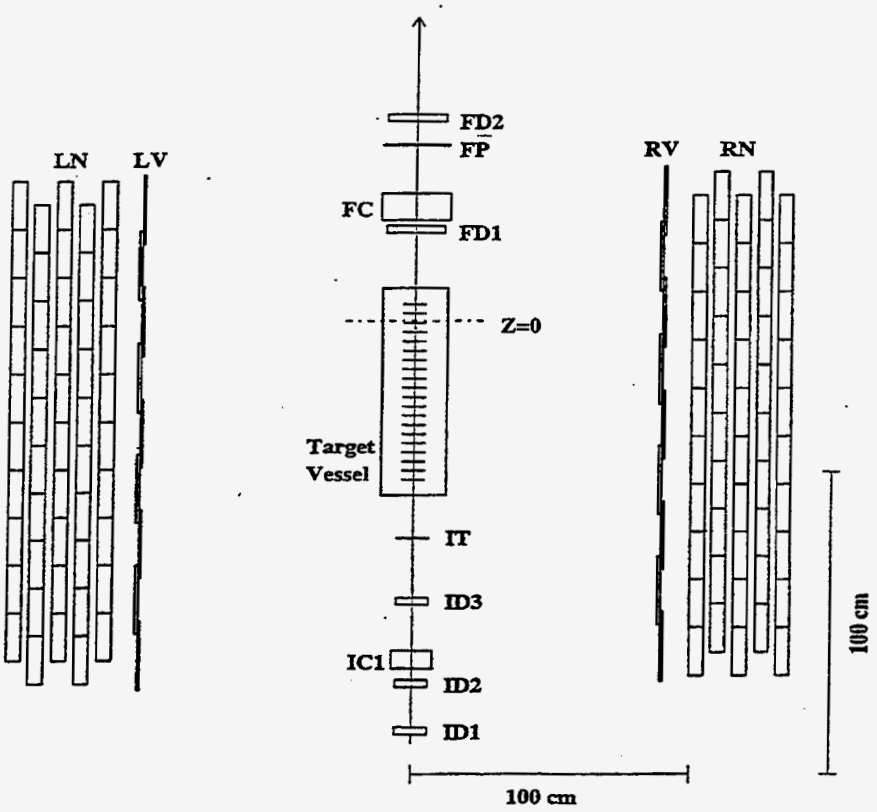
Spokesmen: D. A. Bryman, L. S. Littenberg, A. J. S. Smith

- **Brookhaven National Laboratory**
  S. Adler, M. S. Atiya, I-H. Chiang, M. Diwan, J. S. Frank, J. S. Haggerty, V. Jain, S. Kettell, T. F. Kycia, K. K. Li, L. S. Littenberg, C. F. Ng, R. C. Strand, C. Witzig
- **Fukui University**
  M. Miyajima, Y. Tamagawa
- **KEK-National Laboratory for High Energy Physics**
  M. Aoki, T. Inagaki, S. Kabe, M. Kobayashi, T. K. Komatsubara, Y. Kuno, M. Kuriki, T. Morimoto, N. Muramatsu, H. Okuno, K. Omata, A. Otomo, T. Sato, T. Shinkawa, S. Sugimoto, K. Ukai, Y. Yoshimura
- **Osaka University** - T. Nakano
- **Princeton University**
  A. Bazanko, P. D. Meyers, D. R. Relyea, F. C. Shoemaker, A. J. S. Smith, J. R. Stone
- **TRIUMF**
  P. Bergbusch, E. W. Blackmore, D. A. Bryman, P. Kapinus,A. Konaka, J. A. Macdonald, J. Mildenberger, T. Numao, J.-M. Poutissou, R. Poutissou, G. Redlinger
- **University of Alberta**
  P. Kitching, S. Ng, R. Soluk

Experiment 787 is a search for reactions of the type $K^+ \to \pi^+ XX'$, where X is a weakly interacting light neutral particle. The experiment is sensitive to such decays at the 10^{-10} level. The prime candidate is $K^+ \to \pi^+ \nu\bar{\nu}$ which provides a uniquely stringent test of the Standard Model and its parameters because it is the only experimentally accessible process that is dominated by an unambiguously calculable higher order weak interaction. Two body decays $K^+ \to \pi^+ X$ are also searched for to place constraints on the existence of a variety of hypothetical particles such as axions, familons, hyperphotons and supersymmetric neutrals predicted by extensions to the SM. Several other rare decays including $K^+ \to \pi^+\gamma\gamma$, $K^+ \to \pi^+\mu^+\mu^-$, $\pi^0 \to \nu\bar{\nu}$, and $\pi^0 \to \gamma XX$ are also being investigated. The former two, $K^+ \to \pi^+\gamma\gamma$ and $K^+ \to \pi^+\mu^+\mu^-$, were discovered by this experiment. Recently a candidate for $K^+ \to \pi^+ \nu\bar{\nu}$ was observed by E787.



Schematic elevation view of 48D48 spectrometer.



Plan view of the neutron detectors surrounding the target area.

Beam: C6
Status: Complete FY 1995
Hours Charged/Approved: 4416/3679

EXPERIMENT 813 - SEARCH FOR A STRANGENESS -2 DIBARYON

Spokesmen: G. B. Franklin and P. D. Barnes

- **Brookhaven National Laboratory** - R. Chrien, P. Pile, R. Sawafta, R. Sutter
- **Carnegie-Mellon University** - A. Berdoz, G. Franklin, R. Magahiz, R. McCrady, F. Merrill, C. Meyer, B. Quinn, R. A. Schumacher, R. Sukaton, V. Zeps
- **Freiburg University**
  T. Bürger, M. Burger, H. Fischer, J. Franz, E. Rössle, H. Schmitt, M. Wieder
- **Indiana Univ. Cyclotron Facility** - J. Szymanski
- **LAMPF** - P. Barnes
- **TRIUMF** - D. Gill
- **Vassar College** - R. Stearns
- **Yale University** - G. Diebold
- **University of Alberta** - M. Rozon
- **University of Birmingham** - J. Lowe, J. Nelson, R. Zybert
- **University of Kyoto** - H. Enyo, T. Iijima, K. Imai, N. Saito, S. Yokkaichi
- **University of Kyoto-Sangyo** - K. Okada, F. Takeutchi
- **University of Manitoba** -
  C. Davis, L. Gan, M. Landry, L. Lee, S. Page, D. Ramsay, V. Sum, W. van Oers
- **University of New Mexico** - B. Bassalleck, M. Chapman, A. Rusek, R. Stotzer, D. Wolfe

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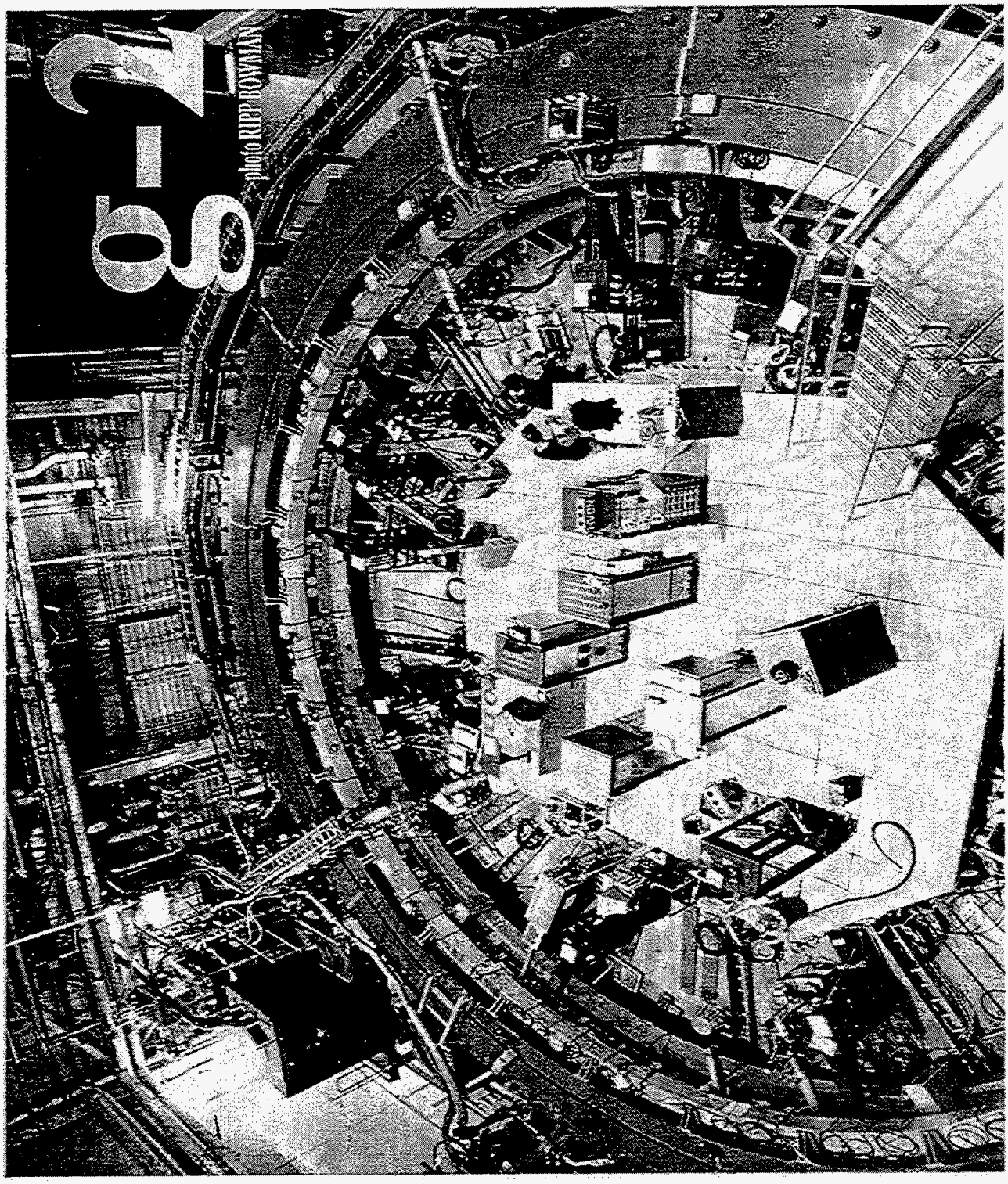
Motivated by Jaffe's 1977 prediction of a six-quark object with strangeness -2 and $J^{\pi}=0^{+}$ at a mass of 2150, this experiment proposed to study the strangeness of -2 two-baryon mass spectrum from 100 MeV below the mass of the lightest known two-baryon strangeness -2 system, $\Lambda\Lambda$ mass. This particle, called the "H," has been predicted by later bag models as well. Although the mass calculation is model dependent, the predictions are considered within the expected range of sensitivity. The possibility of resonances near the $\Lambda\Lambda$ mass due to conventional meson exchange forces can also be explored using the experiment covers the region both above and below the $\Lambda\Lambda$ mass.

EXPERIMENT 821

Home Page • http://www.phy.bnl.gov/g2muon/home.html



Beam: V1
Status: In Process
Hours Charged/Approved: 742/2100

EXPERIMENT 821 - A NEW PRECISION MEASUREMENT OF THE MUON G-2 AT THE LEVEL OF 0.35 PPM

Spokesmen: V.W. Hughes, W.M. Morse, B.L. Roberts

- **Boston University** - R.M. Carey, W. Earle, E. Efstathiadis, M. Hare, E.S. Hazen, F. Krienen, J.P. Miller, O. Rind, B.L. Roberts, L.R. Sulak, A. Trofimovl
- **Brookhaven National Laboratory** - H.N. Brown, G. Bunce, G.T. Danby, R. Larsen, Y. Y. Lee, W.-Z. Meng, W.M. Morse, C. Pai, R. Prigl, S. Rankowitz, J. Sandberg, R. Sanders, Y. Semertzidis, R. Shutt, L. Snydstrup, A. Soukas,
- **Budker Institue for Nuclear Physics** - V.P. Druzhinin, G.V. Fedotovich, B.I. Khazin, I. Logashenko, N. Ryskulov, S. Serednyakov, Yu.M. Shatunov, E. Solodov
- **Cornell University** - T. Kinoshita, Y. Orlov
- **Fairfield University** - D. Winn
- **Lawrence Berkeley Lab./Brookhaven National Lab.** - M.A. Green
- **Max Planck Institut fur Physik** - U. Haeberlen
- **National Laboratory for High Energy Physics (KEK)** - A.Yamamoto
- **Tokyo Institute of Technology** - M. Iwasaki, M. Kawamura
- **Yale University** - H. Deng, S.K. Dhawan, F.J.M. Farley, M. Grosse-Perkekamp, V.W. Hughes,D. Kawall, S.I. Redin
- **University of Heidelberg** - A. Grossmann, K. Jungmann, G. zu Putlitz
- **University of Illinois** - P. Debevec, W. Deninger, D.W. Hertzog, C. Polly, S. Sedyky, D. Urner
- **University of Minnesota** - P. Cushman, L. Duong, S. Giron, J. Kindem, R. McNabb, D. Miller, C. Timmermans, D. Zimmerman

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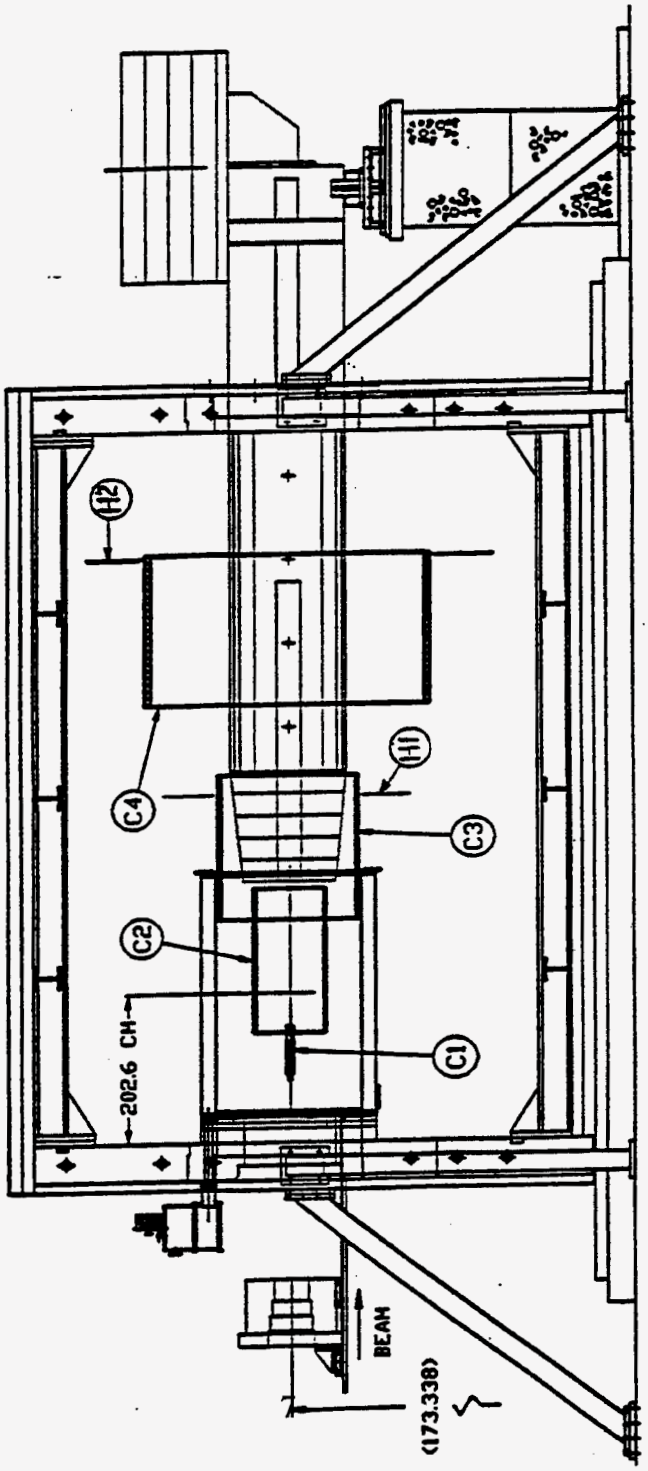
The anomalous gyromagnetic ratio of the muon (g-2) will be measured to 0.35 ppm or a factor of 20 times better than it is currently known. The predicted contribution to (g-2) from the first and second order $W^{\pm}$ and Z^0 radiative corrections is predicted to be 1.3 ppm, so this experiment will provide a direct test of the electroweak radiative corrections, and hence of the renormalizability of the Glashow-Weinberg-Salam theory. Since a_{μ} is sensitive to a wide range of non-standard model effects there is a window in which to search for new physics. W or muon substructure, super-symmetry and the existence of new gauge bosons are several possibilities. A 14 m diameter superferric muon storage ring is now operational. Data collection began in FY 1997.


H2
H1
C4
C3
C2
C1
202.6 CH
BEAM
(173.338)

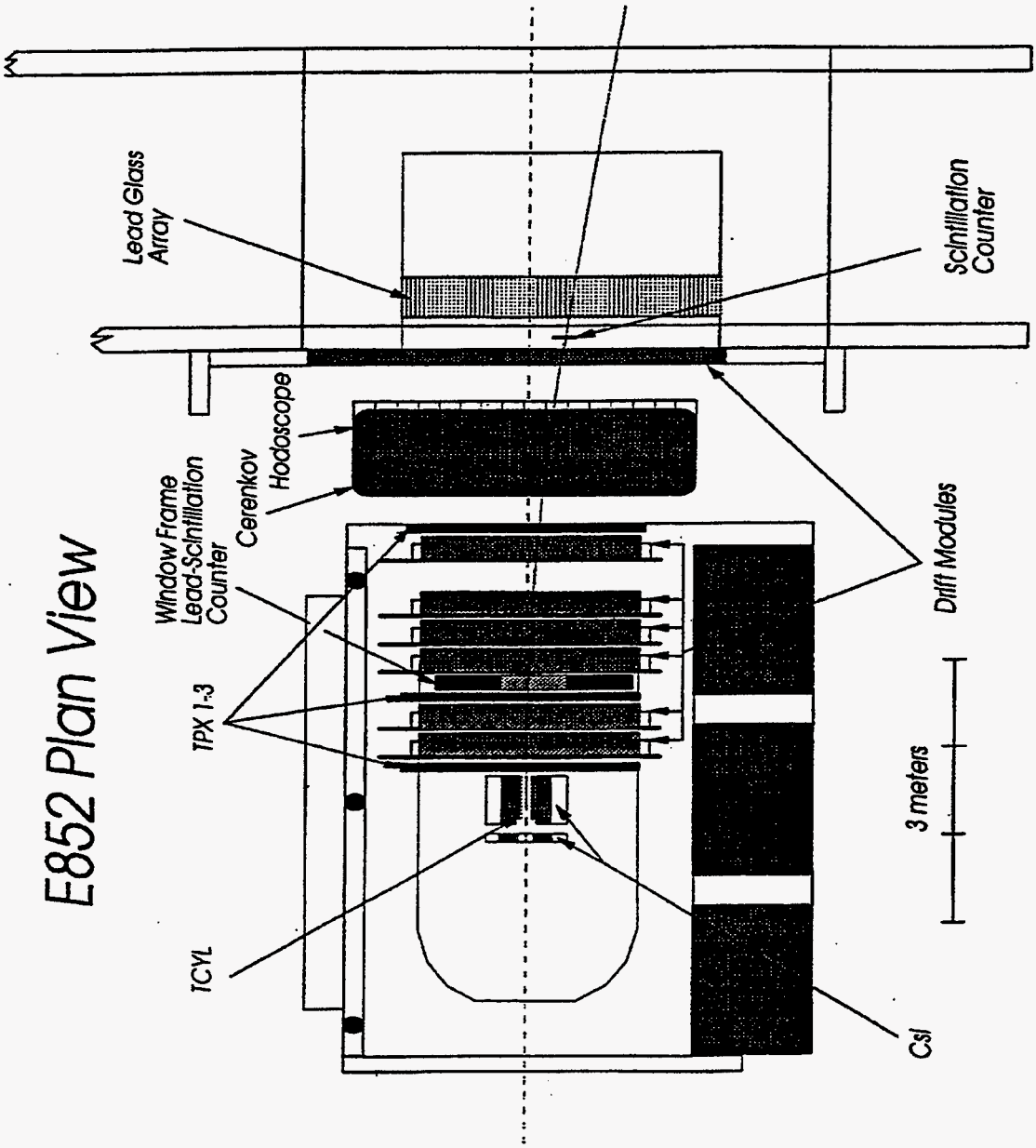
Beam: C1
Status: In progress
Hours Charged/Approved: 2844/4000

EVA, A SOLENOIDAL DETECTOR FOR LARGE ANGLE EXCLUSIVE REACTIONS EXPERIMENT 850 - DETERMINING COLOR TRANSPARENCY

Spokesmen: A.S. Carroll and S. Heppelmann

- **Brookhaven National Laboratory**
  D.S. Barton, G. Bunce, A.S. Carroll, S. Gushue, Y.I. Makdisi, T. Roser
- **J.I.N.R., Dubna**
  Y. Panebratsev, S. Shimanskiy , I. O. Tsvetkov
- **Mt. Holyoke College** - H. Nicholson, C. S. Sutton
- **Pennsylvania State University**
  V. Baturin, S. Heppelmann, A. Leksanov, E. Minor, A. Ogawa, D. Tsalov
- **Tel-Aviv University**
  H. Aclander, J. Alster, S. Durant, E. Kosonovsky, I. Mardor, Y. Mardor, I. Navon, E. Piasetzky
- **University of Auckland** - N. Christensen
- **University of Massachusetts-Dartmouth** - J.J. Russell

In order to extend the range and sensitivity of measurements of large angle exclusive reactions, a new solenoidal detector, EVA, has been built. This detector increases the solid angle acceptance by over a factor of 20 over the existing dipole detector of E834, and provides for momentum measurements of all outgoing particles. The initial experiment, E850, has made new determinations of color transparency for carbon nuclei. Also measurements of carbon spectral functions at large momentum transfers were made. With a neutron detector, the correlations of neutrons associated with quasi-elastic (p,2p) reactions were determined. The solenoidal magnet which has not had reliable operation, has been substantially rebuilt, and now performs in a satisfactory manner.


E852 Plan View
Lead Glass Array
Scintillation Counter
Hodoscope
Cerenkov
Window Frame Lead-Scintillation Counter
TPX 1-3
TCYL
Drift Modules
3 meters
CsI

Beam: A1
Status: In Progress
Hours Charged/Approved: 5309/6109

EXPERIMENT 852 - SEARCH FOR MESONS WITH UNUSUAL QUANTUM NUMBERS

Spokesmen: N. Cason and S.U. Chung

- **Brookhaven National Laboratory** - S.U. Chung, K. Danyo-Blackett, R. W. Hackenburg, K. Olchanski, D.P. Weygand, H.J. Willutzki
- **Indiana University** - B.B. Brabson, R.R. Crittenden, A.R. Dzierba, R. Gardner, J. Gunter, R. Lindenbusch, D.R. Rust, E. Scott, P.T. Smith, T. Sulanke, S. Teige,
- **University of Massachusetts-Dartmouth** - Z. Bar-Yam, J. Dowd, P. Eugenio, M. Hayek, W. Kern, E. King
- **Moscow State University** - L. I. Belzer, V. A. Bodyagain, A. Demianoi, A.M. Gribushin, O.L. Kodolva, V.L. Korotkikh, M.A. Kostin, N. Kurglov, A.I. Ostrovidov, A. Proskuryakov, L. I. Sarycheva, N. B. Sinev, I. N. Vardanyan, A. A. Yershov
- **Northwestern University** - D. S. Brown, T. Pedlar, K. Seth, J. Wise, D. Zhao
- **University of Notre Dame** - T. Adams, J.M. Bishop, N.M. Cason, E.I. Ivanov, J.M. LoSecco, J. J. Manak, A. Sanjari, W. D. Shephard, D. L. Stienike, S. A. Taeger, D.R. Thompson
- **Institute for High Energy Physics - Protvino, Russia** - S. Denisov, V. A. Dorofeev, A. Dushkin, I. A. Kachaev, V. Kochetkov, V. Lipaev, A. V. Popov, D. I. Ryabchikov, I. Shein, A. Soldatov
- **Rensselaer Polytechnic Institute** - G. Adams, J. P. Cummings, J. Kuhn, J. Napolitano, M. Nozar, J. Smith, D. White, M. Witkowski

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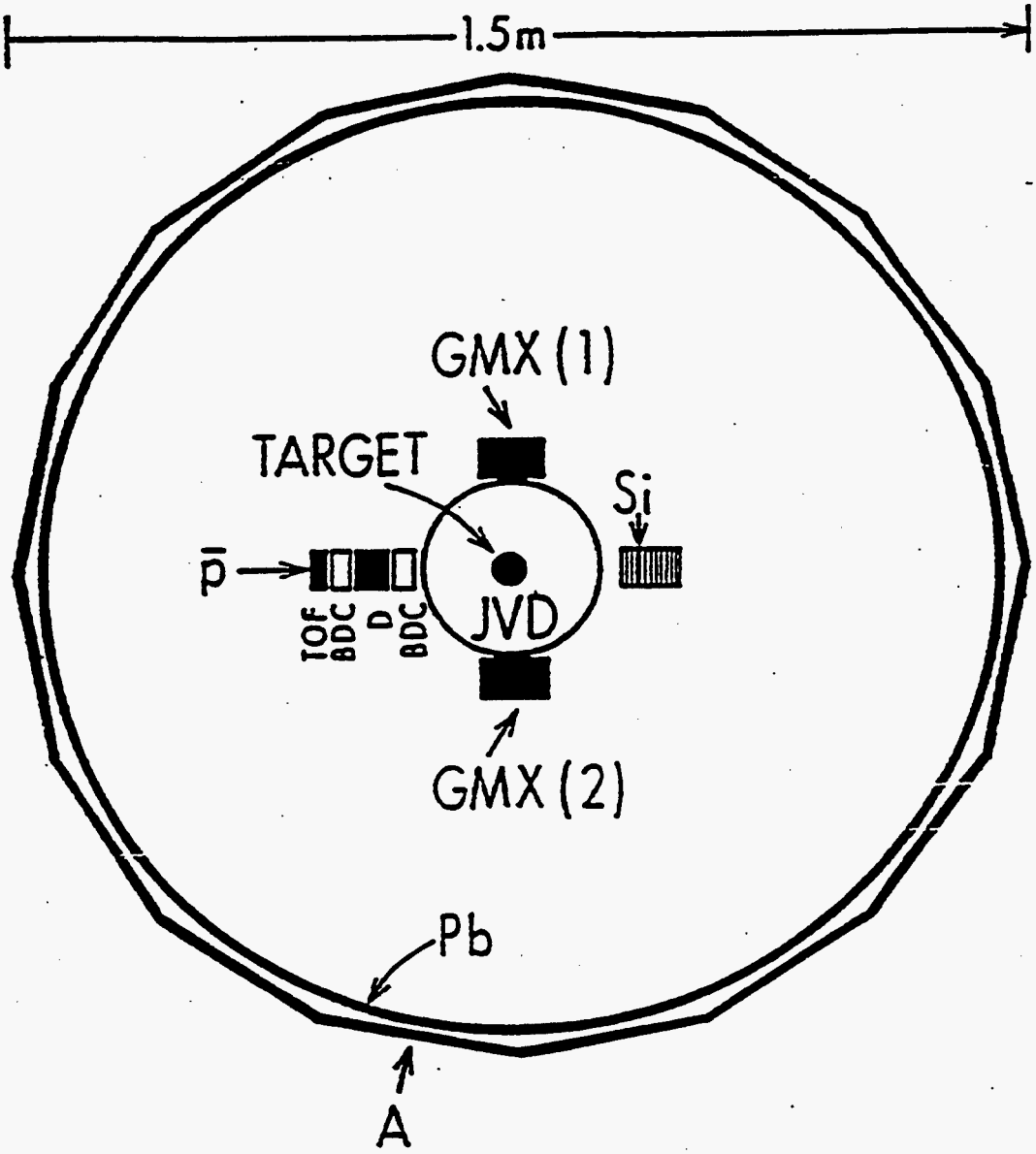
Despite a number of experimental searches there is still no unambiguous candidate for a glueball, hybrid or four-quark state, although QCD predicts such objects. However, there are some tantalizing states, among them the M°(1405) which has exotic $J^{PC} = 1^{-+}$ and the scalar G(1590) which has unusual branching ratios for a quark-antiquark state.

The experimenters will study these and other states, concentrating on decay modes of mesons with multi photons and 0, 1 or 2 charged particles. The detector is built around the MPS. The target will be sur-rounded by a CsI veto, charged particle detectors and a scintillation counter. The target will be followed by charged particle detectors,a Cerenkov counter and a 3000-element lead glass calorimeter to detect photons from meson decays. This experiment aims to search for exotic mesons that cannot be a pair of a quark and an anti-quark. These include glueballs (no valence quarks), multi-quarks (two or more pairs of a quark and an anti-quark) and hybrids (a pair of a quark and an anti-quark, plus a valence gluon).


1.5m
GMX (1)
TARGET
Si
$\bar{p}$
TOF
BDC
D
BDC
JVD
GMX (2)
Pb
A

Beam: C8
Status: Approval withdrawn FY 1997
Hours Charged/Approved: 0/600

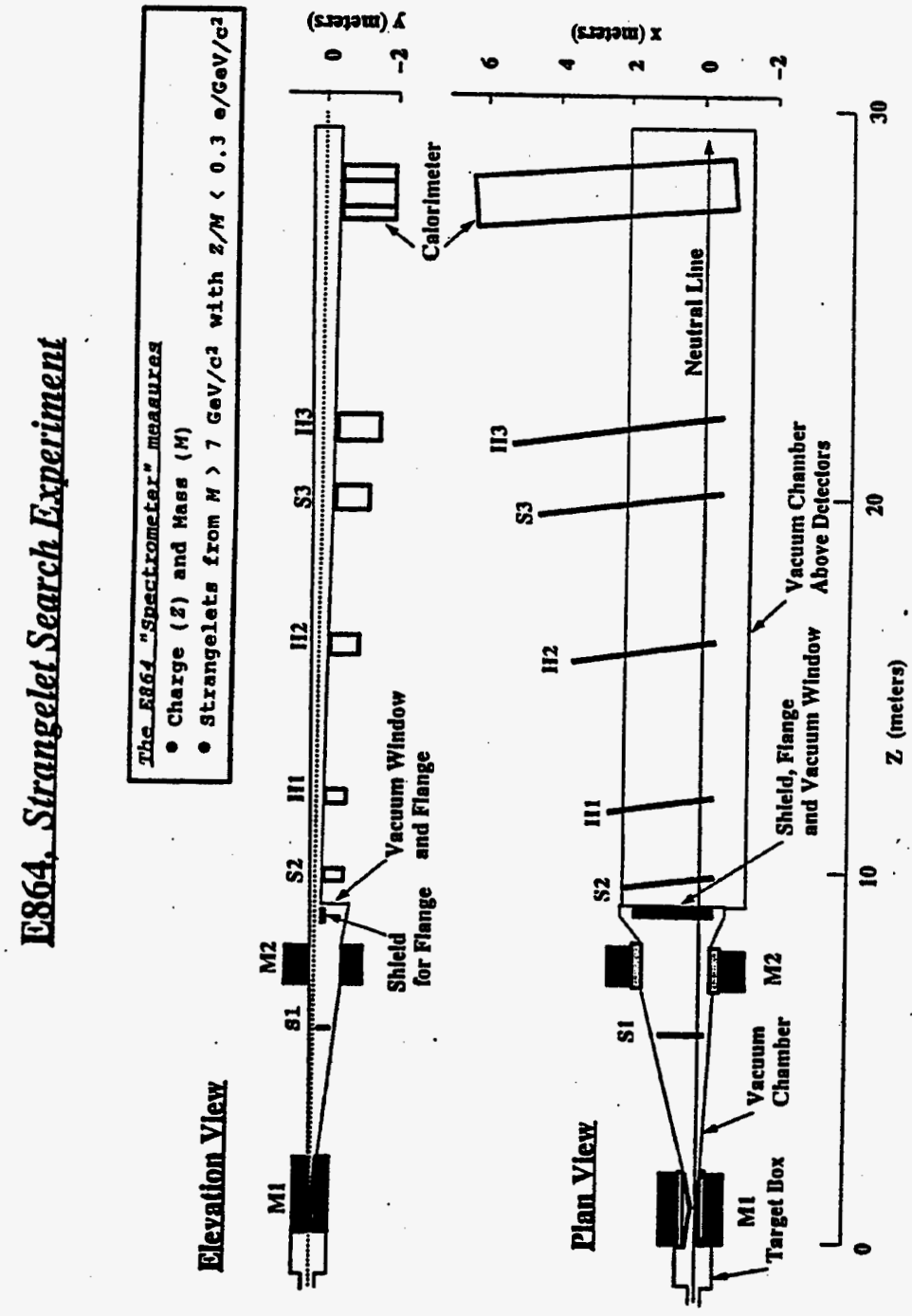
EXPERIMENT 856 - EXPLORATION OF THE BIOMEDICAL POTENTIAL OF ANTIPROTONS

Spokesman: T. Kalogeropoulos

- **Brookhaven National Laboratory**
  S. Bart, G. Bennett, R. Chrien, M. Sakitt, R. Sawafta, R. Sutter
- **Case Western Reserve University** - W. Fickinger, D. K. Robinson
- **Harvard Cyclotron Laboratory** - A. Koehler
- **Loma Linda University** - J. Archambeau
- **Syracuse University** - T. Kalogeropoulos, J. Reed, Z. Sobolewski
- **SUNY Health Science Center** - D. Bassano, S. Manglos, S. C. Prasad
- **University of Massachusetts** - A. B. Brill

The potential of antiprotons for practical applications within present antiproton collection capabilities is promising. Suggested applications include direct 3D electron density imaging, 3D multi-elemental imaging, guiding precise and easy delivery of ion beams to targets, and radiation therapy.

In this initial phase of the research, the following physics questions will be addressed: (a) Comparison of antiproton capture rates in complex targets with the Z-law; (b) Studies of the annihilation mechanism in nuclei. These studies of physics are interesting on their own right and will provide basic information in evaluating the proposed applications as well.


E864, Strangelet Search Experiment
The E864 "Spectrometer" measures
• Charge (Z) and Mass (M)
• Strangelets from M > 7 GeV/c² with Z/M < 0.3 e/GeV/c²
Elevation View
Plan View
Y (meters)
X (meters)
Z (meters)
M1
M2
S1
S2
I11
I12
S3
I13
Vacuum Window and Flange
Shield for Flange
Calorimeter
Neutral Line
Vacuum Chamber Above Detectors
Shield, Flange and Vacuum Window
Vacuum Chamber
Target Box
M1 & M2 = dipole spectrometer magnets
I11,I12 & I13 = scintillation hodoscopes
S1,S2 & S3 = straw tube arrays

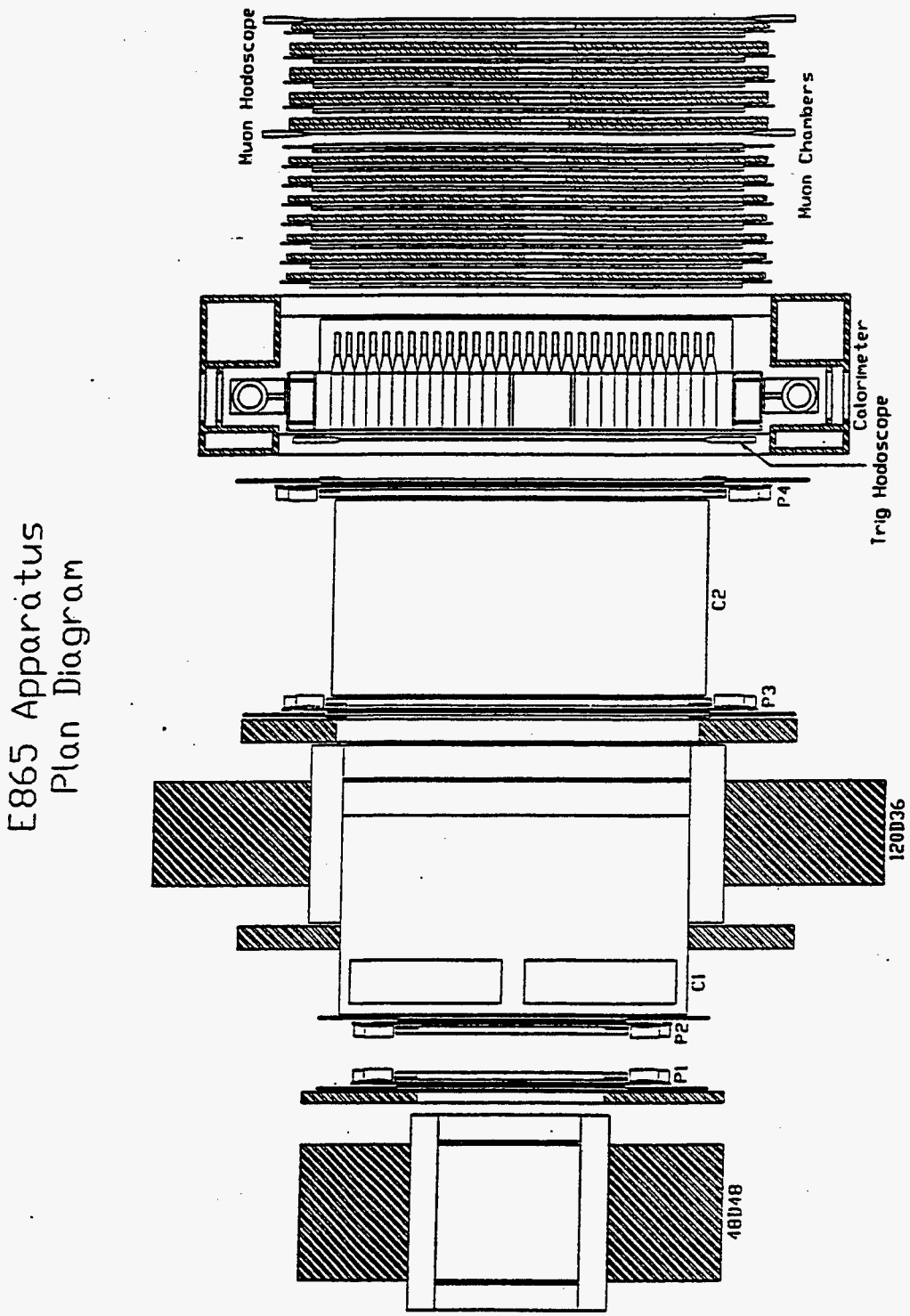
Beam: A3
Status: In Progress
Approved Hours: 2191/3500

EXPERIMENT 864 - PRODUCTION OF RARE COMPOSITE OBJECTS IN RELATIVISTIC HEAVY ION COLLISIONS

Spokesman: J. Sandweiss

- **Ames Laboratory** - H. Skank, G. Sleege
- **Brookhaven National Laboratory** - T. G. Throwe
- **Iowa State University** - L. Ewell, K. Haversten, J. C. Hill, B. Libby, F. K. Wohn
- **Massachusetts Institute of Technology** - E. S. Hafen, P. Haridas, I. Pless, G. Van Buren
- **Penn State University** - T. Armstrong, R. A. Lewis, G. A. Smith
- **Purdue University** - R. M. Davies, A. S. Hirsch, N. T. Porile, R. P. Scharenberg, B. K. Srivastava, B. C. Stringfellow, M. L. Tincknell
- **Vanderbilt University** - V. S. Greene, J. Reid
- **Wayne State University** - R. Bellwied, B. Bennett, T. Cormier, J. Hall, C. Pruneau
- **Yale University** - S. Coe, N. George, J. Lajoie, R. D. Majka, J. Nagle, J. K. Pope, F. S. Rotondo, J. Sandweiss, B. Shiva Kumar, A. J. Slaughter
- **University of Bari, Italy** - P. Spinelli
- **University of California-Los Angeles** - K. Barish, H. Z. Huang
- **University of Massachusetts** - M. S. Z. Rabin

The experimenters have begun to carry out a systematic set of measurements and searches for "composite" objects produced in high energy heavy ion collisions. These measurements are aimed at studies utilizing the heaviest ions available at the AGS, including gold ions. A major focus of the experiment is on charged composites; however, studies of neutral systems are also considered significant in the study. The experiment is designed to study particles produced in the central region of rapidity which are produced in central collisions. Since composite systems must be produced by the overlap of particles produced in the collision, it is expected that composites will be made mostly in the central rapidity region where overlaps would be most probable.


E865 Apparatus
Plan Diagram
Muon Hodoscope
Muon Chambers
Calorimeter
Trig Hodoscope
P4
C2
P3
120D36
C1
P2
P1
48D48

Beam: A1
Status: In Progress
Hours Charged/Approved: 5181/6500

EXPERIMENT 865 - PROPOSAL TO PERFORM AN IMPROVED SEARCH FOR THE DECAY $K^+ \rightarrow \pi^+\mu^+e^-$

Spokesman: M. E. Zeller

- **Brookhaven National Laboratory** - D. Lazarus, L. Leipuner, H. Ma, B. Magurno, P. Rehak
- **Hampton University** - K. Assamagan, K. Baker
- **High Energy Physics Inst. Tibilsi State University** - N. Amaglobeli, Y. Bagaturia, D. Mazavia, T. Sachelashvili
- **Institute for Nuclear Research, Academy of Sciences of Russia (Moscow)** - G. S. Atoian, S. N. Gninenko, V. V. Issakov, V. Lebedev, A. A. Poblaguev, V. Postoev, A. Proskuryakov
- **Paul Scherrer Institute** - J. Egger, W. D. Herold, H. Kaspar, H. Weyer
- **Yale University** - D. Bergman, S. Dhawan, H. Do, W. Majid, M.E. Zeller
- **University of Basel** - W. Menzel
- **University of Bern** - J. Gasser
- **University of Connecticut** - J. Lozano
- **University of New Mexico** - J. Armendariz, B. Bassalleck, S. Eilerts, H. Fischer, J. Lowe, R. Stotzer, D. Wolfe
- **University of Pittsburgh** - R. Appel, C. Felder, B. Giles, D. E. Kraus, J.A. Thompson
- **University of Zurich** - S. Pislak, P. Robmann, P. Truoel

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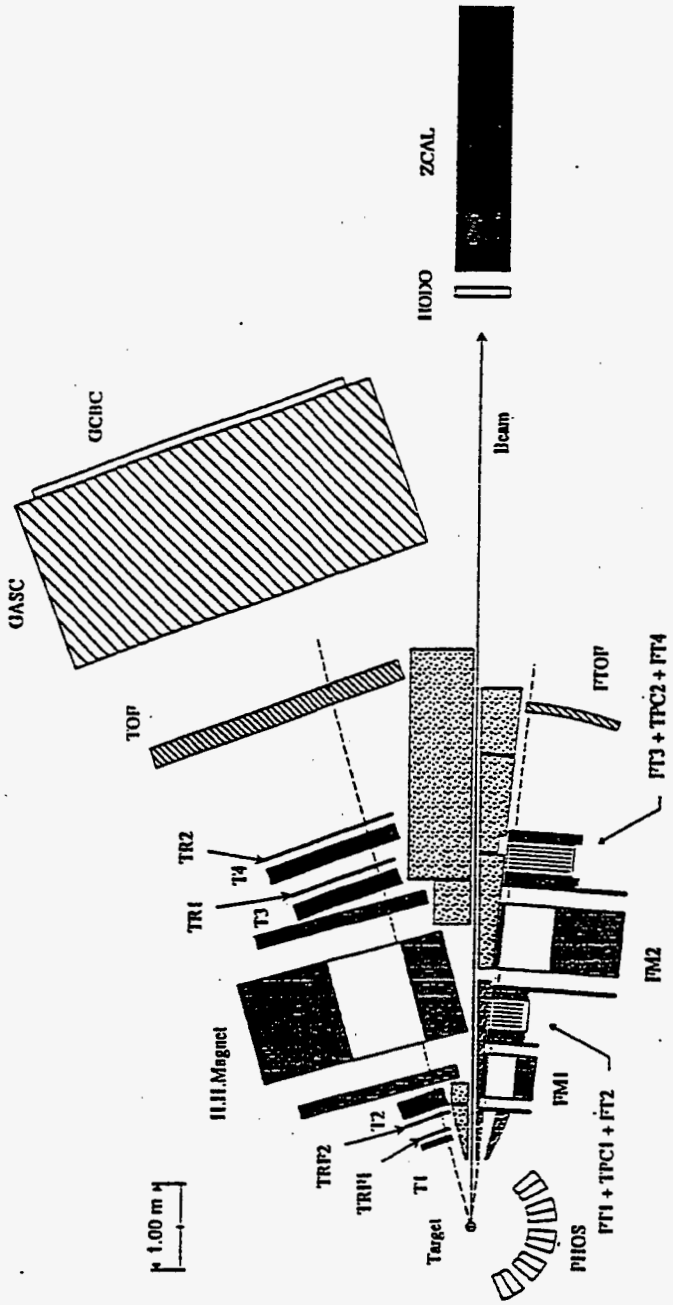
E865, a second generation search for $K^+ \rightarrow \pi^+\mu^+e^-$ at the branching ratio level of ~3 x 10^{-12}, a factor of 70 improvement over the previous limit of 2.1 x 10^{-10}. Data obtained in the FY95 run show a clear $K^+ \rightarrow \pi^+e^+e^-$ signal above background visible on one data tape or about one shift of running. The branching ratio for this decay was measured to be 2.8 x 10^{-7} in E851 and a few hours of running gathers more events than the world sample of 41 events that existed prior to the BNL rare kaon decay program. From this rate and those for $K^+ \rightarrow \pi^+\pi^+\pi^-$ and $K^+ \rightarrow \pi^+\pi^0$ followed by $\pi^0 \rightarrow e^+e^-\gamma$ we estimate our current branching ratio sensitivity to be $< 5 \times 10^{-11}$ for $K^+ \rightarrow \pi^+\mu^+e^-$, well beyond 2.2 x 10^{-10} obtained in E777.

An upgrade of the data acquisition system should result in a factor of two increase in data rate in FY96. Additions to the experiment include special triggering electronics for the decay $K^+ \rightarrow \pi^+\mu^+\mu^-$ and a beam tracking detector in order to improve vertex reconstruction and sensitivity to rare decays with missing energy.


ZCAL
HODO
Beam
GCHC
GASC
TOF
FTOF
FT3 + TPC2 + FT4
TR2
T4
TR1
T3
FM2
II.II.Magnet
FM1
T2
TRF2
TRF1
T1
Target
FT1 + TPC1 + FT2
PHOS
1.00 m

Beam: B1
Status: Completed FY 1996
Hours Charged/Approved: 2698/2600

EXPERIMENT 866 - STUDIES OF PARTICLE PRODUCTION AT HIGH BARYON DENSITY USING THE AU BEAM

Co-Spokesmen: **C. Chasman**

Alternating Co-Spokesmen: **H. Hamagaki and S. Steadman**

- **Brookhaven National Laboratory** - K. Ashktorab, D. Beavis, C. Chasman, Z. Chen, Y. Y. Chu, J. B. Cumming, R. Debbe, S. Gushue, J. H. Lee, M. LeVine, B. Moskowitz, C. Muentz, J. Olness, L. P. Remsberg, M. J. Tannenbaum, F. Videbaek, F. Zhu
- **Columbia University** - I. Chemakin, C. Y. Chi, B. A. Cole, M. Moulson, S. Nagamiya, F. Wang, Y. Wang, Y. Wu, X. Yang, W. A. Zajc
- **Institute for Nuclear Study-University of Tokyo** - Y. Akiba, H. Hamagaki, S. Homma, H. Sako
- **Kyoto University** - H. Kaneko
- **Lawrence Livermore Laboratory** - H. C. Britt, M. N. Namboordiri, T. Sangster, R. Soltz, J. H. Thomas
- **Massachusetts Institute of Technology** - L. Ahle, M. Baker, V. Cianciolo, J. Dunlop, G. Heintzelman, C. Ogilvie, J. Ryan, S. G. Steadman, G. S. F. Stephans, D. Woodruff, H. Yao
- **New York University** - B. Budick
- **Yonsei University** - J. Kang, E. J. Kim
- **University of California, Space Sciences Laboratory** - H. J. Crawford, J. Engelage, E. Judd
- **University of California at Riverside** - J. Chang, W. Eldredge, S.-Y. Fung, H. Liu, R. Seto, H. Xiang, Q. Xu, Q. Zhu
- **University of Maryland** - E. Garcia, A. Mignerey, J. Shea
- **University of Tokyo** - R. S. Hayano
- **University of Tsukuba** - A. Kumagai, K. Kurita, Y. Miake, S. Sato, K. Yagi

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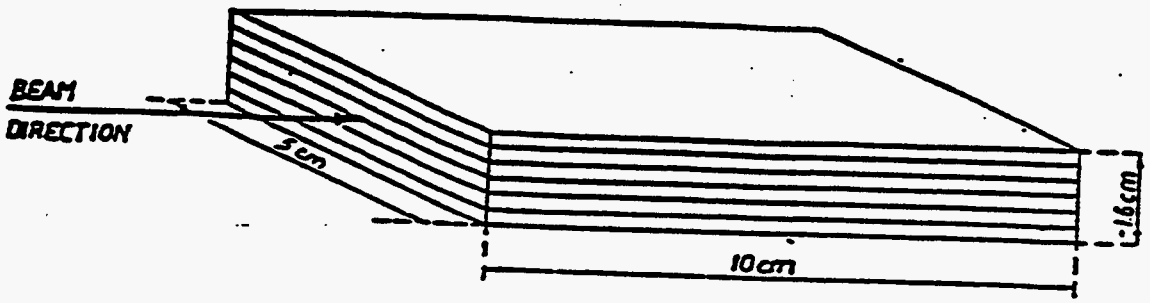
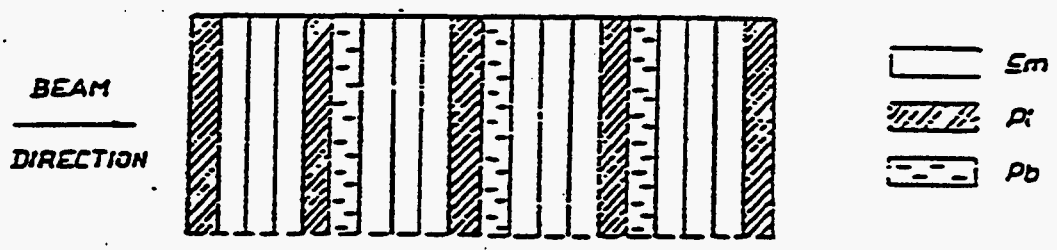
In keeping with the original purpose of E802 and E859, this experiment will continue the investigation of semi-inclusive single particle spectra using the gold beam: (1) to measure the particle momentum spectra as a function of p_t and y' (2) to find how these cross sections vary with "central" or "peripheral" collisions as taken from the event characterizing detectors; (3) to measure two-particle correlations; (4) to look for systemic variations in the cross sections with different beams and targets so as to clarify the reaction dynamics; and (5) to seek evidence in this measurement for the production of very dense nuclear matter, or ultimately, the quark-gluon plasma.



Schematic diagram of the emulsion stack exposures.



Schematic diagram of the emulsion chamber exposures.

Beam: A3
Status: Complete FY1996
Hours Charged/Approved: 29/47

EXPERIMENT 868 - INTERACTIONS OF 10.6 GEV/NUCLEON ^{197}AU NUCLEI IN NUCLEAR EMULSIONS

Spokesman: C.J. Waddington

- **Institute of Nuclear Physics, Krakow**
  A. Dambrowska, R. Holynski, A. Jurak, A. Olszewski, M. Szarska, A. Trzupek, B. Wilczynska, H. Wilczynski, W. Wolter, B. Wosiek, K. Wozniak

- **Institute of Theory and Experimental Physics Moscow**
  A.I. Dubinina, O.K. Egorov, E.D. Kolganova, E.A. Pozharova, T.Yu. Skorotko, V.A. Smirnitski

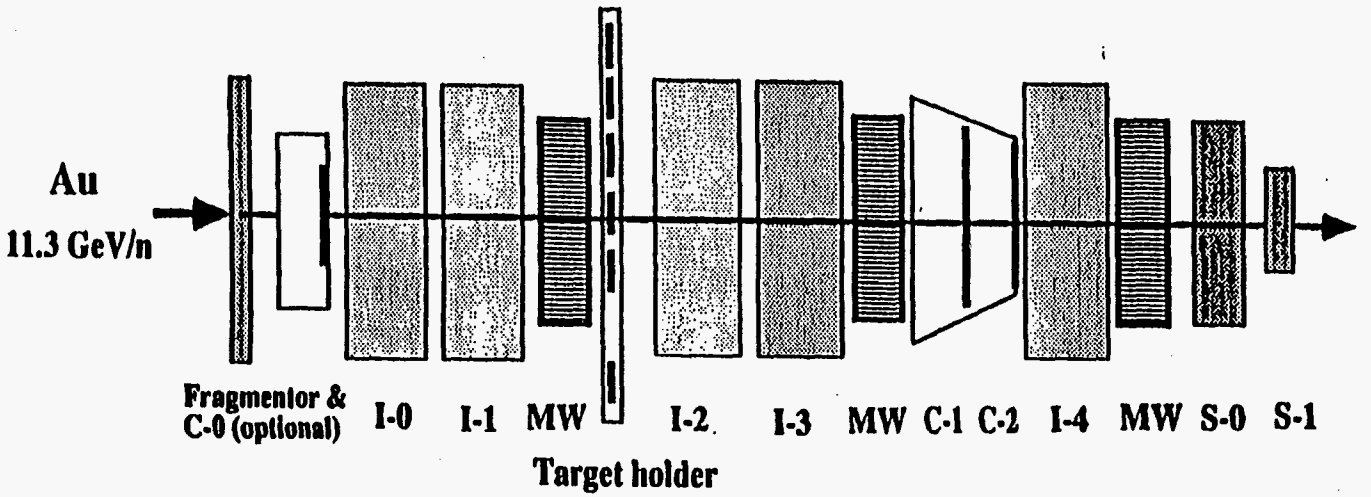
- **Louisiana State University**
  M.L. Cherry, P. Dienes-Jones, W.V. Jones, K. Sengupta, J.P. Wefel

- **University of Minnesota** - C.J. Waddington

The Krakow-Louisiana-Minnesota (KLMM) collaboration has previously exposed small stacks of nuclear emulsions to the light nuclei beams available from the AGS, Exp. 808. The results of this work, when combined with similar exposures of stacks and chambers made at CERN to higher energy beams, EMU07, have been reported in a number of published papers. In April 1992, when beams of heavier nuclei became available with the commissioning of the Booster, the collaboration exposed stacks and chambers of nuclear emulsions to a beam of gold nuclei with a nominal energy of 10.6 GeV/nucleon. Excellent exposures were obtained and the emulsions successfully processed at Dubna. Analysis by Minnesota and Krakow of the interactions in these emulsions has been completed and some of the results published. Further analysis of specific aspects is continuing and further publications can be expected.

Another exposure, conducted by Minnesota, was made in January 1996 to a beam of 4.0 GeV/n gold nuclei. These emulsions have been processed in Dubna and returned to Krakow, where they will be analyzed. No analysis will be possible in Minnesota due to a lack of funding. Inspection of these emulsions show that they were successfully exposed but are characterized by a heavy background.

1992 BNL layout Exp 869



Schematic diagram of the detector setup used for the April 1992 AGS gold run. Ion chambers I – 0 to 4 are four gap parallel plate chambers filled with P10 gas. Cherenkov counters C – 0 to 3 contain radiators of Pilot 425 plastic mounted in white diffusion boxes. The multiwire proportional counters MW have 1 mm wire spacing. The target holder can place any of the targets in the beam by remote command. Thirty-two channels of data are recorded for each event at rates of up to 1,000 events/sec.

Beam: B1
Status: Complete FY1996
Hours Charged/Approved: 163/107

EXPERIMENT 869 - MEASUREMENT OF FRAGMENT YIELDS FOR 14 GEV/NUCLEON AU + X COLLISIONS

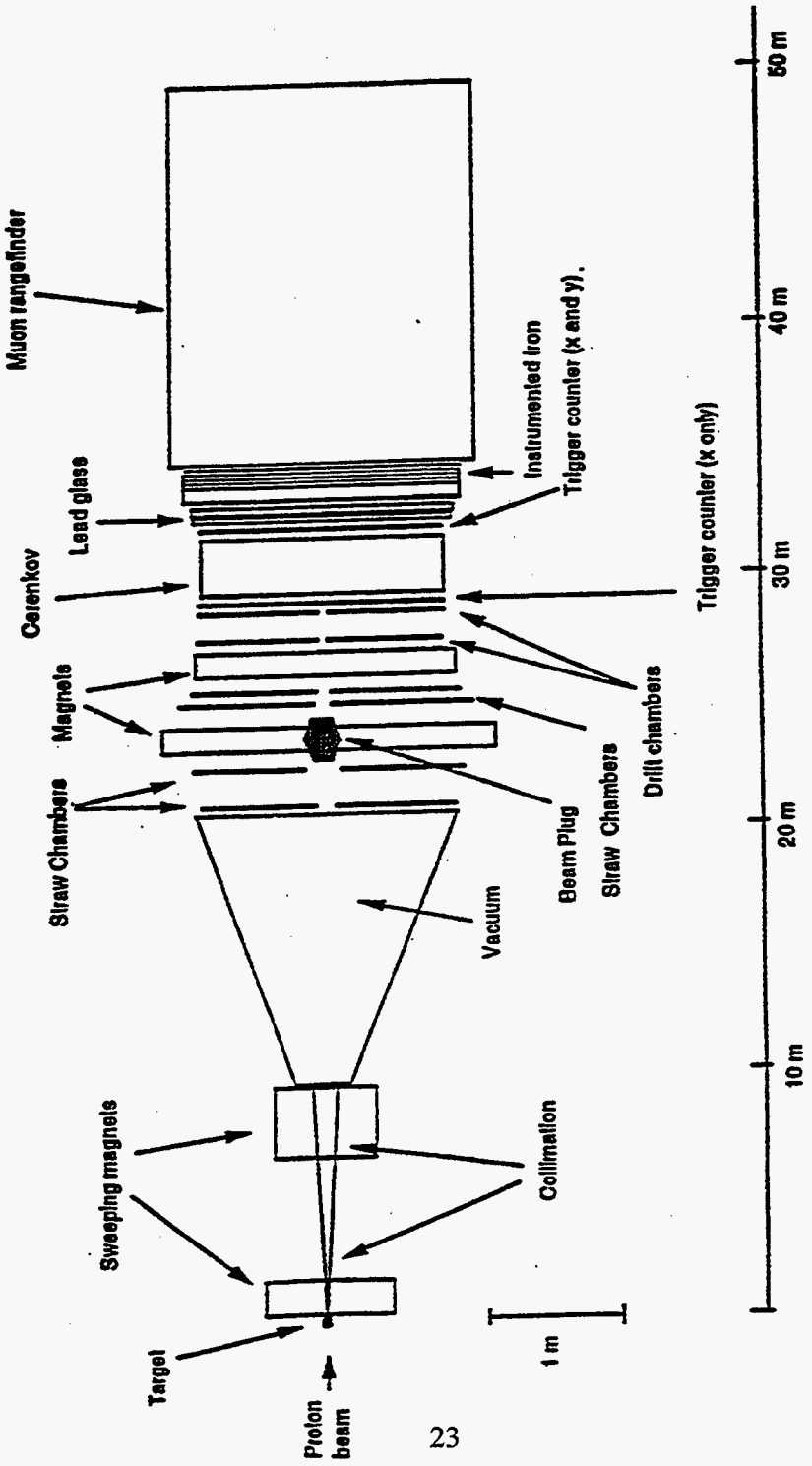
Spokesman: C. J. Waddington

- **Caltech** - J. R. Cummings, T. L. Garrard, E. C. Stone
- **Washington University** - W. R. Binns, L. Y. Geer, J. Klarmann
- **University of Minnesota** - B.S. Nilsen, C. J. Waddington

This experiment was proposed in order to continue a study of the fragmentation of ultra heavy, UH, nuclei begun at the Bevalac as part of a program of cosmic ray studies. It required additional experiments using the new Booster facility at the Brookhaven AGS. The experiments at the AGS would extend the energy range of the measurements upwards to match the energies of the majority of observed cosmic ray nuclei. These measurements would improve our ability to predict the partial cross sections for the production of fragments and allow better calculations of the abundances of the cosmic ray UH nuclei at the sources by taking account of the effects of propagation on the observed abundances. These measurements would also extend our current studies of the nuclear physics topics of factorization, limiting fragmentation, charge pickup, Coulomb dissociation and fission.

The detector array used during exposures to the AGS gold beam in April 1992 and January 1996 is shown. It consists of a combination of ion chambers and Cherenkov counters which identify the particles entering a target and then measure the sum of the charges emitted from interactions in the targets. During the 1992 exposure, 10.6 GeV/n gold projectiles were allowed to fall on targets of polyethylene, carbon, aluminum, copper, tin and lead. In each case sufficient data was taken to determine partial cross sections of 10 mb with better than 10% accuracy. In addition, a fragmentor was placed in the primary beam, generating secondary beams of fragments. Sufficient of these fragments were generated to allow partial cross sections to be determined in the targets for all projectiles between Z = 79 and 70. The excellent resolution of the detector array allows the identification of fragments with charges as low as Z = 50 coming from gold projectiles.

In January 1996 a beam of 4.0 GeV/n gold nuclei was used in a similar set-up. In addition, data were taken at seven other lower energies using a combination of internal and external degraders. These results will allow a determination of the energy dependence of the partial cross sections, which will be very important in modeling the propagation of the heavy cosmic ray nuclei through the interstellar medium. The analysis of these data has only just begun.


Muon rangefinder
Lead glass
Cerenkov
Magnets
Straw Chambers
Sweeping magnets
Target
Proton beam
Instrumented Iron
Trigger counter (x and y).
Trigger counter (x only)
Drift chambers
Straw Chambers
Beam Plug
Vacuum
Collimation
1 m
50 m
40 m
30 m
20 m
10 m

Beam: B5
Status: Complete in FY 1996
Hours Charged/Approved: 6178/7000

EXPERIMENT 871 - A NEW SEARCH FOR VERY RARE K_L^o DECAYS

Spokesmen: J. R. Kane, W. R. Molzon, J. L. Ritchie, S. G. Wojcicki

- **College of William and Mary**
  M. Eckhause, A.D. Hancock, C. Hoff, J.R. Kane, Y. Kuang, R.D. Martin, R.E. Welsh, E. Wolin

- **Stanford University**
  K. Ecklund, C. Hartman, M. Hebert, G.M. Irwin, M. Pommot-Maia, S. G. Wojcicki

- **University of California at Irvine**
  M. Bachman, D. Connor, P. DeCecco, N. Kanematsu, R. Lee, W. R. Molzon

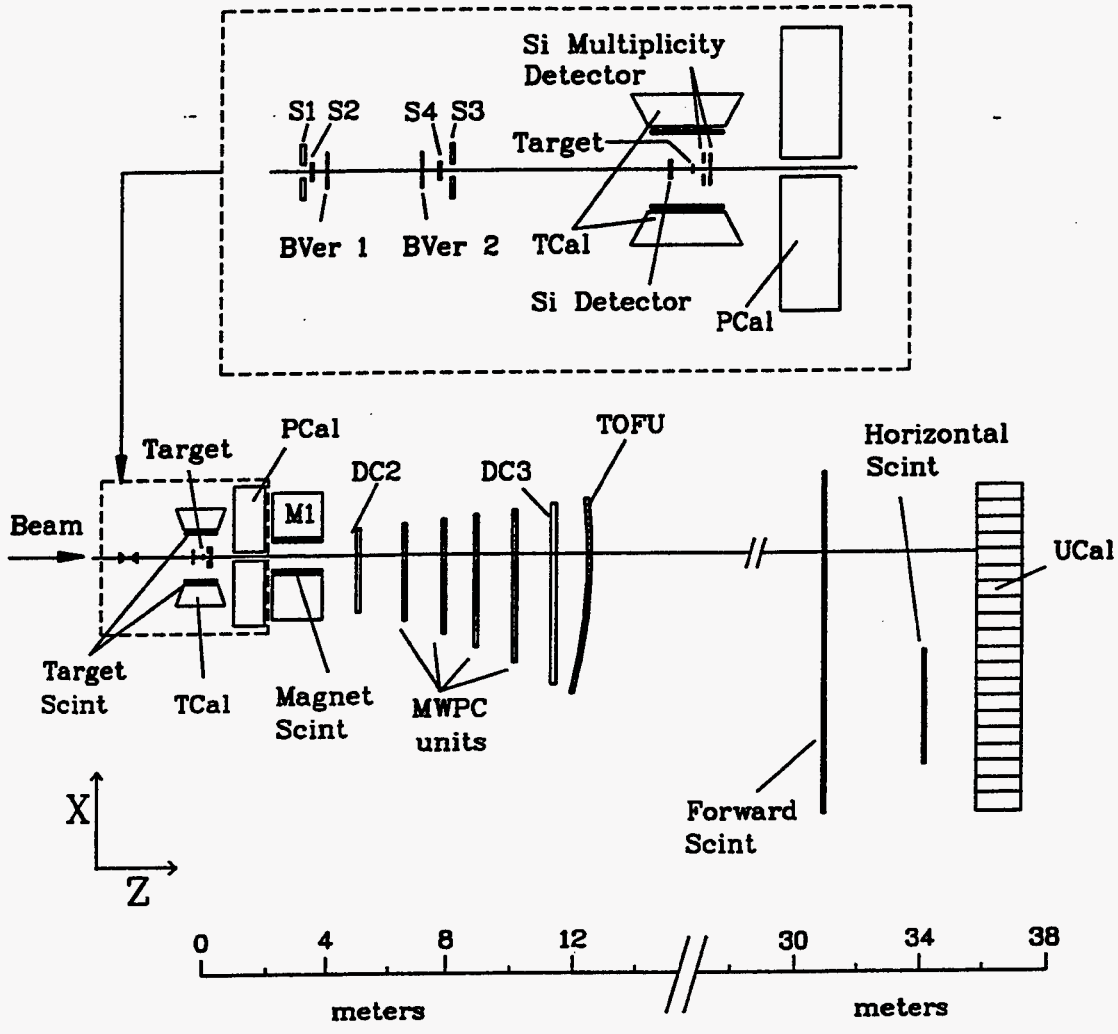
- **University of Richmond** - P. Rubin

- **University of Texas at Austin**
  D. Ambrose, S. Graessle, S. Hamilton, G. W. Hoffmann, K. Lang, M. R. Marcin, J. McDonough, A. Milder, P. J. Riley, J. L. Ritchie, C. B. Ware, S. Worm

---

This group is carrying out a new search for the decays $K_L^o \rightarrow \mu e$ and $K_L^o \rightarrow ee$, building on the experience from the recently completed experiment, E791. The $K_L \rightarrow \mu\mu$ branching ratio measurement will also be improved. The final E791 single event sensitivity for $K_L^o \rightarrow \mu e$ was about 1-2 x 10^{-11}. The new experiment will reach a single event sensitivity below 10^{-12}, and if no events are observed, will set an upper limit of about 2 x 10^{-12}. About 10,000 $K_L^o \rightarrow \mu\mu$ decays will also be observed.

The experiment takes the novel approach of stopping the neutral beam in a beam stop near the upstream end of the spectrometer.


Si Multiplicity
Detector
S1 S2
S4 S3
Target
BVer 1
BVer 2
TCal
Si Detector
PCal
Target
PCal
TOFU
Horizontal
Scint
DC2
DC3
Beam
M1
UCal
Target
Scint
TCal
Magnet
Scint
MWPC
units
X
Z
Forward
Scint
0
4
8
12
30
34
38
meters
meters

Beam: C5
Status: Completed FY 1996
Hours Charged/Approved: 2708/2600

EXPERIMENT 877 - STUDY OF RELATIVISTIC NUCLEAR COLLISIONS WITH HEAVY BEAMS USING THE E814 4π CALORIMETRY AND MODIFIED FORWARD SPECTROMETER

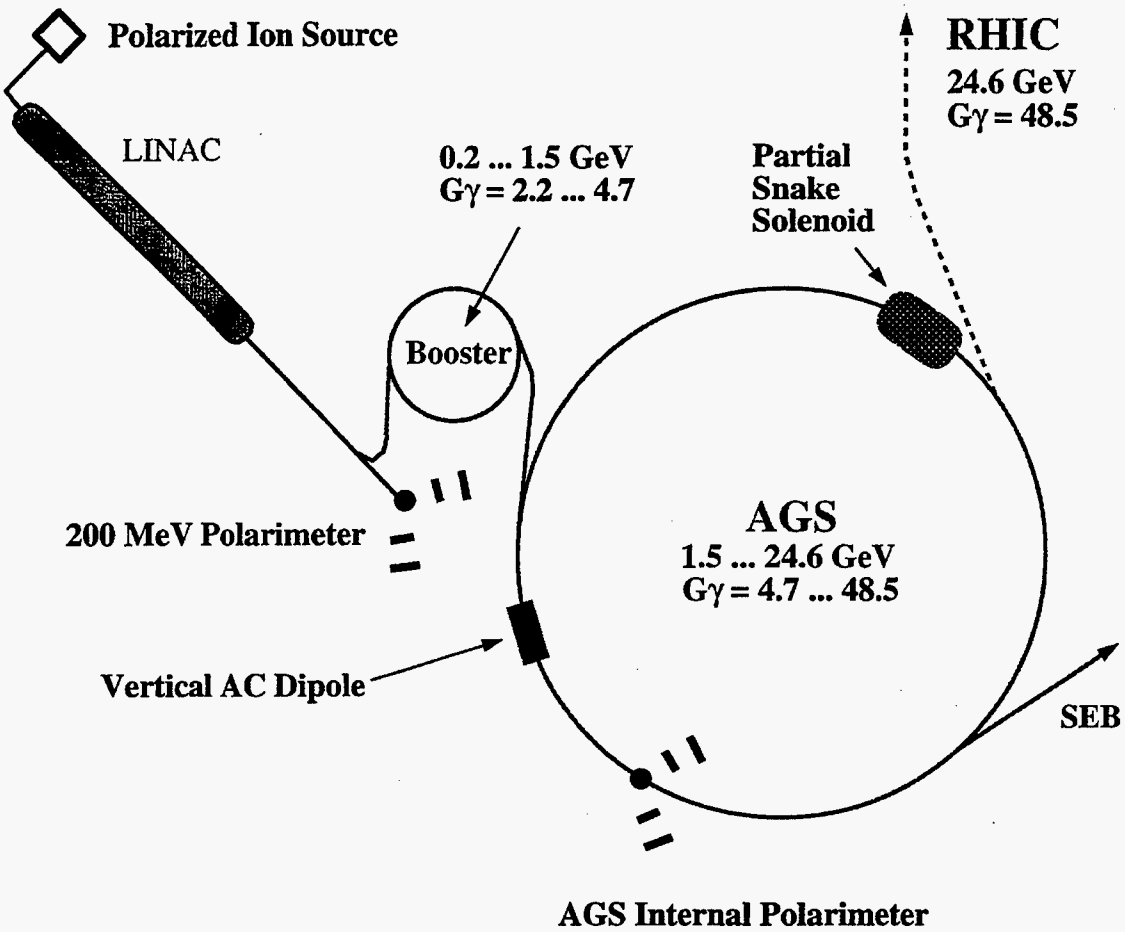
Spokesman: P. Braun-Munzinger

- **Brookhaven National Laboratory**
  G. David, T. Ludlam, S. McCorkle, E. O'Brien, M. Rosati, C. Woody
- **GSI, Darmstadt** - N. Herrmann
- **Idaho National Engineering Laboratory** - J. Cole, M. Drigert, E. Reber
- **McGill University** - J. Barrette, Y. Dai, R. Lacasse, S. K. Mark, L. Normand, N. Starinsky
- **SUNY at Stony Brook** - R. Bersch, P. Braun-Munzinger, T. K. Hemmick, B. Hong, S. Johnson, Y. Kwon, D. Miskowiec, S. Panitkin, P. Paul, T. Piazza, J. Stachel, M. Trzaska, T. Vongpaseuth, J. Wessels, Y. Zhang, C. Zou
- **Wayne State University**
  R. Bellwied, T. Budny, T. Cormier, A. French, F. Gang, J. Hall, B. Kim, K. Lahab, Q. Li, C. Pruneau, J. Sheen, H. Xiong
- **University of Pittsburgh** - W. Cleland, M. Clemen, U. Sonnadara, S. Voloshin
- **University of São Paulo** - N. DaSilva, O. Dietzsch, M. Takagui

Using an upgraded E814 set-up, this experiment proposes to study central collisions between heavy nuclei and projectiles from the Booster/AGS accelerators. The main emphasis is on a detailed study of the energy flow into 4π and measurements of the spectra of nucleons and produced particles for rapidities $y > 1.5$ and low transverse momenta, with event characterization over the full solid angle. In addition, nucleons, nuclear fragments and produced particles in the target fragmentation region will be measured.

Polarized Proton Experiments in the AGS with a Partial Siberian Snake (E880)

(ANL,BNL,INDIANA,TRIUMF,KEK,RIKEN,IHEP)



Beam: AGS Internal Beam
Status: In Progress
Hours Charged/Approved: 729/320

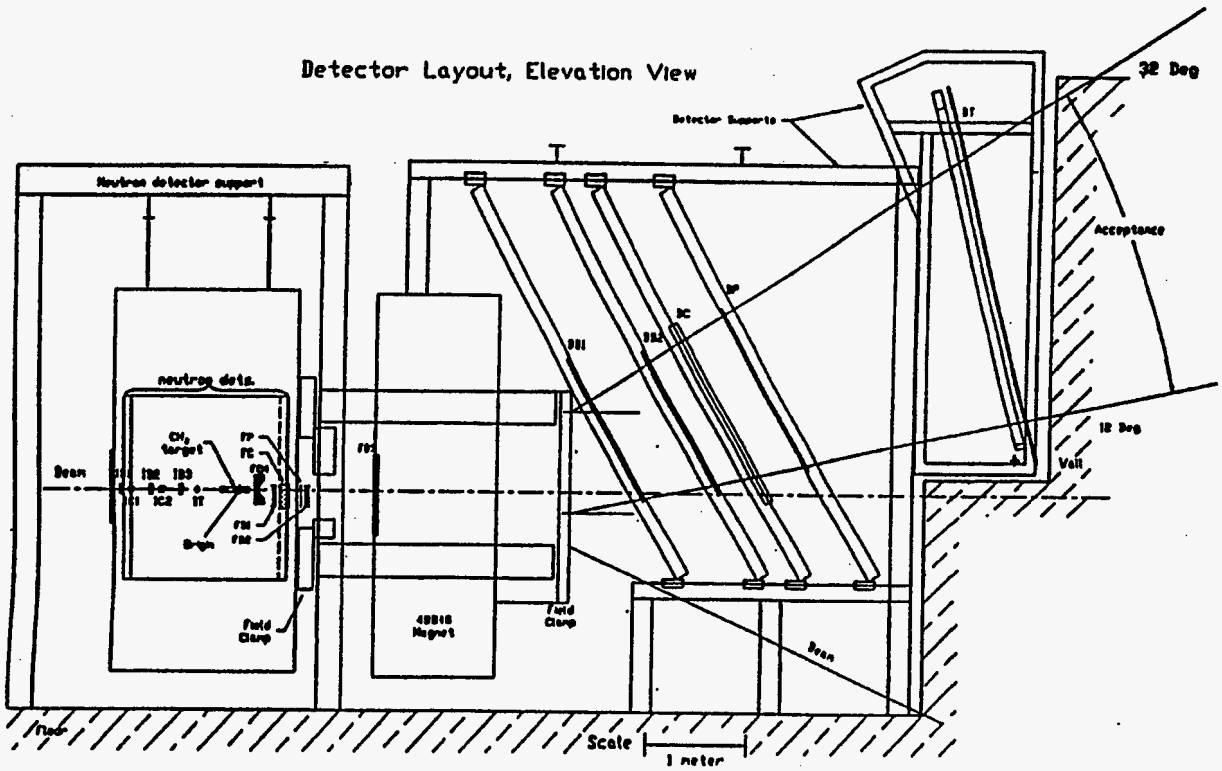
EXPERIMENT 880 - THE EFFECTS OF A PARTIAL SIBERIAN SNAKE ON POLARIZATION AT THE AGS

Spokesmen: S. Y. Lee and T. Roser

- **Argonne National Laboratory** - C. Allgower, M. Bai,[1] K. Krueger, H. Spinka, L. Teng, D. G. Underwood, A. Yokosawa
- **Brookhaven National Laboratory** - L. Ahrens, J. Alessi, K. Brown, G. Bunce, P. Cameron, E. D. Courant, J. W. Glenn, H. Huang, P. Ingrassia, Y. Y. Lee, A. Luccio, Y. I. Makdisi, F.Mariam, L. Ratner, K. Reece, T. Roser, J. F. Skelly, A. Soukas, M. Syphers, S. Tepikian, R. E. Thern, N. Tsoupas, W. van Asselt, N. Williams
- **Fermilab** - V. Bharadwaj, S. Hseuh
- **Indiana University IUCF** - P. Chu, D. Jeon, W. Lamble, S.Y. Lee
- **Institute for High Energy Physics, Serpukhov** - A. Ufimtsev
- **KEK** - S. Hiramatsu, Y. Mori, H. Sato, K. Yokoya
- **Riken** - T. Katayama, M. Okamura, T. Tominaka
- **TRIUMF** - U. Wienands[2]

This group has built a 4.7 Tesla-meter room temperature solenoid which has been be installed in a 10-foot long AGS straight section. AGS polarized proton beam time is used to perform *partial snake experiments*. These experiments tested successfully the idea of using a partial snake to correct all de-polarizing imperfection resonances. Intrinsic depolarizing resonances are successfully overcome by using an AC vertical dipole to generate coherent betatron oscillation.

(1) Also at Indiana University
(2) Present address: SLAC



Detector configuration for ΛΛ experiment. Drift chambers ID1, ID2, and ID3 determine incoming K^- trajectory and are combined with upstream hodoscope data to determine K^- momentum. Drift Chambers FD1, FD2, FD3, BD1 and BD2 determine K^+ momentum. Scintillators IT and BT determine K^+ time-of-flight. Hodoscopes FP and BP determine spectrometer acceptance. Aerogel Cerenkovs IC1, IC2, FC, and BC reject pions. Hydrogen Cerenkov FCH rejects protons.

Beam: D6
Status: Complete in FY 1996
Hours Charged/Approved: 1617/2000

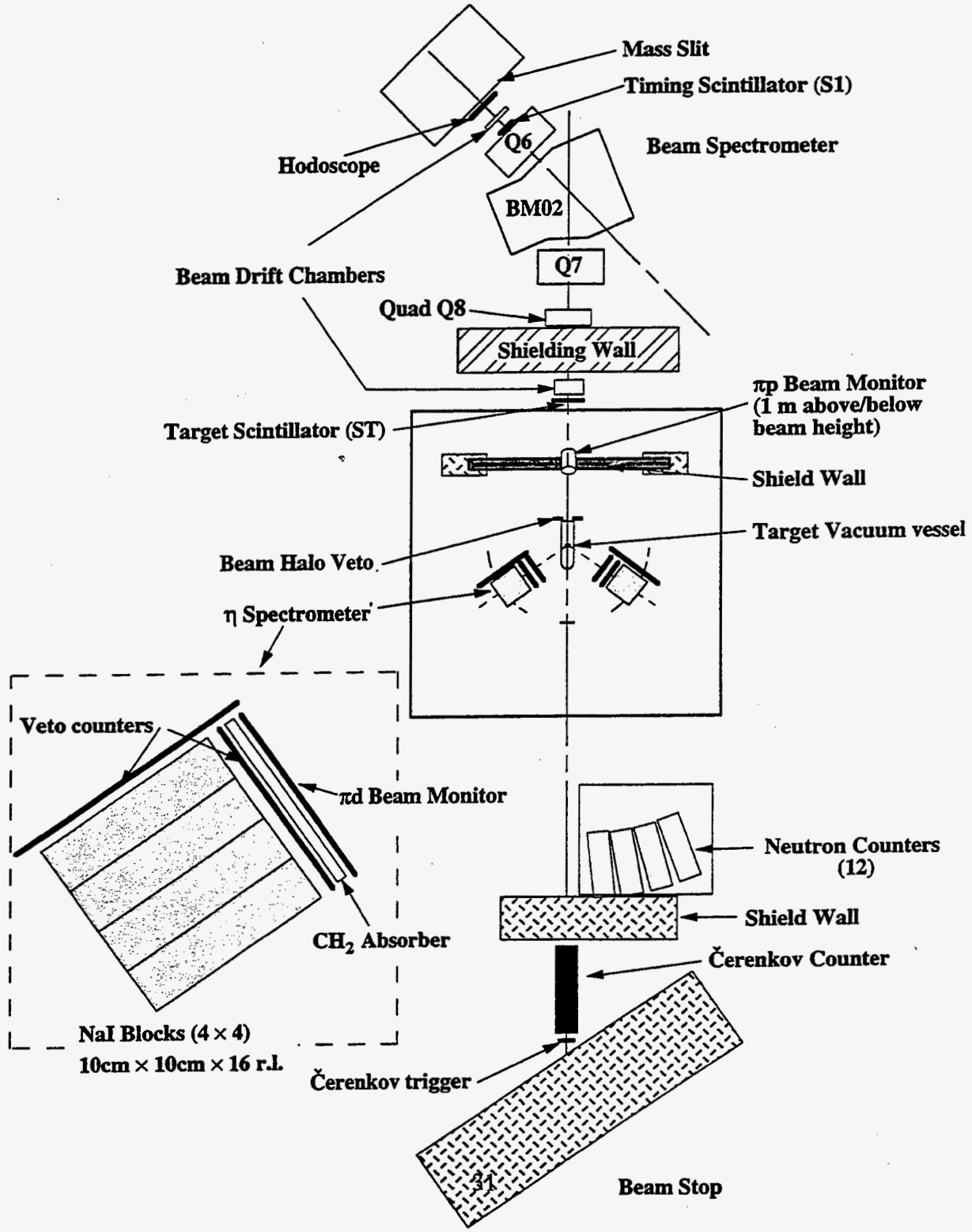
EXPERIMENT 885 - EXPERIMENT TO DETECT ΛΛ HYPERNUCLEI

Spokesmen: M. May, G. Franklin and C. Davis

- **Brookhaven National Laboratory** - D. Alburger, R. E. Chrien, M. May, P. H. Pile, A. Rusek, R. Sawafta, R. Sutter
- **Carnegie-Mellon University** - A. Berdoz, A. Biglan, D. Carman, G. Franklin, P. Khaustov, P. Koran, R. Magahiz, R. McCrady, C. Meyer, K. Paschke, B. Quinn, R. Schumacher
- **Freiburg University** - T. Bűrger, H. Fischer, J. Franz, K. Konigsmann, H. Schmidt
- **KEK** - T. Iijima
- **Kyoto University** - A. Ichikawa, K. Imai, Y. Kondo, K. Yamamoto, Y. Yosoi
- **Los Alamos National Laboratory** - P. Barnes, F. Merrill
- **Rutgers University** - R. Ransome
- **TRIUMF** - C. Davis, J. Doornbos
- **University of Kentucky** - V. Zeps
- **University of Kyoto-Sangyo** - F. Takeutchi
- **University of Manitoba** - J. Birchall, L. Gan, M. Landry, L. Lee, S. Page, D. Ramsay, V. Sum, W. van Oers
- **University of New Mexico** - B. Bassalleck, R. Stotzer

The existence and properties of ΛΛ hypernuclei are intimately related to the H particle, a proposed six quark state (uuddss) and the question of strange matter and strangelets. If the H exists and is sufficiently bound, two Λs in a hypernucleus will fuse to form an H. The collaboration has built an experiment to form and detect ΛΛ hypernuclei by stopping many more X^- than in any previous attempt.

Running of the experiment to date has primarily utilized a diamond target for high stopping rate of short-lived X^-. K^- at 1.8 GeV/c incident on a diamond target form X^- which stop in the diamond and K^+ which are detected in the spectrometer. Capture of X^- by carbon nuclei form ΛΛ hypernuclei. A scintillating fiber array tracks hypernuclear decay products, and a large TOF array detects the formation neutron. If H particles are formed, their decays can be detected. S = -2 systems formed in the initial K^- interaction will also be studied.


Mass Slit
Timing Scintillator (S1)
Q6
Beam Spectrometer
Hodoscope
BM02
Q7
Beam Drift Chambers
Quad Q8
Shielding Wall
πp Beam Monitor
(1 m above/below
beam height)
Target Scintillator (ST)
Shield Wall
Target Vacuum vessel
Beam Halo Veto
η Spectrometer
Veto counters
πd Beam Monitor
Neutron Counters
(12)
Shield Wall
Čerenkov Counter
CH_2 Absorber
NaI Blocks (4 × 4)
10cm × 10cm × 16 r.l.
Čerenkov trigger
Beam Stop

Beam: C8
Status: Complete FY 1995
Approved Hours: 1842/1519

EXPERIMENT 890 - A NEW TEST OF CHARGED SYMMETRY IN ETA PRODUCTION ON DEUTERIUM

Spokesmen: B. M. K. Nefkens, R. E. Chrien, J. C. Peng

- **Abilene Christian University** - M. Sadler, L. D. Isenhower
- **Brookhaven National Laboratory** - R. E. Chrien, R. Sawafta, R. J. Sutter
- **Forschungszentrum Jülich** - H. Seyfarth
- **George Washington University** - W. Briscoe, T. Morrison, Z. Papandreou
- **JINR, Dubna** - A. Efendiev
- **Los Alamos National Laboratory** - M. J. Leitch, J. C. Peng
- **Ruder Boskovic Institute** - M. Batinić, A. Marušić, I. Šlaus, A. Švarc
- **Petersburg Nuclear Physics Institute** - V. V. Abaev, V. S. Bekrenev, N. G. Kozlenko, S. P. Kruglov, A. B. Starostin
- **University of California-Los Angeles** - M. J. Clajus, S. McDonald, T. Moriwaki, B. M. K. Nefkens, J. W. Price, W. B. Tippens, D. B. White

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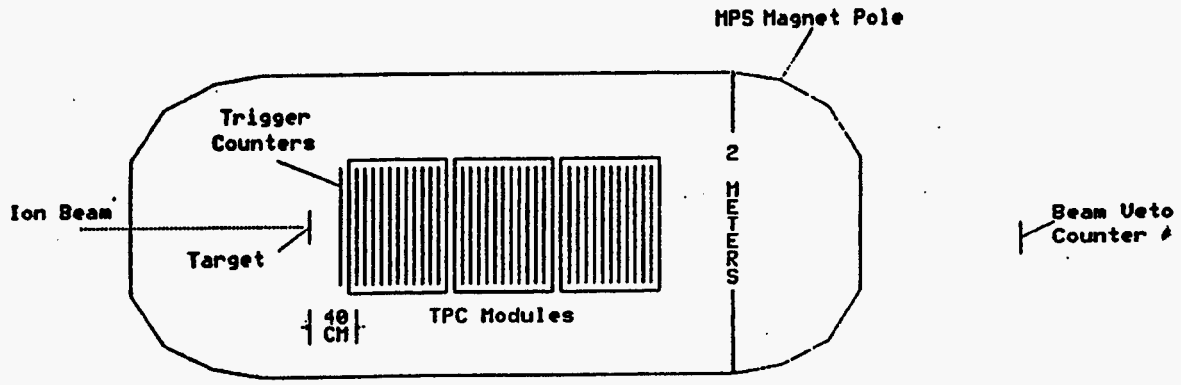
The experimenters have measured the ratio of η production on deuterium by positive and negative pions over the momentum range from 640 MeV/c to 755 MeV/c. This range spans the onset of the $S_{11}(1535)$ resonance, which has a very large branching ratio for η decay. The ηs are observed by detection of the photons from the neutral decay of the η into two photons.

The measurement of this ratio is a direct test of the validity of charge symmetry in this unexplored domain of nuclear physics. Violations of the symmetry are to be expected because of π^0-η mixing.

The experiment showed large asymmetries, ranging up to over 10% at the highest momentum pions.

A preliminary fit of the data to a model of η production which includes π°-η mixing as the only adjustable parameter requires a value for the mixing angle of ~ 1-2°. This is the first direct evidence of π°-η mixing in a nuclear environment .

The experiment also demonstrated the power of the AGS as a potent source of η mesons.


MPS Magnet Pole
Trigger Counters
Ion Beam
Target
40 CM
TPC Modules
2 METERS
Beam Veto Counter

Beam: A1
Status: Approval withdrawn FY 1997
Approved Hours: 184/1000

EXPERIMENT 891 - A SEARCH FOR QUARK MATTER (QGP) AND OTHER NEW PHENOMENA UTILIZING AU-AU COLLISIONS AT THE AGS

Spokesmen: E. D. Platner

- **Brookhaven National Laboratory** - S. E. Eiseman, A. Etkin, K. J. Foley, R. W. Hackenburg, R. S. Longacre, W. A. Love, A. C. Saulys
- **City College of New York** - C. S. Chan, E. Efstathiadis, M. A. Kramer, S. J. Lindenbaum*, K. Zhao, Y. Zhu
- **Rice University** - S. Ahmad, B. E. Bonner, J. A. Buchanan, J. M. Clement, G. S. Mutchler, E. D. Platner
- **University of California, Berkeley** - J. Marx, L. Schroeder

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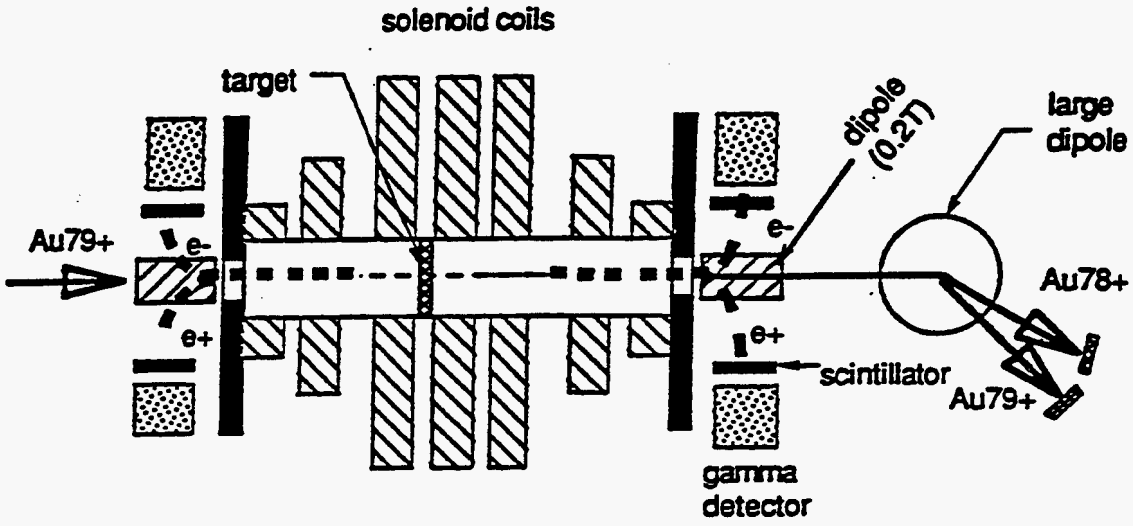
A program is underway to study Au-Au collisions at the AGS by measuring the angles and momenta of charged tracks, K_s^0's and Λ's using the TPC's and trigger detectors from E810. In order to handle the higher track multiplicities produced by Au beams, a modified geometric arrangement of the TPC modules is used. This program allows the experimenters to look for anomalous behavior in rapidities (or pseudorapidities), multiplicity, strangeness enhancements, $P_\perp$ ($E_\perp$), energy flow; possibly observe Hanbury-Brown and Twiss effects and other new phenomena. These observations are on an event-by-event basis so that particularly interesting classes of events can be selected and added together to search for new effects (like strangelets) implying a QGP or other new states of matter in a manner which tends to maximize signal-to-background ratios.

* Also associated with Brookhaven National Laboratory



Schematic diagram of the apparatus. The adiabatically decreasing solenoid field (shown schematically by the coil height) transports and focuses the positrons. Small dipoles at either end deflect the positrons and electrons into the scintillator detectors. These detectors measure the positron energy and, from time of flight, determine the emission angle of the positron. Positrons are verified by the 511 keV annihilation radiation detected in the gamma detectors. A large dipole magnet(s) located downstream from the APS separates the charge states of the emerging ions.

Beam: D
Status: Complete FY 1996
Hours Approved: 169/600

EXPERIMENT 892 - CAPTURE FROM PAIR PRODUCTION
Spokesman: H. Gould

- **Lawrence Berkeley Laboratory** - A. Belkacem, N. Claytor, T. Dinneen, B. Feinberg, H. Gould

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The experiment measures the cross section for capture from pair production and free pair production of 10 GeV/n Au^{79+} on Au collisions. This provides the first measurement of capture from pair production at energies above the 1 GeV/n region. The results are essential to understand the process, to guide ongoing efforts, to develop a nonperturbative theory, and to supply important data for the operations of RHIC. Capture from pair production is the process in which an electron-positron pair is produced by the transient electromagnetic field from a relativistic heavy-ion atomic collision (no nuclear contact) and the electron emerges bound to the projectile ion. It is unique because it is the only recombination process in which the cross section *increases* with energy at relativistic energies. At sufficiently high energies it is predicted to become the dominant re-combination mechanism.

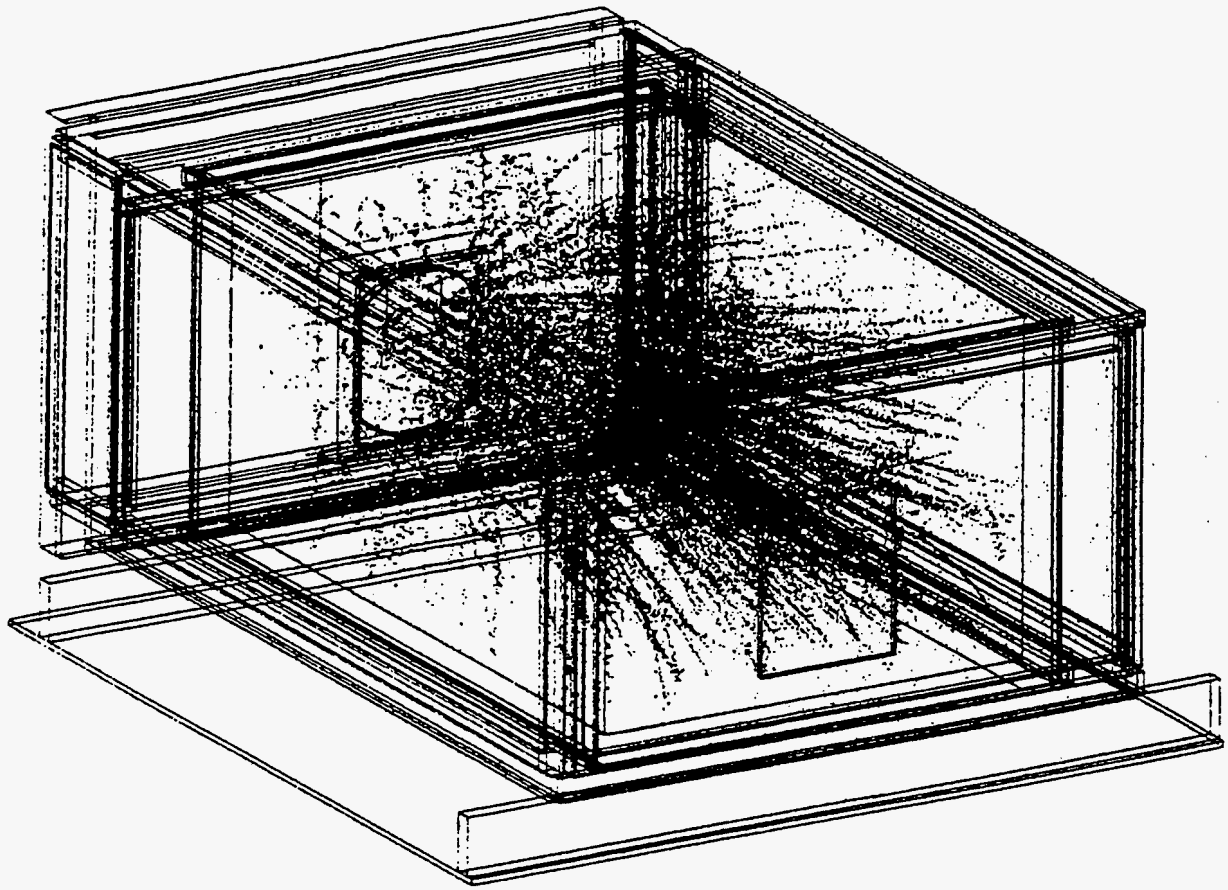
Beam: B1
Status: Complete FY 1996
Hours Approved: 10/1

EXPERIMENT 893 - TEMPERATURE/ZENITH ANGLE CALIBRATION OF POLYCARBONATE TRACK DETECTORS

Spokesman: A. Thompson

Dublin Institute for Advanced Studies

This experiment proposes to measure the track response of polycarbonate track detectors to relativistic Au ions at -20C and to investigate the isotropy of track response to Au at the same energy. This is a continuation of a program to calibrate polycarbonate SSNTD systems and to optimize their resolving power with special reference to the long tern exposure which took place during the NASA LDEF Mission.



Gold Event - TPC

Beam: A1
Status: Complete in FY 1997
Hours Requested: 870/1688

EXPERIMENT 895 - EXCLUSIVE STUDY OF NUCLEAR COLLISIONS AT THE AGS

Spokesman: G. Rai

- **Brookhaven National Laboratory** - S. Gushue
- **Carnegie-Mellon University** - M. Kaplan, Z. Milosevich, J. Whitfield
- **Columbia University** - B. Cole
- **Harbin Institute of Technology** - L. Huo, Y. M. Liu, W. N. Zhang
- **Kent State University** - M. Justice, D. Keane, H. Liu, S. Panitkin, S. Wang, R. Witt
- **Lawrence Berkeley National Laboratory** - D. Best, T. Case, K. Crowe, G. Odyniec, D. Olson, G. Rai, H. G. Ritter, L. Schroeder, N. Stone, J. Symons, T. Wienold
- **Ohio State University** - A. Das, M. Lisa, R. Wells
- **Purdue University** - A. Hirsh, E. Hjort, M. Gilkes,* N. Porile, B. Srivastava, R. Scharenberg
- **State University of New York at Stony Brook** - N. Ajitanand, J. Alexander, P. Chung, R. Lacey, R. McGrath, C. Pinkenburg
- **University of Auckland** - D. Krofcheck
- **University of California-Davis**
  P. Brady, W. Caskey, D. Cebra, J. Chance, J. Draper, M. Heffner, J. Romero

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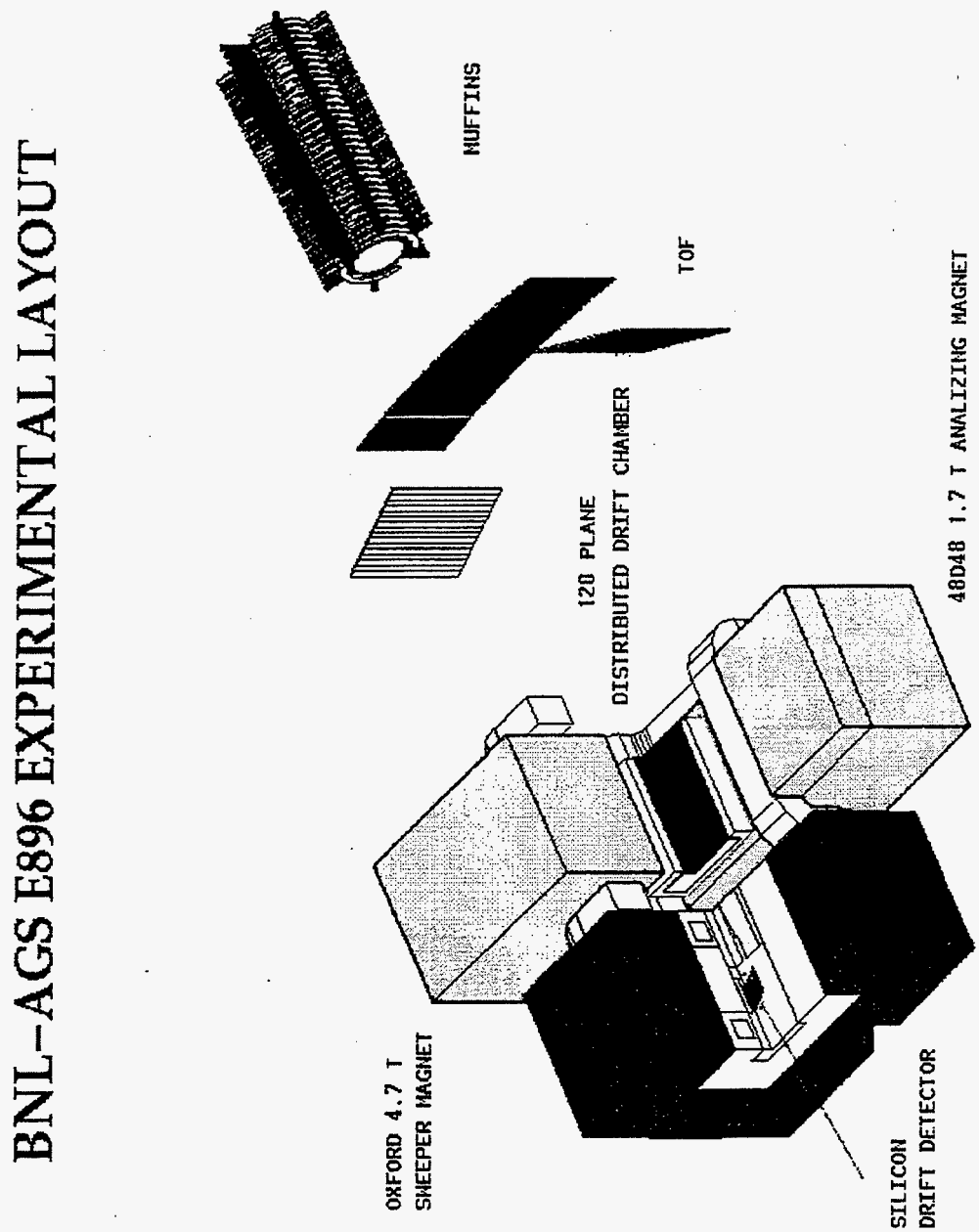
The experimenters are carrying out a systematic and exclusive measurement of the energy (2-10 A GeV) and mass dependence of particle production, correlations, and collective flow effects in Au+Au collisions. They seek to determine the highest compression achievable in nuclear matter and to study its properties and they will search for evidence for an exotic Equation of State, that is, new physics such as Resonance Matter, Exotica, and QGP. The experimenters are also interested in signatures of critical phenomena in dilute nuclear matter.

It is proposed to measure the four-momentum of light mass particles ($\pi^{\pm}$, K^0_s, $K^{\pm}$, Λ, n, p, d, ^{3}He, ^{4}He, ^{6}He, and the isotopes of Li and Be), projectile fragments from Z=6 to Z=79, and anti-proton production. The majority of the data will be acquired, on an event by event basis, from a state-of-the-art Time Projection Chamber (EOS TPC) built and used at LBL by the EOS collaboration. The TPC provides continuous tracking, almost 4π acceptance and particle identification for the light mass particles.

* Deputy at the AGS


BNL–AGS E896 EXPERIMENTAL LAYOUT
MUFFINS
TOF
120 PLANE
DISTRIBUTED DRIFT CHAMBER
48D48 1.7 T ANALIZING MAGNET
OXFORD 4.7 T
SWEEPER MAGNET
SILICON
DRIFT DETECTOR

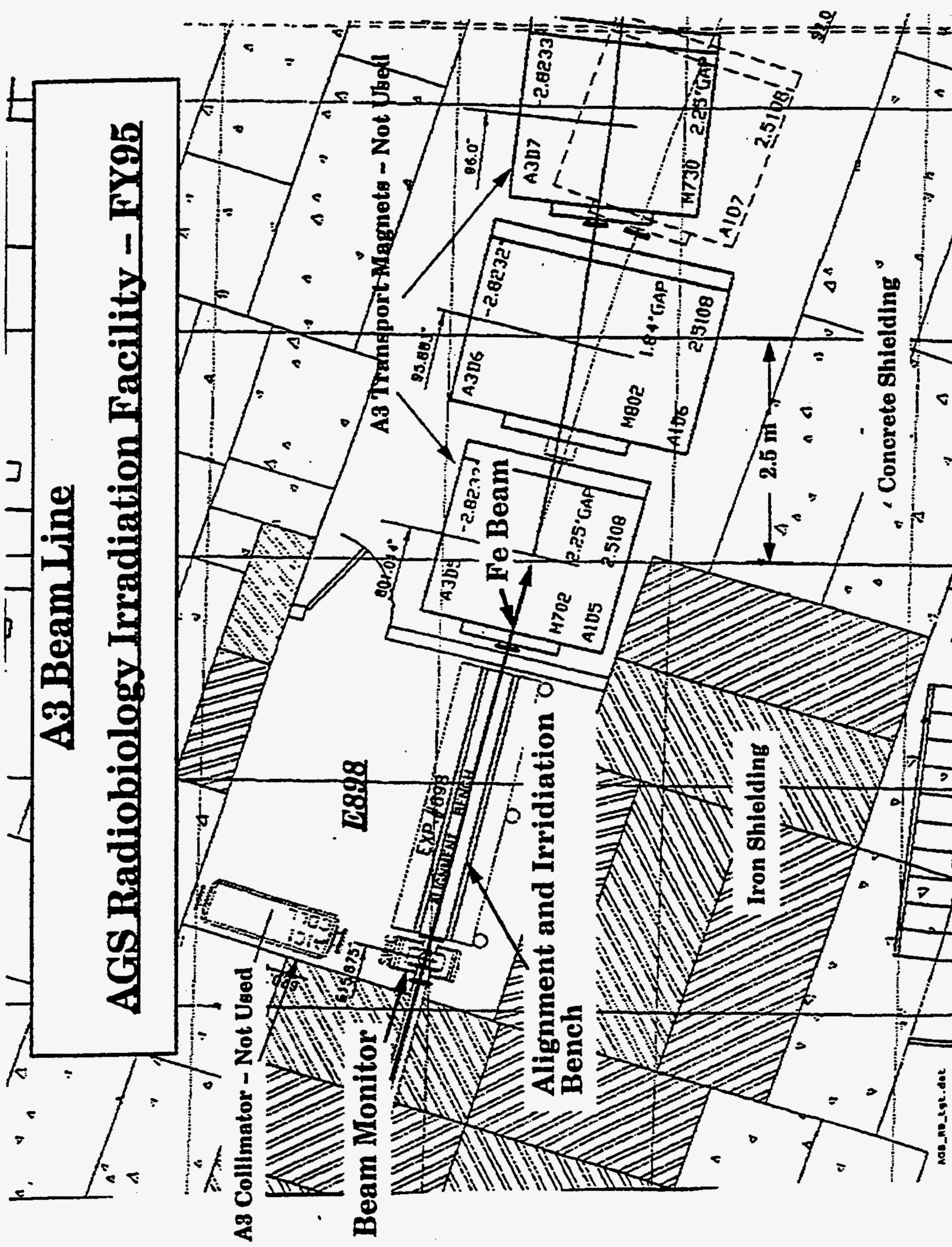
Beam: C5
Status: In Progress
Hours Requested: 428/1000

EXPERIMENT 896 - A PROPOSAL TO THE BNL AGS: TO SEARCH FOR A SHORT-LIVED H_0 DIBARYON, SHORT-LIVED STRANGE MATTER, AND TO INVESTIGATE HYPERON PRODUCTION IN 11.6 A GEV/C AUAU COLLISION

Spokesmen: H. Crawford and T. Hallman

- **Brookhaven National Laboratory** - W. Christie, R. Debbe, T. Hallman, T. Ljubicic, R. Longacre, D. Lynn, J. Mitchell, E. Mogavero, A. Saulys
- **Carnegie-Mellon University** - C. Brown, M. Kaplan, P. Karol, Z. Milosevich, J. Whitfield
- **CERN** - P. Sonderegger
- **Johns Hopkins University** - L. Madansky
- **Lawrence Berkeley Laboratory** - L. Greiner, P. Lindstrom, J. Marx, I. Sakrejda
- **NASA-Goddard Space Flight Center** - J. W. Mitchell
- **Ohio State University** - T. Humanic, I. Kotov, G. LoCurto, E. Sugarbaker
- **Rice University** - B. Bonner, M. Gupta, K. Kainz, W. Llope, G. Mutchler, E. Platner, C. Stokeley, H. Themann, P. Yepes
- **Space Science Laboratory** - M. Bennett, H. Crawford, M. Cronqvist, J. Engelage, M. Flores, L. Greiner, E. Judd, G.Visser
- **Wayne State University** - R. Bellwied, Y. Guo, J. Hall, S. Nehmeh, S. Pandey, J. Sheen, J. Takahashi, K. Wilson
- **Yale University** - S. Kumar, F. Rotondo, N. Smirnoff
- **University of California-Los Angeles** - H. Huang, G. Igo, S. Kelly, S. Trentalage
- **University of Catania** - S. Albergo, D. Boemi, Z. Caccia, G. Cina, S. Costa, A. Insolia, R. Potenza, G. Russo, A. Tricoma, C. Tuve
- **University of Michigan** - R. Welsh
- **University of Texas-Austin** - G. Hoffman, P. Jensen, S. Paganis, P. Riley, J. Schambach, J. Tang

The experiment is a search for the HO di-baryon and for new states of nuclear matter produced in nucleus-nucleus (AA) collisions at the AGS. The experiment enhances the existing AA program by extending the search into regions of shorter lifetime and complements the existing double-strangeness-exchange program by offering access to a new, more probable doorway channel, the coalescence of two Λ's into a bound di-Λ. The detector is a capable of unambiguously identifying the topological signature of unstable particle decays as well as the rigidity of each particle produced, affording a sensitive search for new metastable states and investigation of the properties of known strange particles such as the Λ polarization and $\Lambda\Lambda$ potential.


A3 Beam Line
AGS Radiobiology Irradiation Facility – FY95
A3 Transport Magnets – Not Used
Fe Beam
E898
Alignment and Irridiation Bench
Beam Monitor
A3 Collimator – Not Used
Iron Shielding
Concrete Shielding
2.5 m

Beam: A3
Status: Complete in FY 1997
Hours Charged/Approved: 338/300

EXPERIMENT 898 - RADIOBIOLOGY AND BIOPHYSICS WITH HIGH ENERGY HEAVY IONS

Spokesmen: J. Miller, A. Kronenberg, G. A. Nelson

- **Bemidji State University** - A. L. Lindgren
- **Brookhaven National Laboratory** - B. M. Sutherland, M. E. Vazquez
- **Colorado State University** - J. T. Lett, C. Waldren
- **Columbia University** -T. K. Hei
- **Georgetown University Medical Center** - T. J. Jorgensen
- **Jet Propulsion Laboratory** - G. A. Nelson
- **Lawrence Berkeley Laboratory** - M. H. Barcellos-Hoff, P. Cooper, A. Kronenberg, J. Miller
- **Los Alamos National Laboratory** - D. J. Chen
- **NASA Johnson Space Center** - T. C-h Yang
- **Pacific Northwest National Laboratory** - N. F. Metting
- **University of California** - L. H. Lutze-Mann
- **University of Maryland** - B. M. Rabin
- **University of Maryland School of Medicine** - E. K. Balder-Kubiczek

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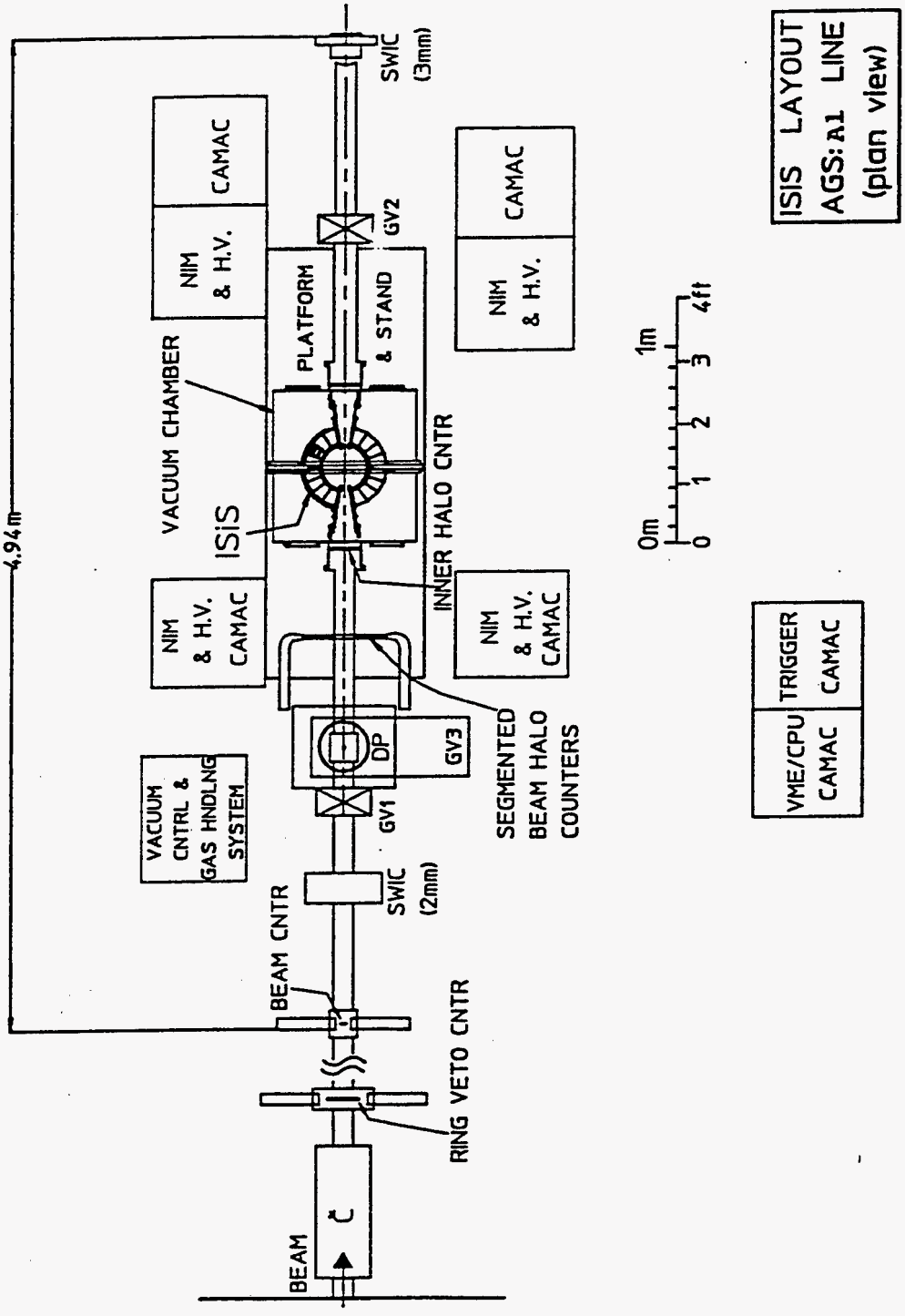
This experiment studies effects produced by heavy ions (principally 1 GeV/u ^{56}Fe) in a hierarchy of biological systems. The biological effects of densely ionizing radiation are studied for a number of genetic and cellular endpoints, constituting a broad range of quantifiable endpoints for the molecular to the whole animal level, in some cases including genetic responses over several generations. The biology experiments are supported by physics components designed to provide basic dosimetric information as well as the detailed characterization of the radiation field essential for the accurate interpretation of biological data.

E898 differs from a typical AGS experiment in that it actually consists of a number of more or less independent biology and physics experiments. The list of experiments and PI's may vary from year to year. Please contact Dr. Marcelo Vazquez (BNL x 3443) for a list of investigators for 1995-1996.


ISIS LAYOUT
AGS: A1 LINE
(plan view)
4.94m
SWIC (3mm)
GV2
PLATFORM
& STAND
NIM & H.V. CAMAC
NIM & H.V. CAMAC
VACUUM CHAMBER
ISIS
INNER HALO CNTR
NIM & H.V. CAMAC
NIM & H.V. CAMAC
SEGMENTED BEAM HALO COUNTERS
DP
GV3
GV1
VACUUM CNTRL & GAS HNDLNG SYSTEM
SWIC (2mm)
BEAM CNTR
RING VETO CNTR
BEAM
C
0m 1m 4ft
0 1 2 3
VME/CPU CAMAC
TRIGGER CAMAC

Beam:C5/A1
Status: In Progress
Hours Charged/Approved: 927/1827

EXPERIMENT 900 - ENERGY DISSIPATION AND MULTIFRAGMENTATION IN H + A REACTIONS BETWEEN 2 AND 24 GEV/C

Spokesmen: K. Kwiatkowski and V. E. Viola

- **Argonne National Laboratory** - B. Back
- **Brookhaven National Laboratory** - S. Gushue, L. P. Remsberg
- **Indiana University** - W.-Ch Hsi, K. Kwiatkowski, T. Lefort, V. E. Viola, N. R. Yoder
- **Los Alamos National Laboratory** - D. S. Bracken, K. B. Morley
- **Simon Fraser University** - R. Korteling
- **Texas A&M University** - F. Gimeno-Nogues, E. Ramakrishnan, D. Rowland, S. J. Yennello
- **Warsaw University** - L. Pienkowski
- **University of Maryland** - H. Breuer

Exclusive studies of target fragmentation in 2 - 24 GeV/c hadron (p, $\bar{p}$ and π^-)-induced reactions have started. Measurements are performed with the Indiana Silicon Sphere 4π detector array, capable of identifying H and He isotopes and Z = 3 - 20 fragments for target rapidity ejectiles over a wide dynamic range. The primary physics objectives are twofold: (1) to improve the understanding of energy dissipation phenomena for central collisions in the h + A reaction at relativistic energies, and (2) to examine the decay modes of hot nuclear matter excited by simple hadron probes. The bombarding energy regime is chosen to overlap the region in which previous inclusive measurements at AGS have been interpreted in terms of a liquid-gas phase transition in hot finite nuclei. It is in this energy region that the excitation of Δ, N* and higher resonances provide an effective means of dissipating projectile energy into internal excitation energy of the target nucleus. Thus, these data will place fresh constraints on the new generation of transport codes, as well as current models of mulifragmentation. During the 1996 proton cycle, studies were successfully completed on the p + ^{197}Au system at 6.0, 10.0, 12.0 and 14.6 GeV/c and π^- + ^{197}Au at 5.0, 9.2 and 11.0 GeV/c. These measurements demonstrated an independence of energy deposition on projectile momentum and type for these reactions. In 1998 it is intended to measure the 7 GeV/c $\bar{p}$ + ^{197}Au reaction to search for enhanced energy deposition with antiproton beams.

EXPERIMENT 903
Home Page • http:

Beam: A
Status: Completed FY 1995
Hours Charged/Approved: 1/24

EXPERIMENT 903 - A STUDY OF DOMAIN WALL PINNING IN IRRADIATED SAMPLES OF $Nd_2Fe_{14}B$

Spokesman: C. L. Snead and D. K. Finnemore

- **Ames Laboratory** - P. C. Canfield, D. K. Finnemore, R. W. McCallum
- **Brookhaven National Laboratory** - C. L. Snead

The experimenters proposed to irradiate specimens of permanent-magnet materials so that the defect pinning of magnetic domain walls due to particle tracks can be evaluated.

An assortment of 10 samples ranging in thickness from 0.1 to 1.0 mm, each being about 1 mm square were used. The most interesting spacing for the damage tracks is in the range of 10 to 100 nm which implies irradation to a dose of about 10^{10} ions per cm^2. After the samples had been irradiated and characterized, annealing experiments were carried out to determine the micro-structural changes induced by the annealing and the corresponding changes in domain wall pinning and performance characteristics of the material. Some samples were irradiated parallel to the c-axis and others at 45° to the c-axis.

The above has been completed.

EXPERIMENT 904
Home Page • http:

Beam:
Status: Withdrawn 1/98
Hours Charged/Approved: 0/35

EXPERIMENT 904 - A STUDY OF COLUMNAR PINNING CENTERS IN HIGH T_C SUPERCONDUCTOR

Spokesman: R. Weinstein

- **Indiana University Cyclotron Facility** - C. C. Foster
- **Texas Southern University** - V. Obot
- **University of Houston** - J. Liu, D. Parks, Y. Ren, R-P Sawh, R. Weinstein

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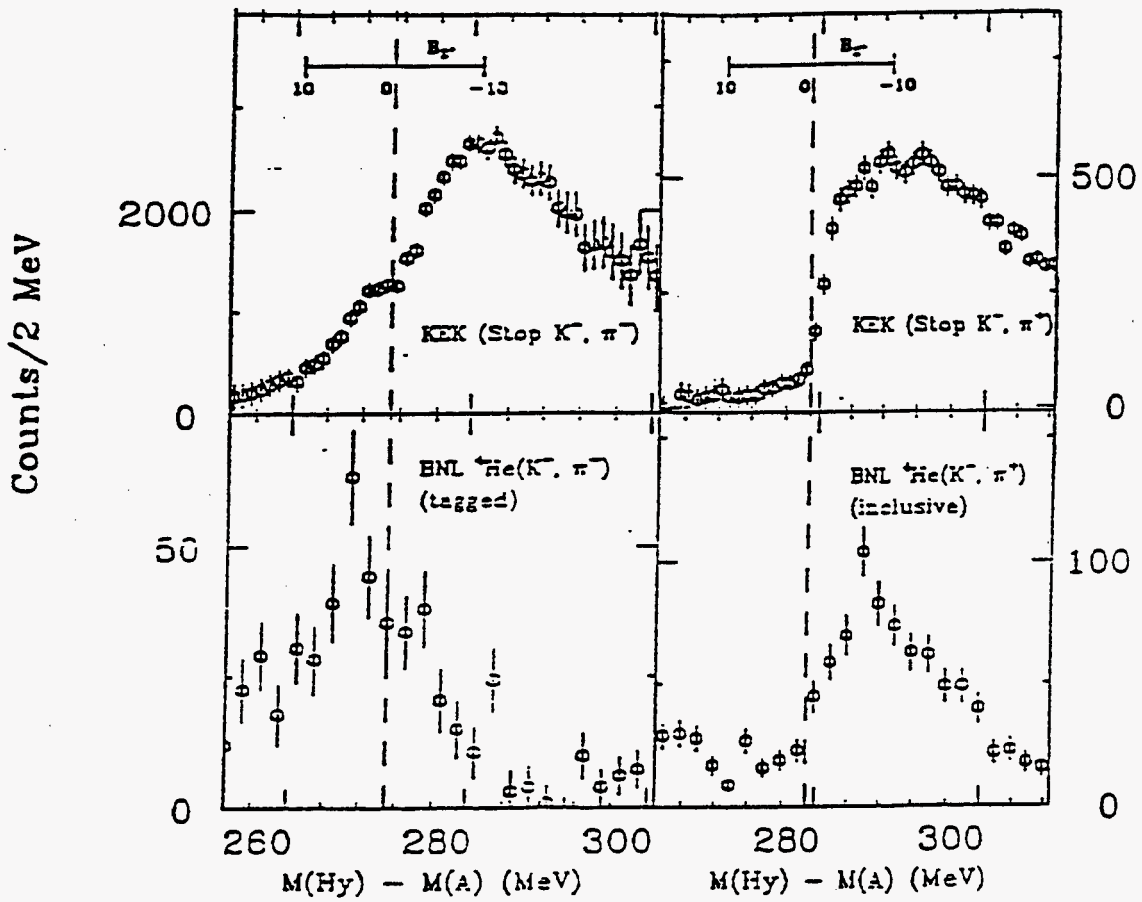
The experimenters will irradiate several stacks of YBCO tiles. The chemistry ($Y_{1.7}Ba_2Cu_3Pt_{0.01}$) of these tiles, and their heat processing and oxygen annealing, are the best known at present for field trapping. One set of tiles will each be 20 mm in diameter and 8 mm thick. A stack of several such tiles will be used. As the Au ions penetrate, dE/dx increases. The ions will first form string-of-beads defects. This experiment will provide a string-of-beads test for the first time and will provide the materials to produce a trapped field magnet (TFM) of greater field than any previously achieved. The experimenters estimate that the field will be 5 Tesla at 77K, and 12.5 Tesla at 65K.

In addition, 4 sets of smaller tiles (3.7 mm in diameter and 2 mm thick) will also be irradiated. The small size of the tiles in these runs in these runs is suitable to VSM or SQUID measurement of the magnetic moment and hence J_C. These runs will provide a desirable cross check on the large scale analysis of J_C via trapped field. In order to get the same fluence as in the case of 20 mm diameter tiles, these smaller tiles require 1/16 of the beam x time. The 4 sets o f tiles will be run at 4 values of fluence.



A comparison of the in-flight (BNL) observations of the Σ-structure in ^{4}He and the stopped kaon experiments at KEK. In both sets, the structure is present in (K^-,π^-) reactions, but not for (K^-,π^+).

Beam: C6
Status: Complete in FY 1996
Hours Charged/Approved: 751/500

EXPERIMENT 905 - SEARCH FOR A Σ HYPERNUCLEAR BOUND STATE IN ^{4}HE (K^-, $\pi^\pm$) REACTIONS

Spokesman: T. Nagae

- **Brookhaven National Laboratory** - R. E. Chrien, A. Rusek, R. Sutter
- **George Washington University** - W. Briscoe
- **Hampton University** - W. Naing
- **INS-University of Tokyo**
  T. Fukuda, T. Miyachi, T. Nagae, J. Nakano, H. Outa, T. Tamagawa
- **North Carolina A&T** - R. Sawafta
- **Zagreb University** - M. Planinic
- **University of Houston** - T. Empl, E. V. Hungerford
- **University of North Carolina** - K. Johnston, C. Neerman
- **University of Tokyo** - R. S. Hayano, K. Kubota, Y. Shimizu, H. Tamura

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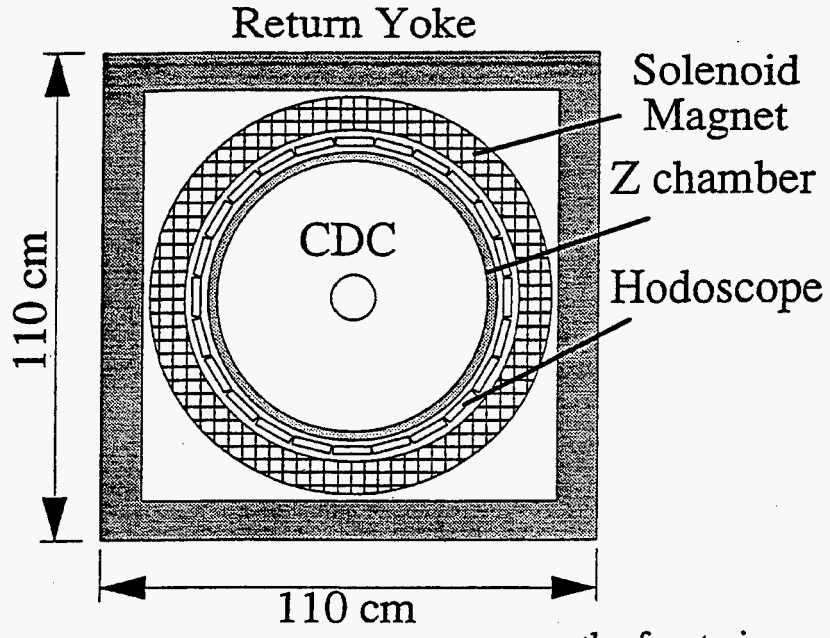
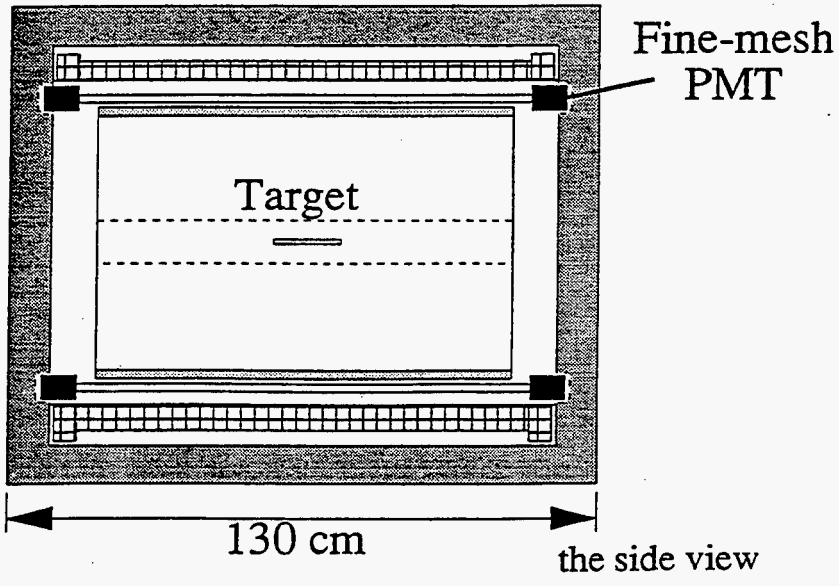
The evidence for the existence of Σ (bound)-nuclei derives from three experiments: the first in a ^{4}He bubble chamber at the AGS, the second at KEK with stopped K^- in ^{4}He, and the third, BNL experiment E774. The purpose of E905 is to remeasure helium, using in-flight reactions to verify the existence of a bound state and to obtain the binding energy and width with high precision. This will be accomplished by making use of experience gained in BNL's E774 and E887 to get better control of systematic errors, suppress backgrounds due to electrons and muons and to obtain increased statistics. The precise measurement of the position and width of the postulated bound state may allow a definite allocation of the structure observed in these experiments to a bound state or to a threshold cusp, which is an alternative explanation. The precise measurement of the Σ-production cross sections in the bound and unbound regions will allow a choice between competing model explanations.



the front view



the side view

Beam:D6
Status: Running
Hours Charged/Approved: 663/1600

EXPERIMENT 906 - EXPERIMENT TO DETECT DOUBLE-Λ HYPERNUCLEI BY OBSERVING CHARACTERISTIC II - MESONIC DECAYS

Spokesmen: T. Fukuda and R. E. Chrien

- **Brookhaven National Laboratory** - R. E. Chrien, M. May, P. Pile, A. Rusek, R. Sutter
- **Carnegie-Mellon University** - A. Berdoz, D. Carman, G. B. Franklin, B. P. Quinn, R. A. Schumacher
- **Gifu University** - M. Hanabata, K. Nakazawa
- **INR-Russia** - M. Prohvatilov, V. Rasin
- **INS-University of Tokyo** - J. Ahn, H. Akikawa, T. Fukuda, K. Kubota, T. Myuchi, T. Nagae, J. Nakano, K. Omata, H. Outa, M. Sekimoto, T. Tamagawa, H. Tamura, K. Tanida
- **Kyoto University** - K. Imai, K. Yamamoto, M. Yosoi
- **Kyoto-Sangyo University** - K. Okada, T. Kishimoto, F. Takeutchi
- **North Carolina A&T University** - R. Sawafta
- **Osaka University** - S. Ajimura, T. Kishimoto
- **Temple University** - E. Meziani
- **University of Freiburg** - H. Fischer, J. Franz, K. Konisgmann, H. Schmitt
- **University of New Mexico** - B. Bassalleck, H. Fischer, J. Lowe, D. M. Wolfe

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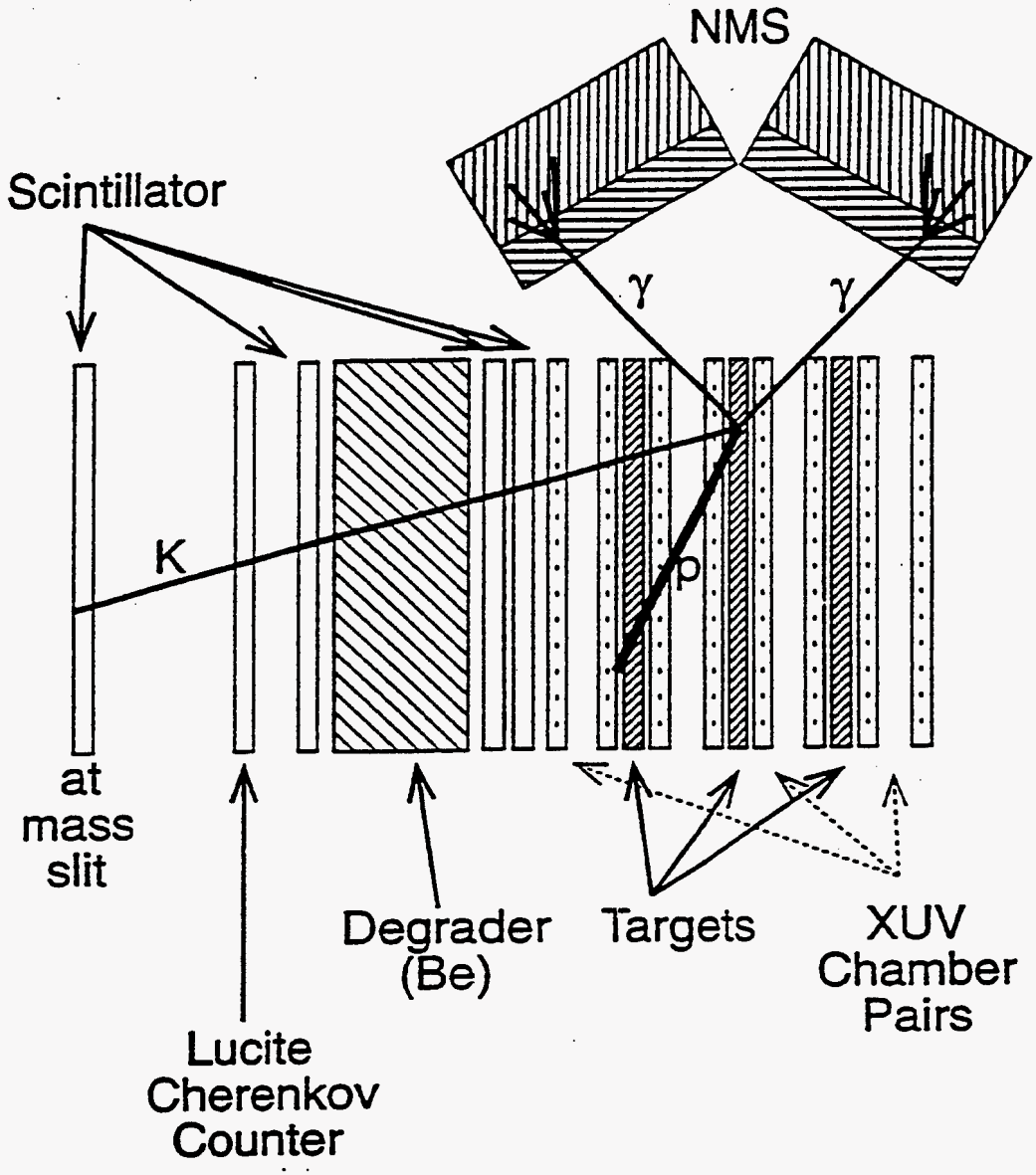
The experimenters propose a new way to produce and to identify several hundred double-Λ hypernuclei by observing two (successive) mesonic-decay pions with about 1.7 MeV resolution. The rate is larger by two orders of magnitude than other experiments done so far and will enable us to open a new spectroscopy of double-Λ hypernuclei.

Double-Λ hypernuclei will be produced at the (K^-, K^+) reaction point through multi-step processes and successive mesonic-decay pions will be detected by a cylindrical detector system and solenoidal magnetic spectrometer (CDS) surrounding the target. The 2 GeV/c kaon beam line and the same experimental setup used for E813 and E836 (with some minor modifications), will be used for this experiment.



Schematic layout of the experimental setup.

Beam: C8
Status: In Progress
Hours Charged/Approved: 1093/1450

EXPERIMENT 907 - INVESTIGATION OF LIGHT HYPERNUCLEI USING THE (K^-_{STOP}, π°) REACTION

Spokesmen: E. Hungerford and Jen-Chieh Peng

- **Arizona State University** - J. R. Comfort, C. Gauland
- **Brookhaven National Laboratory** - R. E. Chrien, J. Gerald, M. May, P. H. Pile, A. Rusek, R. Sutter, W. B. Tippens
- **Carnegie-Mellon University** - G. B. Franklin, B. Quinn
- **CEBAF** - L. Tang
- **George Washington University** - W. Briscoe
- **Los Alamos National Laboratory** - J. Amann, D. Boudrie, C. Edwards, B. F. Gibson, C. Morris, J. O'Donnell, J-C. Peng, A. Thiessen
- **Louisiana Tech University** - M. Barakat, K. Johnston
- **North Carolina A&T** - R. Sawafta
- **R. Boskovic Institute** - I. Supek
- **Tohoku University** - O. Hashimoto
- **University of California at Los Angeles** - B. Nefkens
- **University of Colorado** - G. A. Peterson
- **University of Houston** - M. Ahmed, X. Cui, A. Empl, E. V. Hungerford, A. Lan, B. Mayes, L. Pinsky
- **University of Kentucky** - V. Zeps
- **University of Maryland** - P. G. Roos
- **University of Minnesota** - D. Dehnhard
- **University of Texas at Austin** - G. Glass, C. Fred Moore, H. Ward
- **University of Zagreb** - D. Androic, M. Furic, T. Petkovic, M. Planinic

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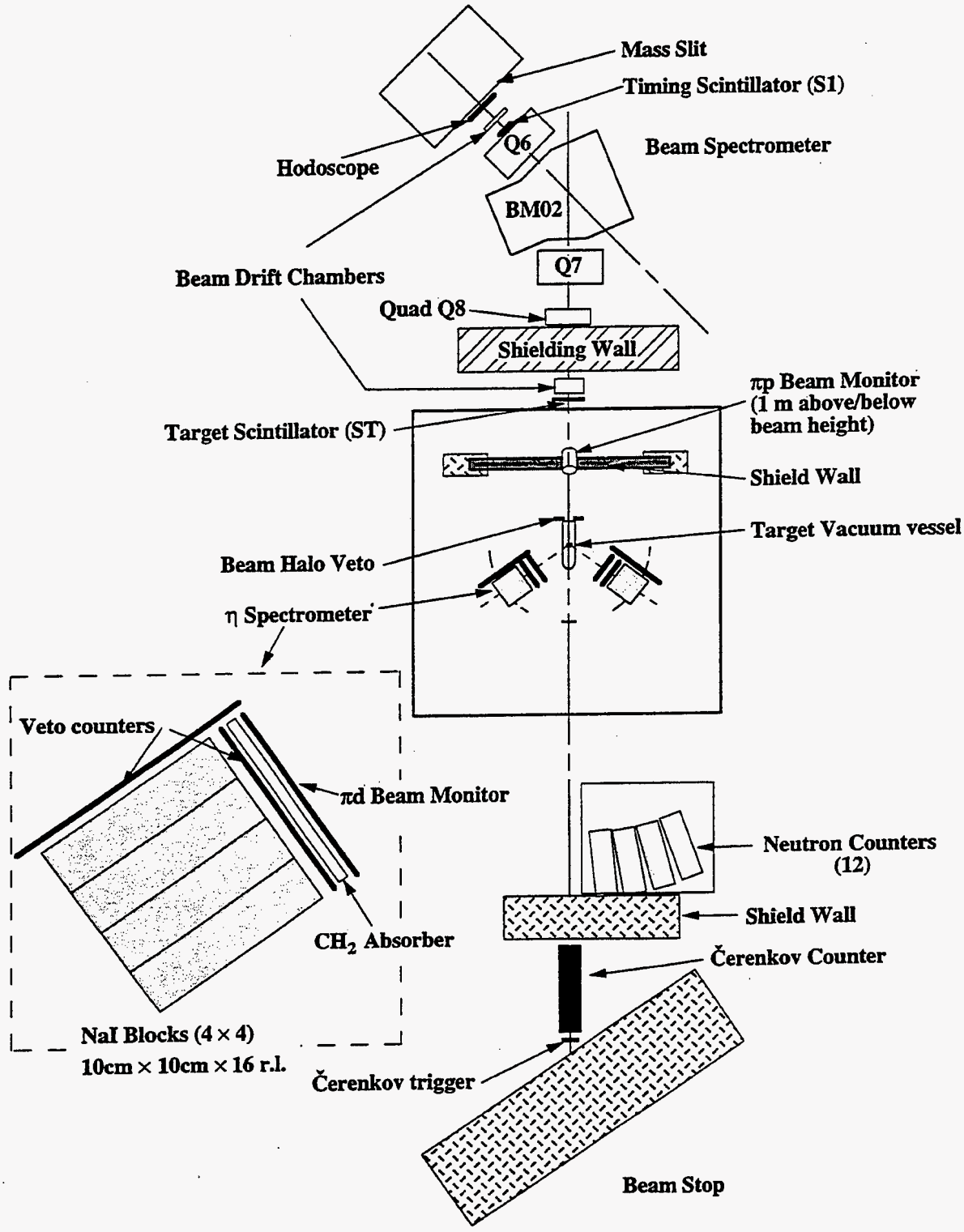
The experimenters propose to use the combination of a multi-layer active target and the Neutral Meson Spectrometer (NMS) to detect π°s in order to study hypernuclear physics. The reaction to be used is (K^-_{stop}, π°), with stopping K^- obtained from the LESB-II(C) beam line at the AGS. The NMS has been moved from LAMPF to BNL for this experiment.


Mass Slit
Timing Scintillator (S1)
Q6
Beam Spectrometer
Hodoscope
BM02
Q7
Beam Drift Chambers
Quad Q8
Shielding Wall
πp Beam Monitor
(1 m above/below
beam height)
Target Scintillator (ST)
Shield Wall
Target Vacuum vessel
Beam Halo Veto
η Spectrometer
Veto counters
πd Beam Monitor
Neutron Counters
(12)
Shield Wall
CH_2 Absorber
Čerenkov Counter
NaI Blocks (4 × 4)
10cm × 10cm × 16 r.l.
Čerenkov trigger
Beam Stop

Beam: C8
Status: Complete FY 1995
Hours Charged/Approved: 727/600

EXPERIMENT 909 - ETA PRODUCTION AT THRESHOLD IN THE REACTIONS $\pi^- p \rightarrow \eta n$ and $K^- p \rightarrow \Lambda\eta$

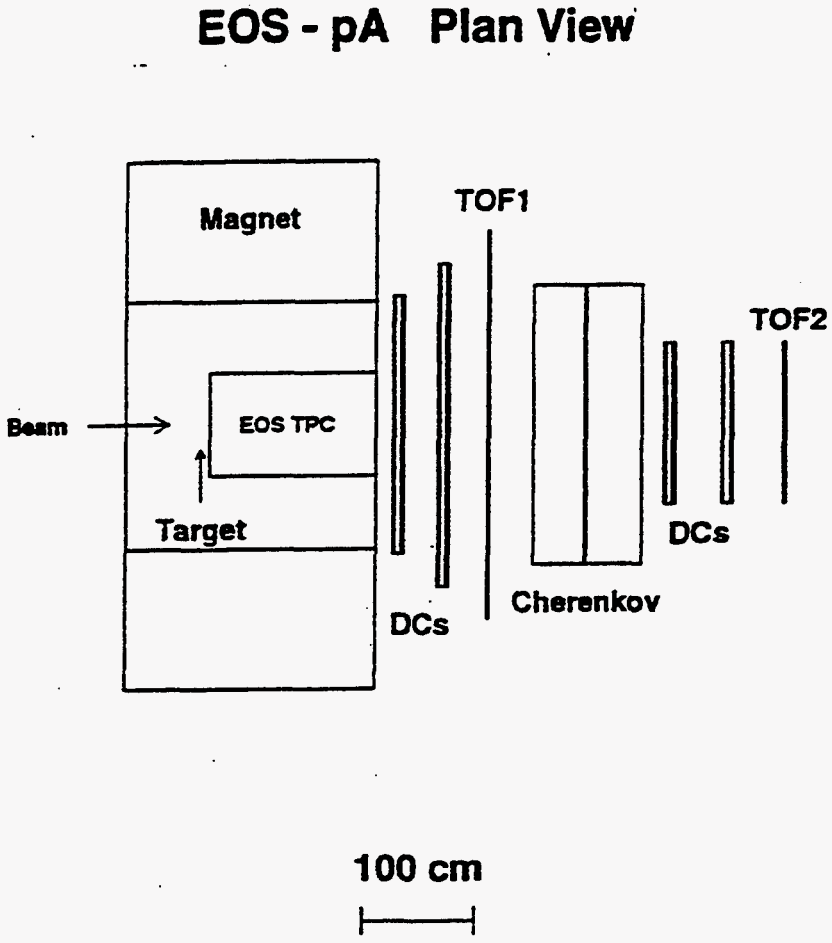
Spokesmen: W. J. Briscoe and W. B. Tippens

- **Abilene Christian University** - L. D. Isenhower, M. E. Sadler
- **Brookhaven National Laboratory** - S. Bart, R. E. Chrien, R. Sawafta, D. Sutter
- **George Washington University** - C. Bennhold, W. J. Briscoe, T. W. Morrison, Z. Papandreou, S. Philips, R. Pratt, J. Prokop,
- **Joint Institute for Nuclear Research-Dubna** - A. Efendiev
- **PNPI, Gatchina** - V. Abaev, V. Bekrenev, N. Kozlenko, S. Kruglov
- **Rudjer Boskovic Institute** - A. Marusic, I. Šlaus
- **University of California-Los Angeles** - M. Clajus, S. McDonald, T. Moriwaki, B. M. K. Nefkens, W. B. Tippens, D. White

The threshold for η production in the reactions $\pi^- p \rightarrow \eta n$ and $K^- p \rightarrow \Lambda\eta$ is close to the mass of the S_{11}(N*(1535) and S_{01} (Λ*(1670) resonances, respectively. The cross section for η production in both reactions is unexpectedly large as are other η threshold production cross sections. Better quality data, particularly angular distributions which are currently lacking, in both the $K^- p$ and $\pi^- p$ reactions are needed to understand the role of these resonances near the η threshold. There is a factor of four discrepancy in the determination of the ηN scattering length and the $\eta\Lambda$ scattering length is unknown due to a lack of precise threshold cross section data. New, precision data at threshold would allow better determinations of these scattering lengths.

The experimenters propose to measure total cross section, as well as angular distributions for η production in both of these reactions from threshold (P_π = 685 MeV/c, and P_K = 723 MeV/c) up to 760 MeV/c. The η particles are detected via the 2γ decay mode using the improved η spectrometer currently in operation on the C8 beam line.

Plan view of the proposed experiment



Beam: A1
Status: Complete in FY 1996
Hours Charged/Approved: 1592/1000

EXPERIMENT 910 - A FACILITY TO STUDY PROTON-NUCLEUS AND HEAVY ION COLLISIONS USING A LARGE-ACCEPTANCE DETECTOR WITH PARTICLE IDENTIFICATION CAPABILITIES

Spokesman: B. A. Cole

- **Brookhaven National Laboratory** - R. Fernow, S. Gushue, H. Kirk, L. Remsberg, M. Rosati, Y. Torun
- **Columbia University** - I. Chemakin, B. A. Cole, H. Hiejima, M. Moulson, D. Winter, X. Yang, W. A. Zajc, Y. Zhang
- **Florida State University** - A. D. Frawley
- **Kent State University** - M. Justice, D. Keane
- **Lawrence Berkeley Laboratory** - G. Rai
- **Lawrence Livermore National Laboratory** - V. Cianciolo, M. Kreisler, M. N. Namboordiri, T. C. Sangster, R. Soltz, J. Thomas
- **State University of New York at Stony Brook** - M. Gilkes, R. L. McGrath
- **Yonsei University** - J. H. Kang, Y. H. Shin
- **University of Tennessee** - S. Mioduszewski, D. Morrison, K. Read, S. Sorensen
- **University of Tsukuba- Institute of Physics** - K. Kurita, Y. Miake

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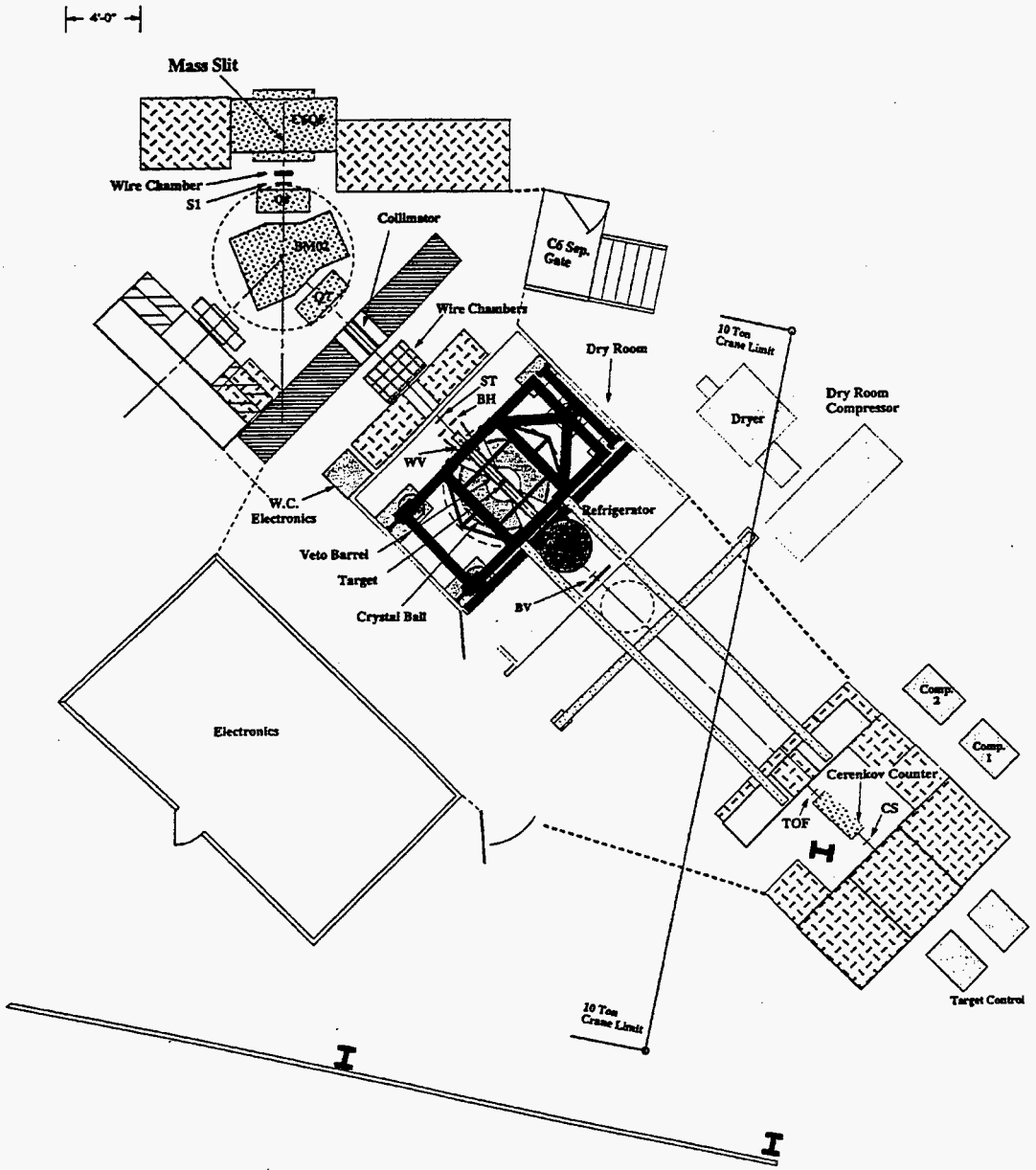
The experimenters are studying proton-nucleus (p-A) and heavy ion collisions at the AGS using a large-acceptance detector. The main focus of the experiment is measurement of strange particle production and a search for H^0 dibaryon formation in p-A collisions. The strange-particle production measurements will provide data for comparison to recent measurements in heavy-ion collisions and also allow more detailed studies of the mechanisms that are responsible for strangeness enhancement in p-A and heavy-ion collisions. The main component of the proposed detector is the EOS TPC, a part of Exp. 895. The TPC will be augmented with downstream tracking, a high-resolution time-of-flight wall and a second-level trigger capable of triggering on kaons in the final state. The apparatus will provide a dedicated facility for the EOS TPC which would allow the detector to be employed during all modes of AGS running.


4'-0"
Mass Slit
Wire Chamber
S1
Collimator
C6 Sep. Gate
Wire Chambers
Dry Room
10 Ton Crane Limit
Dryer
Dry Room Compressor
ST
BH
WV
W.C. Electronics
Refrigerator
Veto Barrel
Target
Crystal Ball
BV
Electronics
Comp. 2
Comp. 1
Cerenkov Counter
TOF
CS
Target Control
10 Ton Crane Limit

Beam: C6
Status: In Progress
Hours Charged/Approved: 320/700

EXPERIMENT 913 - BARYON SPECTROSCOPY WITH THE CRYSTAL BALL

Spokesmen: M. E. Sadler and W. B. Tippens

- **Abilene Christian University** - R. Bagga, B. Draper, J. Huddleston, D. Isenhower, Z. Mulkey, M. Sadler
- **Argonne National Laboratory** - T. Kasprzyk, H. Spinka
- **Arizona State University** - J. Comfort, K. Craig, A. Ramirez
- **Brookhaven National Laboratory** - T. Kycia
- **George Washington University** - W. J. Briscoe, A. Shafi
- **Kent State University** - D. M. Manley
- **Petersburg Nuclear Physics Institute-Gatchina** - V. Abaev, V. Bekrenev, S. Kruglov, A. Kulbardis, I. Lopatin, A. Starostin
- **Rudjer Boskovic Institute** -I. Šlaus, I. Supek
- **Valparaiso University** - A. Gibson, D. Grosnick, D.D. Koetke, R. Manweiler, P. Nord, S. Stanislaus
- **University of California-Los Angeles** - M. Clajus, S. McDonald, A. Marusic, B.M.K. Nefkens, M. Pulver, W. B. Tippens
- **University of Colorado** - J. Patterson, J. Peterson
- **Universit at Karlsruhe** - H. Staudenmaier
- **University of Regina** - N. Knecht, G. Lolos, Z. Papandreou

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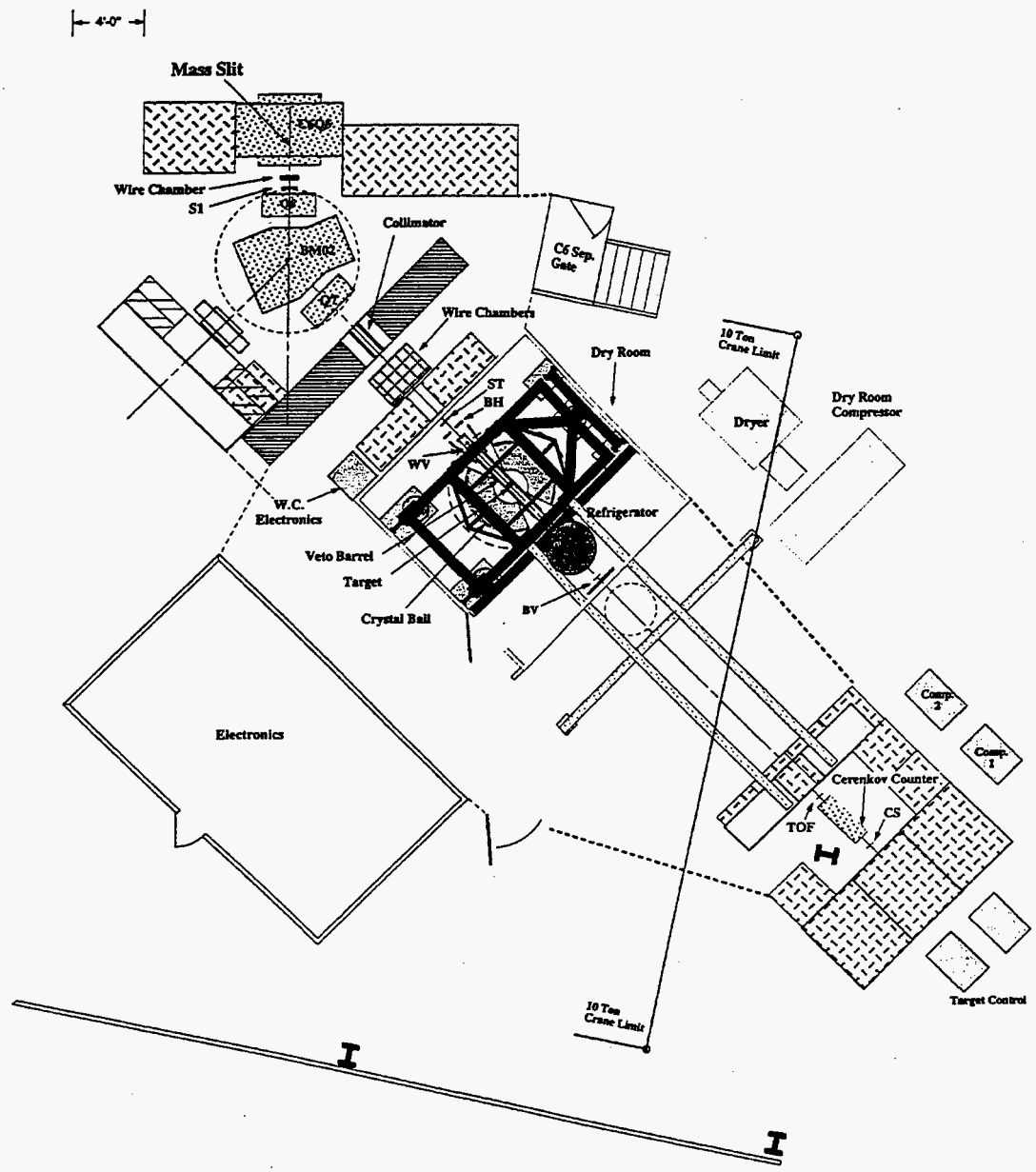
This is a comprehensive experimental program in baryon spectroscopy using the SLAC Crystal Ball detector to make precision measurements of total and differential cross sections for neutral final states in π^-p interactions using pion beams in the momentum range 0.4 - 1.9 GeV/c. The angular distributions of all the neutral final states such as γn, π° are measured simultaneously. The purpose is to improve the mass, width, and neutral branching fractions for the N^* resonances in this energy region. The Crystal Ball detector is a nearly 4π multi-photon spectrometer which is used to analyze events by reconstructing the invariant mass and, in conjunction with the measured beam momentum, the missing mass of the produced γ rays.


4'-0"
Mass Slit
E850
Wire Chamber
S1
Collimator
BM02
C5 Sep. Gate
Wire Chambers
Dry Room
10 Ton Crane Limit
Dryer
Dry Room Compressor
ST
BH
WV
W.C. Electronics
Refrigerator
Veto Barrel
Target
Crystal Ball
BV
Electronics
Comp. 2
Comp. 1
Cerenkov Counter
TOF
CS
Target Control
10 Ton Crane Limit

Beam: C6
Status: In Progress
Hours Charged/Approved: 72/700

EXPERIMENT 914 - NEUTRAL HYPERON SPECTROSCOPY

Spokesmen: B.M.K. Nefkens, T. Kycia, S.P. Kruglov

- **Abilene Christian University** - R. Bagga, B. Draper, J. Huddleston, D. Isenhower, Z. Mulkey, M. Sadler
- **Argonne National Laboratory** - T. Kasprzyk, H. Spinka
- **Arizona State University** - J. Comfort, K. Craig, A. Ramirez
- **Brookhaven National Laboratory** - T. Kycia
- **George Washington University** - W. J. Briscoe, A. Shafi
- **Kent State University** - D. M. Manley
- **Petersburg Nuclear Physics Institute-Gatchina** - V. Abaev, V. Bekrenev, S. Kruglov, A. Kulbardis, I. Lopatin, A. Starostin
- **Rudjer Boskovic Institute** -I. Šlaus, I. Supek
- **Valparaiso University** - A. Gibson, D. Grosnick, D.D. Koetke, R. Manweiler, P. Nord, S. Stanislaus
- **University of California-Los Angeles** - M. Clajus, S. McDonald, A. Marusic, B.M.K. Nefkens, M. Pulver, W. B. Tippens
- **University of Colorado** - J. Patterson, J. Peterson
- **Universit at Karlsruhe** - H. Staudenmaier
- **University of Regina** - N. Knecht, G. Lolos, Z. Papandreou

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This experiment proposes to investigate the spectrum of Λ^* and Σ^* resonances via their neutral decays in the reactions:

$K^- P \rightarrow \Lambda\gamma$	600-1800 MeV/c (p_{lab})
$K^- P \rightarrow \Lambda\pi^0$	"
$K^- P \rightarrow \Lambda 2\pi^0$	"
$K^- P \rightarrow \Lambda\eta$	720-1800 MeV/c (p_{lab})
$K^- P \rightarrow \Sigma^0\gamma$	600-1800 MeV/c (p_{lab})
$K^- P \rightarrow \Sigma^0\pi^0$	"
$K^- P \rightarrow \Sigma^0 2\pi^0$	"
$K^- P \rightarrow \Sigma^0\eta$	890-1800 MeV/c (p_{lab})

Measurements of total and differential cross sections of these reactions will be made simultaneously over the full angular range, using the Crystal Ball multi photon spectrometer and a LH2 target. The Crystal Ball has a 94% solid angle coverage and good energy and angular resolution. The incident beam momentum is varied in steps of 25-50 MeV/c from 600 MeV/c in the C-line to the maximum momentum of 1.8 GeV/c in the D-line.

EXPERIMENT 915
Home Page • http:

Beam: B1
Status: Complete FY 1996
Hours Charged/Approved: 20/5

EXPERIMENT 915 - Proposal for 11.4 A GeV Au Exposure at the AGS
The Trek Collaboration
Spokesman: A. Westphal

- **University of California at Berkeley** - A. Westphal
- **Space Research Institute at Moscow** - V. V. Akimov

The Trek Collaboration proposes to use the 11.4 A GeV Au beam at the AGS to calibrate the large collector of the Trek experiment. Trek is a collaborative experiment consisting of the physicists at Berkeley and at the Space Research Institute in Moscow. Trek consists of two detectors. The small detector (0.09 m^2 in area) was mounted on an outside wall of the living quarters of the space station and has already been returned to earth for analysis. Its goal is to measure the isotopic abundances of iron-group elements in the galactic cosmic-rays. A large collector for ultraheavy galactic cosmic rays was mounted on the outside of the Kvant-2 module for the Mir Space Station to two cosmonauts in an EVA in June 1991. The goals of the large Trek collector are to resolve and measure the composition of both odd-Z and even-Z cosmic-ray nuclei from tin (Z=50) through uranium (Z=92) and to search for transuranic nuclei and exotic particles such as strangelets. The experimenters propose to calibrate the detectors with a highly relativistic gold beam at the AGS at the first opportunity after recovery.

EXPERIMENT 916
Home Page • http:

Beam: B1
Status: Complete FY 1996
Hours Charged/Approved: 2/2

EXPERIMENT 916 - STUDY OF PROJECTILE FRAGMENTATION FOR ^{197}AU IONS AT ~4A GEV IN VARIOUS TARGETS

Spokesman: Y. D. He

- **University of California - Berkeley** - Y. D. He, P. B. Price

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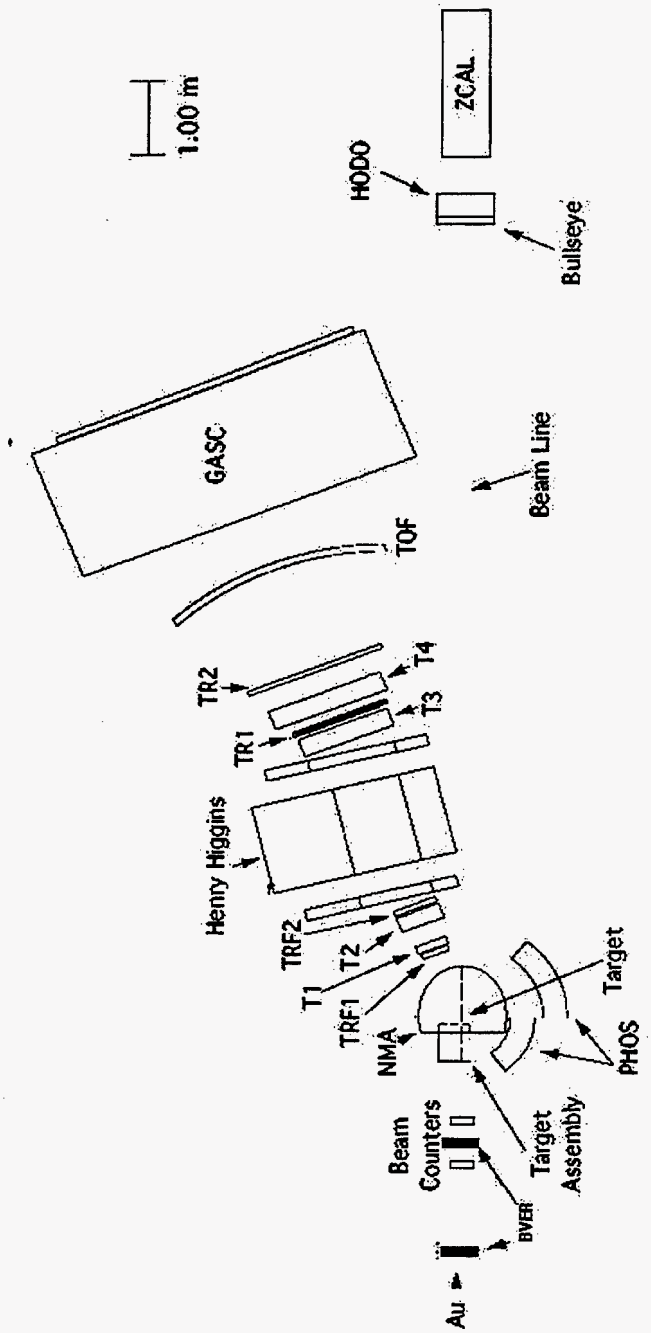
This is a small-scale experiment with ^{197}Au ions at ~ 4A GeV. We exposed 10 BP-1 glass detectors interleaved with targets ranging from C to Pb to a defocused low intensity beam over an area of 5 cm x 5 cm at a density of 1200 $\pm$ 200 cm^{-2}. Using our automated scanning system, the charge resolution from one single measurement is found to be ~ 0.14 charge unit. The charge resolution for beam particles and projectile fragments obtained from 5 plates of detectors is ~ 0.06 charge unit (see figure). This charge resolution is more than adequate to identify fragments and hence to measure cross sections for charge- changing interactions. With this experiment, we hope to accomplish the following:

1. **Fragmentation Study:**

   We will study nuclear reactions that we have previously studied at ~1 A GeV at BEVALAC and ~11 A GeV at AGS. In particular, we will measure cross sections at ~4 A GeV for frag-mentation both nuclear and electromagnetic, for charge pickup reaction, and for other processes in collisions of ~4 A GeV on various targets. We hope to establish the energy dependence of these cross sections, which may enable us to understand the physics in peripheral collisions of relativistic heavy ions.

2. **Detector Response Study:**

   Another interesting topic is the study of the response of BP-1 glass detectors to relativistic heavy ions with different energies. We have previously established the dependence of the detector response on charge Z for a given velocity βc. The response is empirically known to be a com-plicated function of $(Z/\beta)^2$, to a good approximation, for a limited range of β tested. However, the dependence of the response on Lorentz factor γ for a wide range of β remains unknown. With this experiment, we expect to study the dependence of the detector response on β for a given Z. This set of data will permit an interesting examination of the dependence of restricted energy loss on γ in addition to $(Z/\beta)^2$ term.


1.00 m
ZCAL
HODO
Bullseye
GASC
Beam Line
TOF
TR2
T4
T3
TR1
Henny Higgins
TRF2
T2
T1
TRF1
NMA
Target
PHOS
Beam Counters
Target Assembly
BVETO
Au

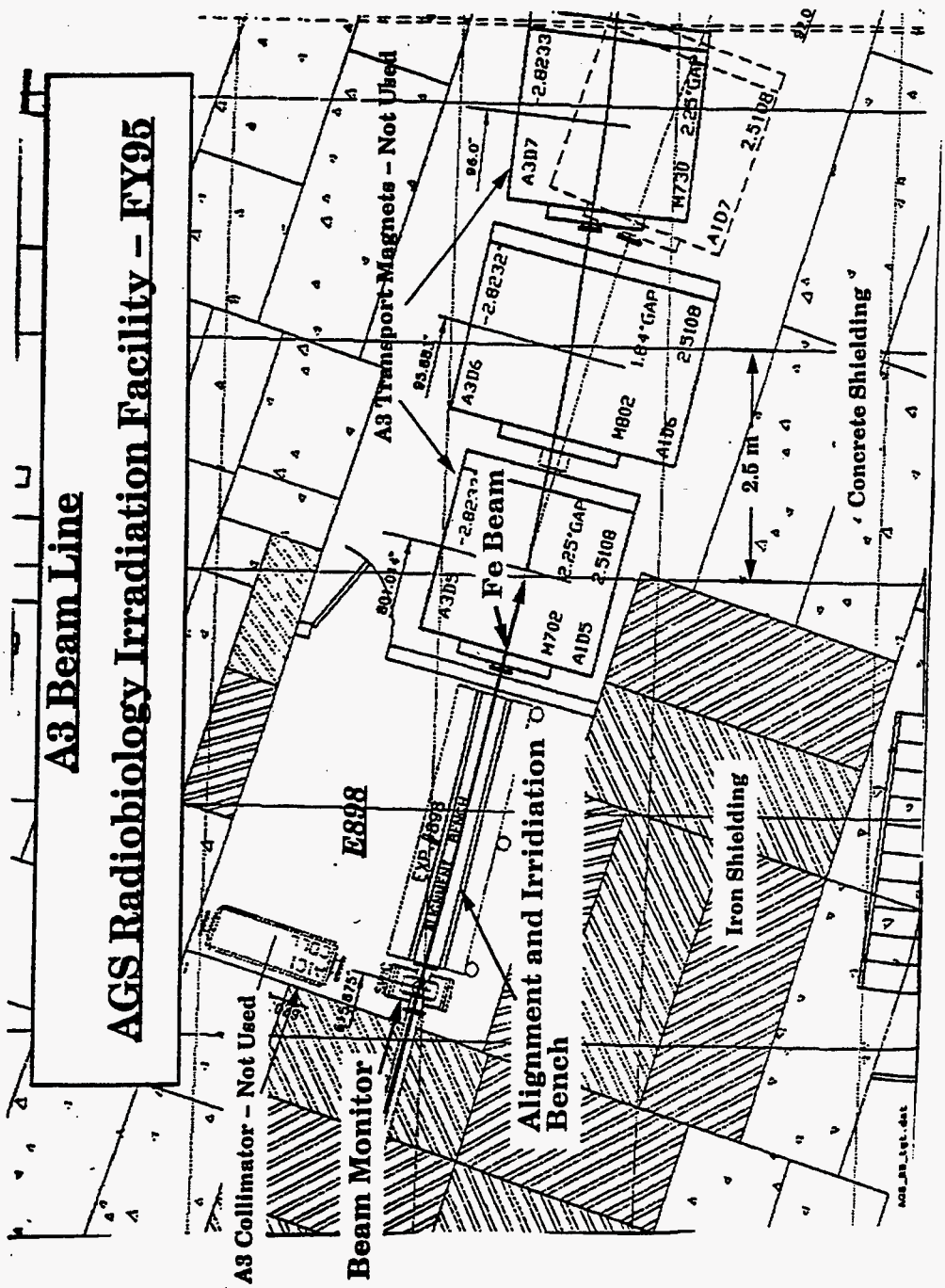
Beam: B1
Status: Complete in FY 1997
Hours Charged/Approved: 1401/1600

EXPERIMENT 917- STUDIES OF HIGH DENSITY BARYON MATTER USING RARE PROBES

Spokesmen: R. Seto and A. Mignerey

- **Argonne National Laboratory** - B. Back, A. Gillitzer, w. Henning, d. Hofman, V. Nanal, A. Wuosmaa
- **Brookhaven National Laboratory** - Y. Y. Chu, J. Cumming
- **Columbia University (Nevis Labs.)** - C. Y. Chi
- **Massachusetts Institute of Technology** - J. Dunlop, G. Heintzelman, C. Ogilvie, G. Stephans, H. Yao
- **Yonsei University** - J. H. Kang, E-J. Kim, S. Y. Kim, Y. Kwon
- **University of California-Riverside** - J. Chang, W. Chang, W. Elderege, S. Y. Fung, R. Seto, H. Wang, H. Xiang, G. Xu, C Zou
- **University of Illinois - Chicago** - R. Betts, C. Conner, R. Ganz, B. Holtzman, D McLeod
- **University of Maryland** - H. Britt, E. Garcia, A. Mignerey, A. Ruangma, D. Russ, J. Stanskas
- **University of Rochester** - R. Pak, F. Wolfs

The proposed experiment will study the physics of the high-baryon density matter being created in Au-Au collisions at the AGS. through the systematic measurement of short lived vector mesons and baryons, the measurement of strange anti-baryons and anti-protons, and high statistics HBT studies.


A3 Beam Line
AGS Radiobiology Irradiation Facility – FY95
A3 Transport Magnets – Not Used
Fe Beam
Concrete Shielding
2.6 m
Iron Shielding
Alignment and Irridiation Bench
Beam Monitor
A3 Collimator – Not Used
E898
A3D7
A3D6
A3D5
H730
H802
H702
A1D7
A1D6
A1D5
2.25" GAP
1.84" GAP
2.5108
-2.8233
-2.8232
96.0"

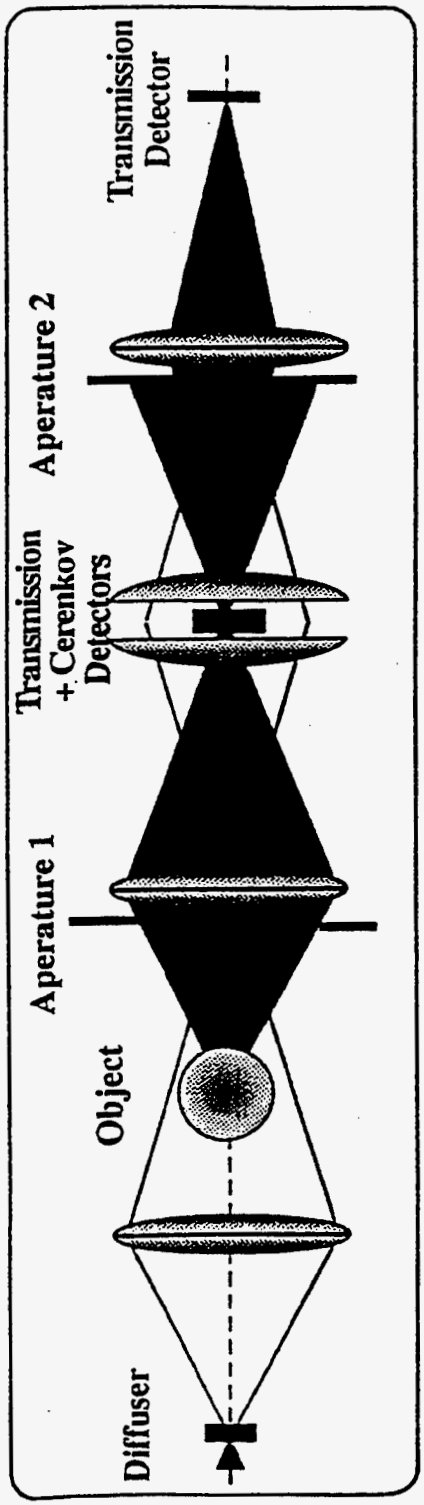
Beam: A3
Status: In Progress
Hours Charged/Approved: 176/300

EXPERIMENT 919- A STUDY OF THE GENETIC AND EPIGENIC EFFECTS PRODUCED BY HIGH ENERGY HEAVY IONS

Spokesmen: M. Vazquez

- **Alabama Agr. and Mechanical University** - P. Kale
- **Brookhaven National Laboratory** - J. Bullis, J. Gatley, B. Sutherland, M. Vazquez
- **Case Western Reserve University** - H. Evans
- **Colorado State University** - T. Borak, G. Mariano, C. A. Waldren
- **Columbia University** - T. K. Hei
- **Georgetown University medical Center** - T. Jorgensen
- **Lawrence Berkeley National Laboratory** - P. Cooper, A. Kronenberg, J. Miller
- **Loma Linda University** - G. Nelson
- **Los Alamos National Laboratory** - D. J. Chen
- **NASA Johnson Space Center** - T. C-h Yang
- **Natl. Inst. Of Radiological Sciences, Japan** - Y. Furusawa
- **Pacific Northwest National Laboratory** - N. F. Metting
- **USAF Armstrong Laboratory** - A. Cox
- **Washington State University** - A. Brooks
- **University of California** - L. H. Lutze-Mann, W. Morgan
- **University of Maryland Baltimore** - E. Balcer-Kubiczek, B. Rabin
- **University of Texas** - M. Natarajan

This is a NASA effort in the AGS to study the genetic and epigentic effects produced by high energy heavy ions. There will be two runs labeled BNL-3, 4 (E919) for the period of October 1, 1996 to September 31, 1998. Each run provides 150 hours of 1GeV/nucleon Fe ions.



Schematic of a MCS radiographic detector system. The beam is first prepared with a diffuser and matching lens to meet optics requirements. It then passes through the object to be radiographed. The transmitted beam passes through an iris, or aperture, is focused on the first detector, then passes through a smaller diameter iris and is focused on a second detector. The ratio of the first and second detector intensities provides both the density profile and material composition of the object.

Beam: A1
Status: Complete 1996
Hours Charged: 197

EXPERIMENT 920 - LENS TEST FOR PROTON RADIOGRAPHY

Spokesman: J. Zumbro

- **Los Alamos National Laboratory** - G. Hogan, K. Morley, C. Morris, K. Mueller, J. Sarracino, H. Ziock, J. Zumbro

---

The goal of this experiment is to provide data for standard test objects which can be benchmarked against models of proton transport and magnetic optics. Additionally the performance of proton radiography will be directly compared with X-ray measurements on the same set of objects.

Beam: C5
Status: Complete in FY 1997
Hours Charged/Approved: 36/48

EXPERIMENT 922 - RADIATION TESTING OF NASA'S GLOBAL POSITIONING SYSTEM AND INERTIAL NAVIGATION SENSOR (GPS/INS)

Spokesman: W. X. Culpepper

- **National Aeronautics and Space Administration** - W. X. Culpepper

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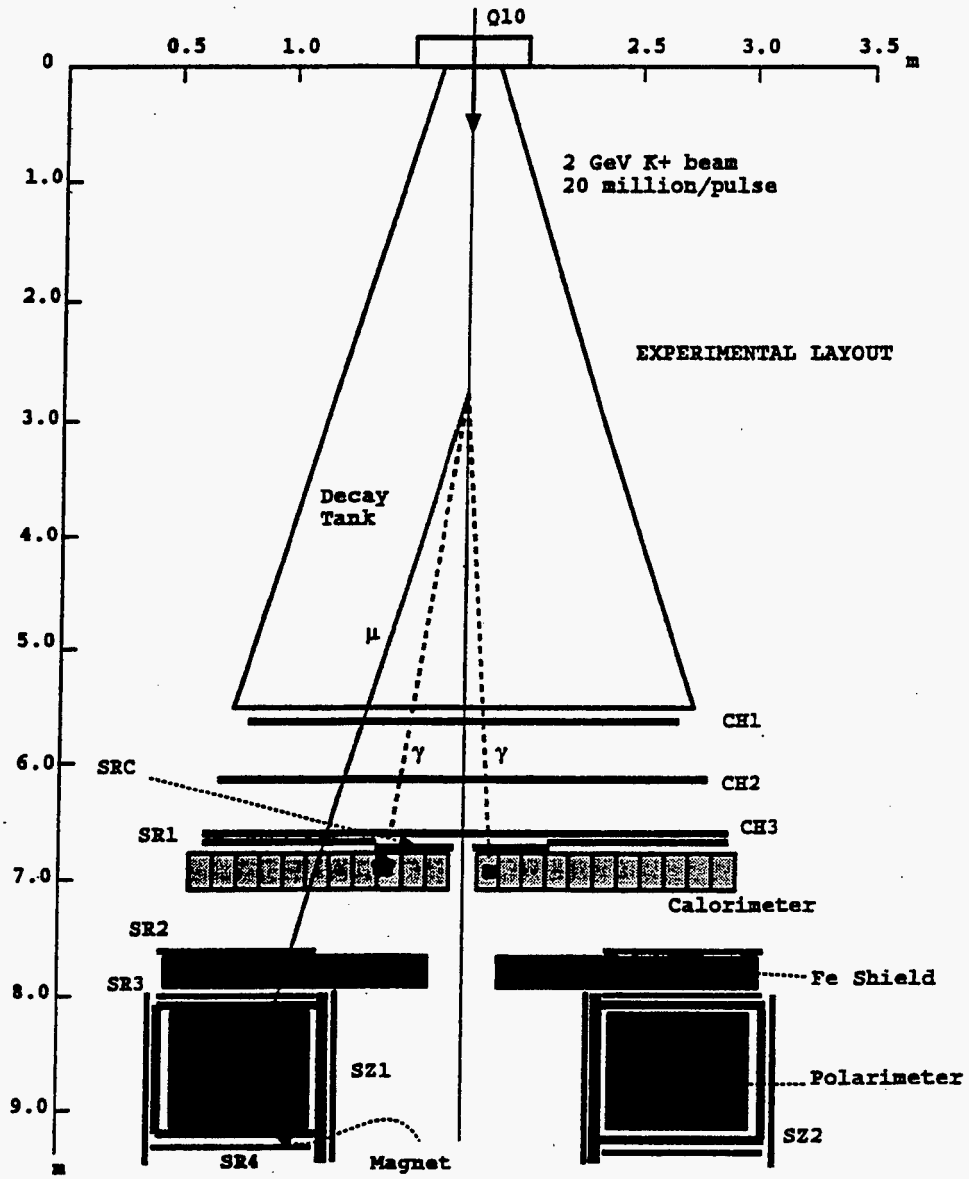
NASA has elected to pursue the development of an integrated global positioning system (GPS) and inertial navigation system (INS) (GPS/INS) for use as common hardware on the International Space Station (ISS), the Space Shuttle Orbiter and the ISS Crew Return Vehicle (CRV). NASA's Johnson Space Center (JSC) is the lead center for this activity. This GPS/INS will perform the prime state vector estimation and navigation functions for the flight vehicles involved and is considered a criticality 1 subsystem, *i.e.*, impacts crew safety, vehicle survivability and mission success.

A facility producing heavy ions with sufficient energy per nucleon is needed to perform system level tests with heavy ions similar to the IUCF proton tests to establish latchup susceptibility for the proposed hardware. The 10-11 GeV gold ion beam scheduled at the AGS in the fall/winter of 1996 is the only American resource known that can accomplish this special testing.



Schematic of the experiment. A typical $K^+ \rightarrow \mu^+\pi^0\nu$ event is superimposed.

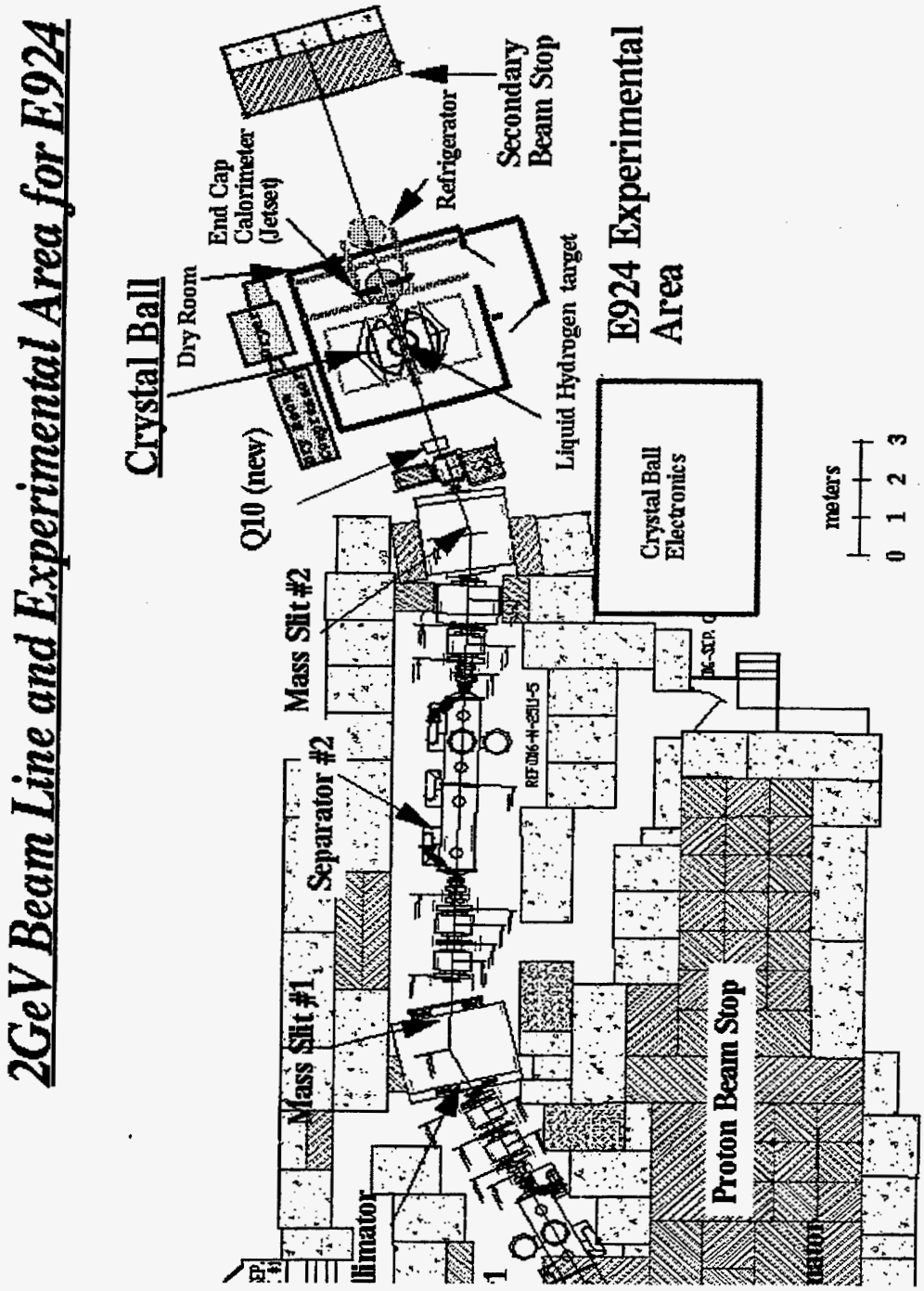
Beam: D6
Status: Approved
Hours Charged/Approved: 0/2000

EXPERIMENT 923 -SEARCH FOR T VIOLATING MUON POLARIZATION IN $K^+ \rightarrow \mu^+\pi^0\nu_\mu$ DECAY

Spokesmen: R. Adair, M. V. Diwan, Hong Ma

- **Brookhaven National Laboratory** - A. S. Carroll, M. V. Diwan, J. Frank, A. Gordeev, S. Kettell, L. Leipuner, L. Littenberg, H. Ma, V. Polychronakas
- **Institute for Nuclear Research, Moscow, Russia**
  G. Atoyan, V. Issakov, O. Karavichev, S. Laptev, A. Poblaguev, A. Proskuryakov
- **Louisiana Tech University** - M. Elaasar, D. Greenwood, K. Johnston
- **Yale University** - R. Adair, R. Larsen

This experiment proposes a new search for the time reversal violating polarization of the muon normal to the decay plan of the $K^+ \rightarrow \mu^+\pi^0\nu$ decay. The experiment will be performed with in-flight decays in an intense (2×10^7 K^+ per sec) 2 GeV/c separated kaon beam in an existing beam-line at the AGS. The center piece of the detector will be a new polarimeter which will consist of 128 carbon wedges, with active detector elements (either scintillator or wire chambers) between the wedges, arranged in a cylindrical manner around the kaon beam. More than 10^9 events are expected to be analyzed to obtain sensitivity to the T-violating polarization of ± 0.0007 to $Im\xi$, an improvement by approximately 40 over the previous best limit.

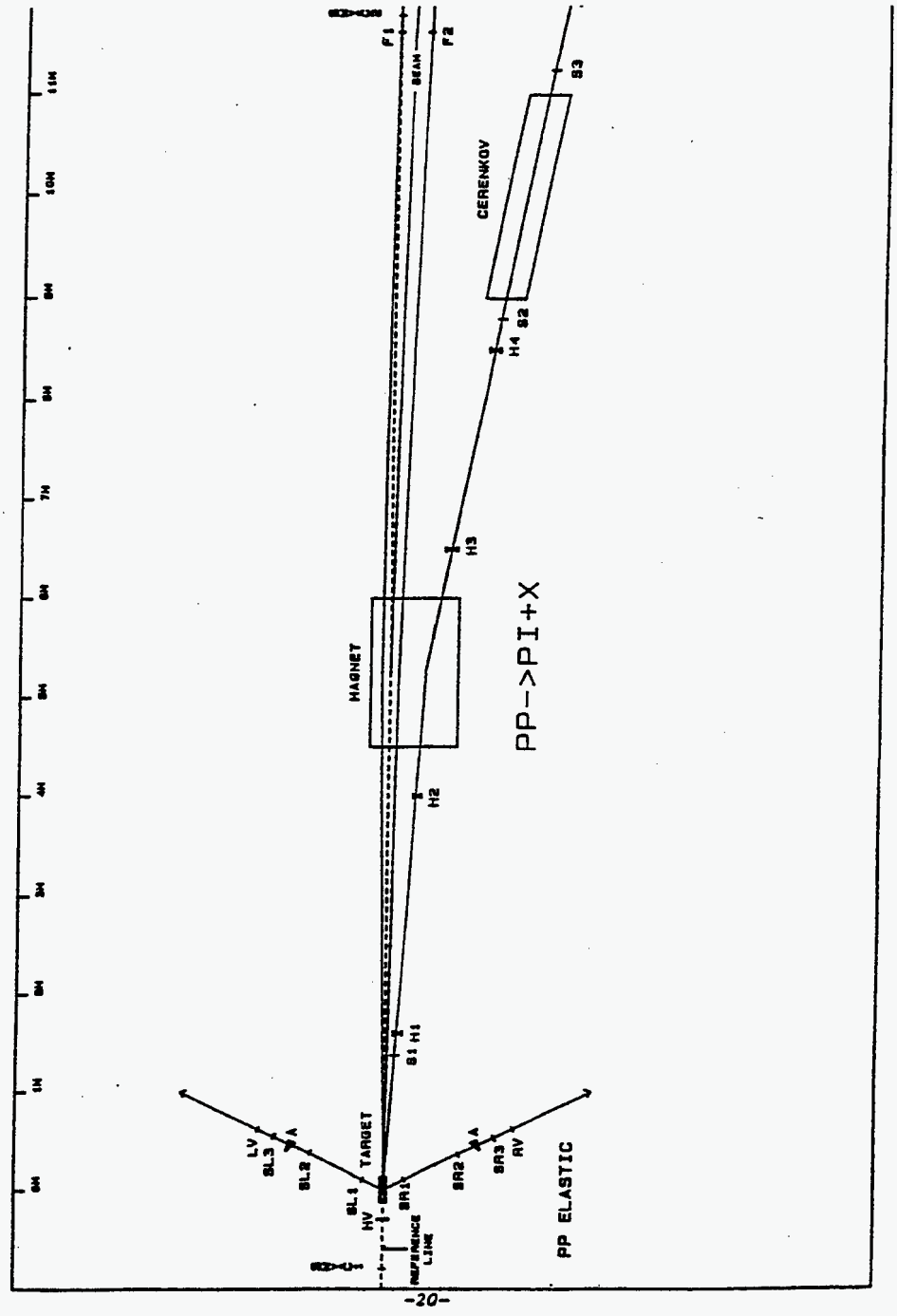

2GeV Beam Line and Experimental Area for E924
Crystal Ball
Dry Room
End Cap Calorimeter (Jetset)
Refrigerator
Secondary Beam Stop
Liquid Hydrogen target
E924 Experimental Area
Q10 (new)
Mass Slit #2
Crystal Ball Electronics
meters
0 1 2 3
Separator #2
Mass Slit #1
Proton Beam Stop

Beam: D6
Status: Approved
Hours Charged/Approved: 0/1400

EXPERIMENT 924 - STUDY OF THE $\xi(2220)$ IN $\bar{p}p \rightarrow$ NEUTRAL FINAL STATES USING THE CRYSTAL BALL IN THE AGS D6 LINE
SPOKESMAN: D. W. HERTZOG

- **Boston University** - J. Miller
- **Brookhaven National Laboratory** - T. Kycia, P. Pile
- **Carnegie-Mellon University** - G. Franklin, C. Meyer, B. Quinn, R. A. Schumacher
- **College of William and Mary in Virginia** - M. Eckhause, J. Kane, R. Welsh
- **George Washington University** - C. Bennhold, W. J. Briscoe
- **Kent State University** - D. M. Manley
- **Northwestern University** - K. Seth
- **Petersburg Nuclear Physics Institute** - V. V. Abaev, V. S. Bekrenev, N. G. Kozlenko, S. P. Kruglov, I. V. Lopatin, A. B. Starostin
- **Valparaiso University** - D. Grosnick, D. D. Koetke, R. W. Manweiler, S. Stanislaus
- **University of California at Los Angeles** - M. Clajus, S. C. McDonald, A. Marušić, B. M. K. Nefkens, W. B. Tippens
- **University of Colorado** - R. J. Peterson
- **University of Connecticut** - R. T. Jones
- **University of Illinois at Urbana-Champaign** - P. Debevec, D. W. Hertzog, P. E. Reimer, J. Ritter, S. Sedykh, D. Urner
- **University of Karlsruhe** - H. M. Staudenmaier
- **University of Maryland** - D. Peaslee
- **University of Regina** - G. J. Lolos, Z. Papandreou

The experimenters propose to study the reactions $\bar{p}p \rightarrow \pi^o\pi^o$, $\bar{p}p \rightarrow \pi^o\eta$, $\bar{p}p \rightarrow \eta\eta$, *and* $\bar{p}p \rightarrow \eta\eta'$ in the region of the ξ using the high-resolution Crystal Ball detector and the D6 (antiproton) beam line.



Sketch of the experimental setup for the proposed inclusive pion experiment.

Beam:
Status: In Progress
Hours Charged/Approved:317/384

EXPERIMENT 925 - ASYMMETRIES IN INCLUSIVE PION PRODUCTION AT LARGE X_F = (0.5 TO 0.8) AND $P_T \geq$ 0.8 GEV/C WITH A POLARIZED BEAM FOR A RHIC POLARIMETER

SPOKESMEN: Y. MAKDISI AND A. YOKOSAWA

- **Argonne National Laboratory** - K. Krueger, T. LeCompte, H. Spinka, D. Underwood, A. Yokosawa
- **Brookhaven National Laboratory** - L. Ahrens, J. G. Alessi, K. Brown, G. Bunce, P. Cameron, H. Huang, A. U. Luccio, Y. Makdisi, F. Mariam, L. Ratner, T. Roser, M. Syphers, N. Tsoupas
- **IHEP, Institute for High Energy Physics, Protvino** - N. I. Belikov, A. M. Davidenko, A. A. Derevschikov, S. V. Erin, Yu. M. Goncharenko, Yu. A. Matulenko, L. V. Nogach, S. B. Nurushev, A. I. Pavlinov, A. N. Vasiliev
- **Indiana University** - M. Bai*, S. Y. Lee
- **Institute for Chemical and Physical Research (RIKEN)** - Y. Goto, H. Hayashi, T. Ichihara, Y. Kondo**, Y. Nakada**, M. Nakamura**, N. Saito
- **Institute for Theoretical and Experimental Physics (ITEP), Moscow** - I. G. Alekseev, V. P. Kanavets, D. N. Svirida
- **University of California-Los Angeles** - K. Barish, L. Betev, V. Ghazikhanian, H. Huang, G. Igo, S. Trentlage, C. Whitten
- **University of Iowa** - N. Akchurin
- **University of Tokyo** - H. Okamura, H. Sakai, T. Wakasa

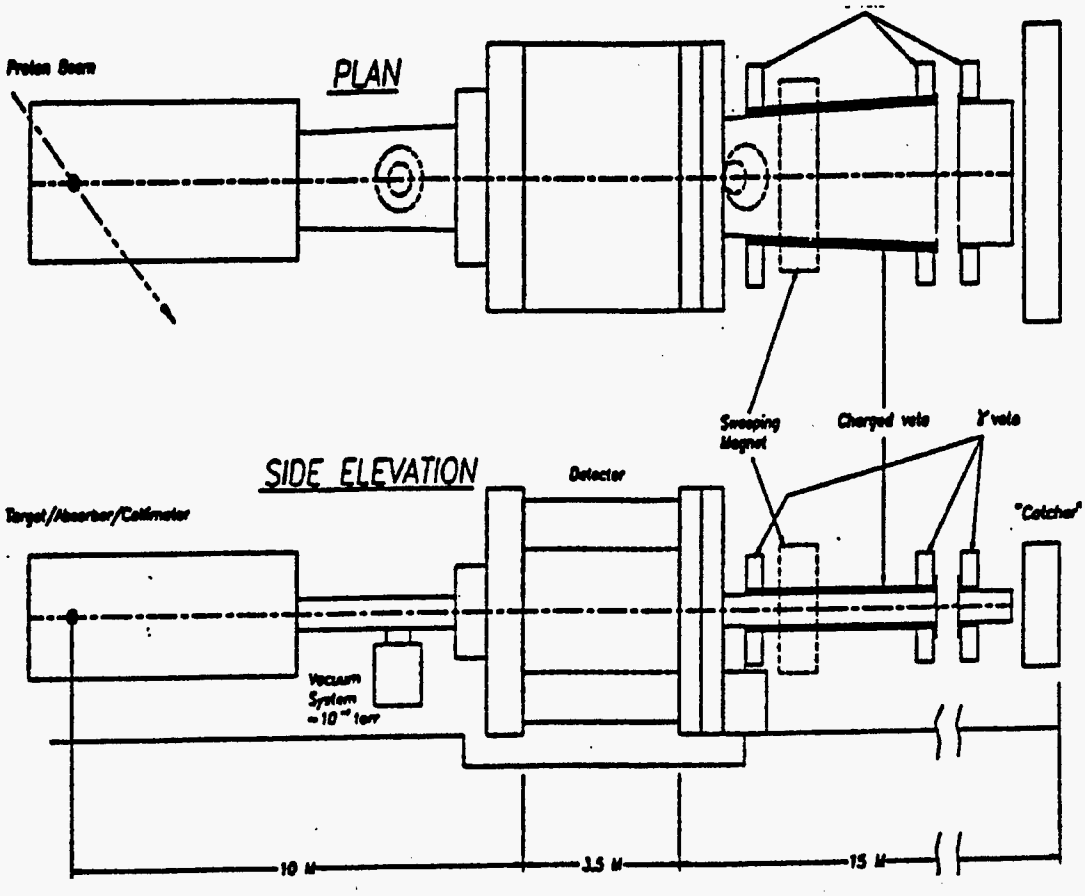
* Also Argonne National Laboratory
** Also Kyoto University, Japan

The experimenters propose to measure asymmetries in the inclusive reactions,

$$p\uparrow p \rightarrow \pi^+ \text{ anything}, \; p\uparrow C \rightarrow \pi^+ \text{ anything},$$
$$p\uparrow p \rightarrow \pi^- \text{ anything}, \; p\uparrow C \rightarrow \pi^- \text{ anything}$$

using a transversely polarized beam, a liquid hydrogen target, and a carbon target. The measurements would be made using the 23-GeV/c proton beam in an extracted beam line from the AGS, a spectrometer consisting of an analyzing magnet, scintillation hodoscopes, scintillation trigger counters, and a gas threshold Cerenkov counter. The kinematic range covered by the experiments would be p_T up to 1.0 GeV/c and $x_F = p_L^*/p_{max}^* \approx 0.5$ *to* 0.8.

The purpose of this proposal is to obtain basic information in order to design a polarimeter for the RHIC polarized beams. The RHIC polarimeter is a crucial item for the success of the RHIC spin program.



Layout of the $K_L^o \rightarrow \pi^o \nu\bar{\nu}$ experiment.

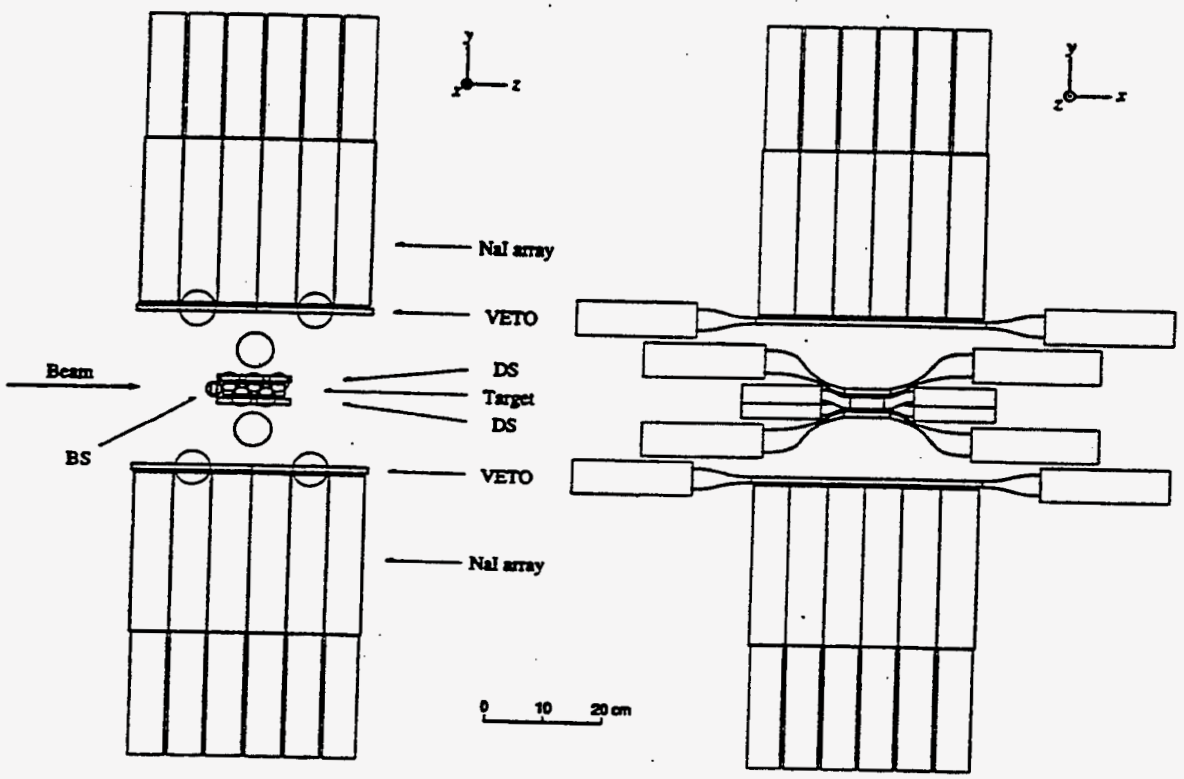
Beam: B5
Status: Approved
Hours Charged/Approved: 0/8000

EXPERIMENT 926 - MEASUREMENT OF $K_L^0 \rightarrow \pi^0\nu\bar{\nu}$

SPOKESMEN: D. BRYMAN, L. LITTENBERG, M. ZELLER

- **Brookhaven National Laboratory** - I-H. Chiang, J. W. Glenn, V. Jain, D. Lazarus, L. Littenberg, R. Strand, C. Woody
- **INR-Moscow** - D. Dementyev, A. Ivashkin. A. Khotjanzev, Y. Kudenko, O. Mineev
- **Kyoto University** - T. Fujiwara, H. Kurashige, N. Sasao
- **Thomas Jefferson National Accelerator Facility** - M. Ito
- **TRIUMF** - E. Blackmore, D. Bryman, P. Gumplinger, P. Kapinos, A. Konaka, J. Macdonald, T. Numao, R. Poutissou, G. Smith
- **Virginia Polytechnic Institute** - M. Blecher, K. Kinoshita, M. Pitt
- **Yale University** - S. Dhawan, H. Kaspar, W. Majid, M. Zeller
- **University of British Columbia** - M. Hasinoff
- **University of New Mexico** - B. Bassalleck, J. Lowe

This experiment will be a measurement of the rare decay $K_L \rightarrow \pi^0\nu\bar{\nu}$. The method employs kaon time-of-flight and full kinematic reconstruction of the π^0 to suppress backgrounds to a level well below an anticipated signal in the range of $3 \pm 2 \times 10^{-11}$.



Schematic layout of the target region and the detector are shown.

Beam: D6
Status: Tests Complete
Hours Charged/Approved: 38/800

EXPERIMENT 929 SPIN-ORBIT SPLITTING OF SINGLE Λ STATE STUDIED BY THE $^{13}C(K^-,\pi^-\gamma)$ REACTION

SPOKESMAN: T. KISHIMOTO

- **Brookhaven National Laboratory** - R. E. Chrien, M. May, P. Pile, A. Rusek, R. Sutter
- **Hampton University** - L. Tang
- **Manitoba University** - L. Lee
- **National Laboratory of High Energy Physics** - H. Noumi
- **North Carolina A&T State University** - R. Sawafta
- **Osaka University - Department of Physics** - S. Ajimura, H. Hayakawa, R. Hazama, T. Kishimoto, K. Morikubo, E. Sajai, R. Sato
- **Osaka University - Research Center for Nuclear Physics** - N. Kudomi, K. Kume, Y. Mizuno, M. Nomachi, K. Tamura
- **Tohoku University** - K. Maeda, T. Suda
- **University of Houston** - M. Ahmed, R. Barber, T. Empl, E. V. Hungerford, K. J. Lan, B. W. Mayes, M. Muerleilier, L. S. Pinsky, M. Youn
- **University of Tokyo - Department of Physics** - H. Tamura
- **University of Tokyo - Institute for Nuclear Study** - T. Fukuda, T. Nagae, J. Nakano, H. Outa, T. Tamagawa

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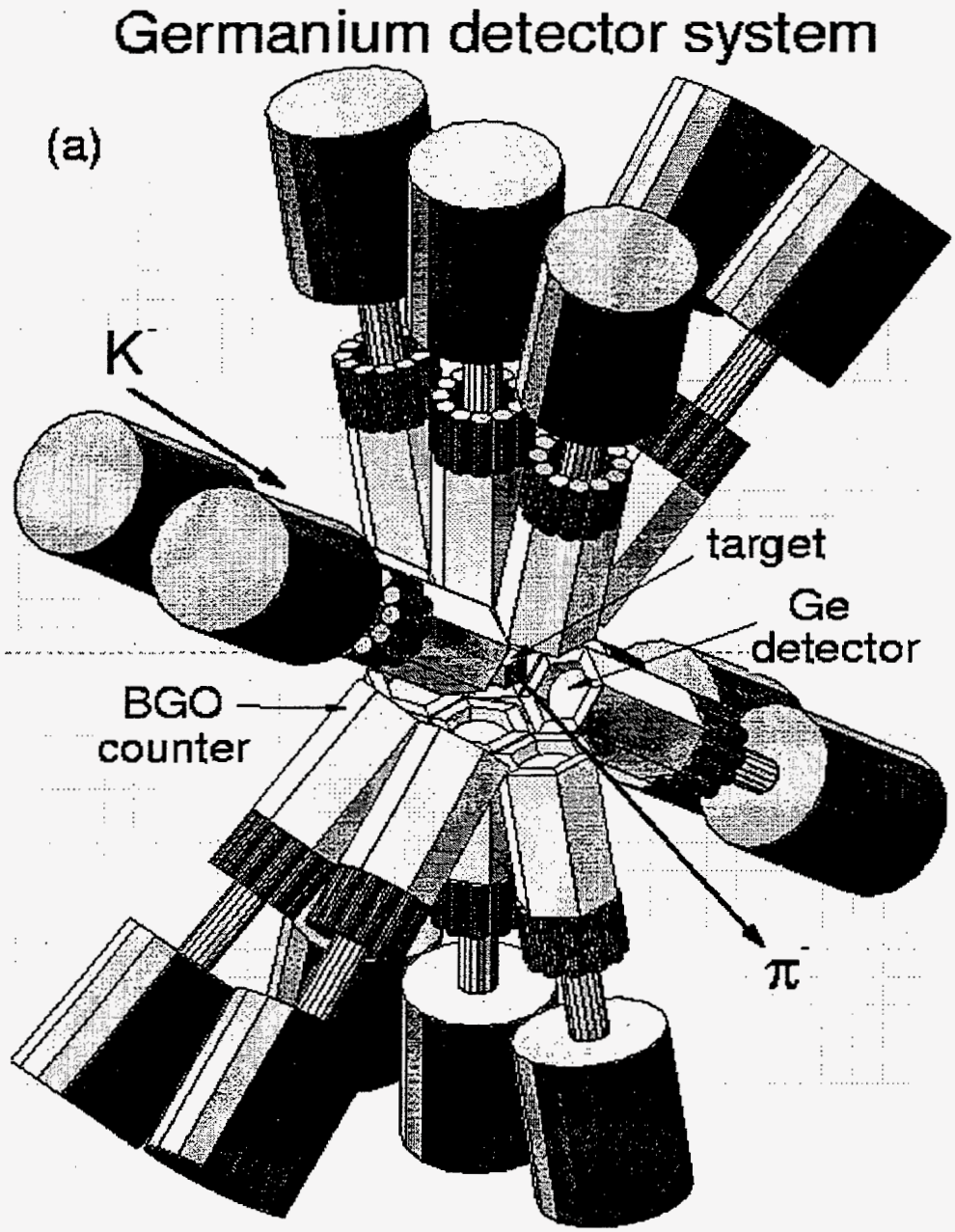
The experimenters propose to measure the spin-orbit (ls) splitting of single Λ particle states in a hypernucleus.


Germanium detector system
(a)
K⁻
target
Ge
detector
BGO
counter
π⁻

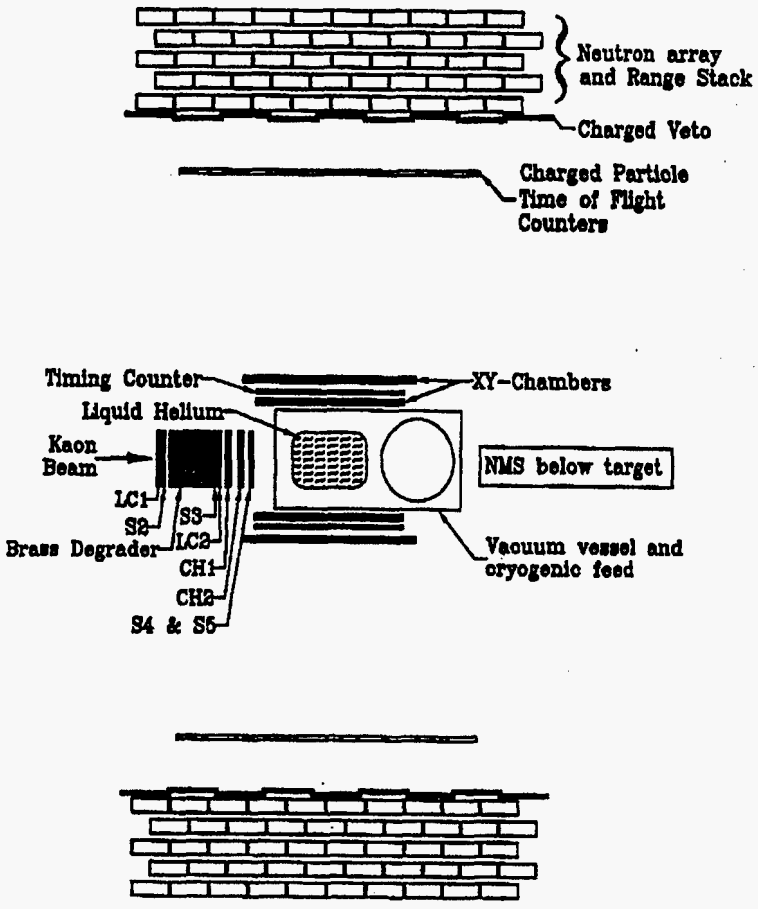
Beam: D6
Status: Approved
Hours Charged/Approved: 0/1040

EXPERIMENT 930 - HIGH-RESOLUTION γ SPECTROSCOPY OF HYPERNUCLEI USING LARGE-ACCEPTANCE GERMANIUM DETECTOR

SPOKESMAN: H. TAMURA

- **Brookhaven National Laboratory** - R. E. Chrien, M. May, P. Pile, A. Rusek
- **Hampton University** - L. Tang
- **KEK** - T. Fukuda, T. Nagae, H. Noumi, H. Outa
- **North Carolina A&T University** - R. Sawafta
- **Osaka University** - S. Ajimura, T. Kishimoto
- **Tohoku University** - O. Hashimoto, H. Tamura, T. Takehashi
- **University of Tokyo - Department of Physics** - T. Ishikawa, K. Tanida

The experimenters propose a high-resolution γ-ray spectroscopy measurement of several light Λ hypernuclei employing a large-acceptance germanium detector system which is being constructed in Japan. Λ hypernuclei are produced by the (K^-,π^-) reaction and their γ transitions are detected in coincidence. They will use K^- beam at C6 beam line together with the present spectrometer. The aim is to determine ΛN spin-dependent interactions through γ spectroscopy of some light hypernuclei. Data will be taken with ^{9}Be, ^{16}O, ^{12}C and ^{7}Li targets and to study γ transitions of $^{15}_{\Lambda}$N, $^{9}_{\Lambda}$Be, $^{16}_{\Lambda}$O, $^{12}_{\Lambda}$C, $^{7}_{\Lambda}$Li, which will give information on the spin-spin, spin-orbit, and tensor interactions between Λ and nucleon.



Top View

Figure 1: Experimental Layout for the weak decay of ${}^{4}_{\Lambda}$H measurement. The beamline elements are labeled according to their type; S2-5 are scintillator elements, LC designates lucite Cherenkov detectors for K/π separation, and CH designates tracking chambers to determine the direction of the incoming kaon.

Beam: C8
Status: Approved
Hours Charged/Approved: 0/800

EXPERIMENT 931 - STUDY OF THE $\Delta I = \frac{1}{2}$ RULE IN THE WEAK DECAY OF S-SHELL HYPERNUCLEI

SPOKESMAN: D. DEHNHARD, E. HUNGERFORD, V. ZEPS

- **Arizona State University** - J. R. Comfort, C. Gauland
- **Brookhaven National Laboratory** - R. E. Chrien, J. Gerald, M. May, P. H. Pile, A. Rusek, R. Sutter, W. B. Tippens
- **Carnegie-Mellon University** - G. B. Franklin, B. Quinn
- **CEBAF** - L. Tang
- **George Washington University** - W. Briscoe
- **Los Alamos National Laboratory** - J. Amann, D. Boudrie, C. Edwards, B. F. Gibson, C. Morris, J. O'Donnell, J-C. Peng, A. Thiessen
- **Louisiana Tech University** - M. Barakat, K. Johnston
- **North Carolina A&T** - R. Sawafta
- **R. Boskovic Institute** - I. Supek
- **Tohoku University** - O. Hashimoto
- **University of California at Los Angeles** - B. Nefkens
- **University of Colorado** - G. A. Peterson
- **University of Houston** - M. Ahmed, X. Cui, A. Empl, E. V. Hungerford, A. Lan, B. Mayes, L. Pinsky
- **University of Kentucky** - V. Zeps
- **University of Maryland** - P. G. Roos
- **University of Minnesota** - D. Dehnhard
- **University of Texas at Austin** - G. Glass, C. Fred Moore, H. Ward
- **University of Zagreb** - D. Androic, M. Furic, T. Petkovic, M. Planinic

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This experiment addresses an unresolved, fundamental question of "why" and"when" to apply the $\Delta I = \frac{1}{2}$ rule to the weak decay of strange hadrons. An opportunity now exists to determine if this apparently universal rule applies to the non-mesonic weak decay of a Λ, by studying particle emission from an important problem which can only be addressed through the coupling of the NMS spectrometer to the C8 beam line.

EXPERIMENT 932
Home Page • http://

Beam: AGS
Status: Completed FY 1997
Hours Charged: 35

EXPERIMENT 932 - STUDY OF RF BUNCHING TECHNIQUES
SPOKESMAN: J. H. NOREM

- **Argonne National Laboratory - J. H. Norem**
- **Brookhaven National Laboratory - T. Roser, M. Brennan, L. Lawrence, V. Mane, D. Trbojevic**
- **Fermi National Laboratory -C. Ankenbrandt, C. Johnstone, B. Ng, Z. Qian, M. Popovic**
- **KEK - M. Yoshi**

This experiment studied rf bunching techniques that would be relevant to the operating modes for a muon collider driver.

EXPERIMENT 933
Home Page • http://

Beam: U
Status: Under Consideration
Hours Charged:

EXPERIMENT 933 - PROTON RADIOGRAPHY
CONTACT PERSONS: C. MORRIS, E. HARTOUNI

- **Bechtal Nevada** - R. Thompson, R. Liljestrand
- **Lawrence Livermore National Laboratory** - E. Ables, M. B. Aufderheide, R. M. Bionta, P. D. Barnes Jr., T. E. Cowan, D. Fujino, E. P. Hartouni, H-S. Park, R. A. Soltz, K. A.VanBibber, D. M. Wright
- **Los Alamos National Laboratory** - J. F. Amann, R. L. Boudrie, G. E. Hogan, N. S. P. King, A. R. Mathews, J. B. McClelland, K. B. Morley, C. L. Morris, C.T. Mottershead, K. H.Mueller, J. S. Sarracino, G. J. Yates, H. J. Ziock, J. D. Zumbro

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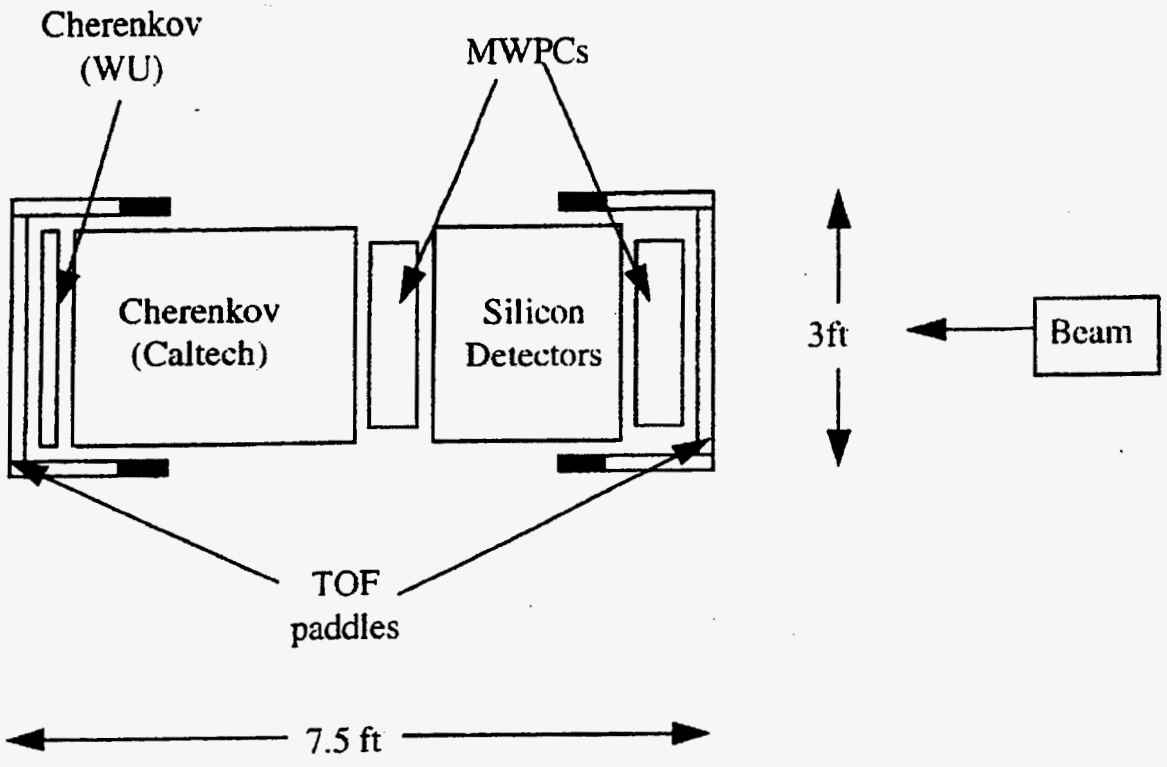
Proton radiography is being investigated as a promising new technology for hydrodynamic testing in support of a science based stockpile stewardship program. It has the potential to outperform traditional X-ray Techniques in meeting the full range of requirements that are being developed by a DOE-DP charted tri-lab working group. This group was established to identify technical approaches by which an advanced hydrodynamic testing capability could certify the stockpile in the absence of underground testing.


Cherenkov
(WU)
MWPCs
Cherenkov
(Caltech)
Silicon
Detectors
3ft
Beam
TOF
paddles
7.5 ft

Beam: C5
Status: Complete FY 1997
Hours Charged/Approved: 36/24

EXPERIMENT 934 - PROPOSAL FOR BROOKHAVEN CALIBRATION OF DETECTORS FOR USE ON ACCESS

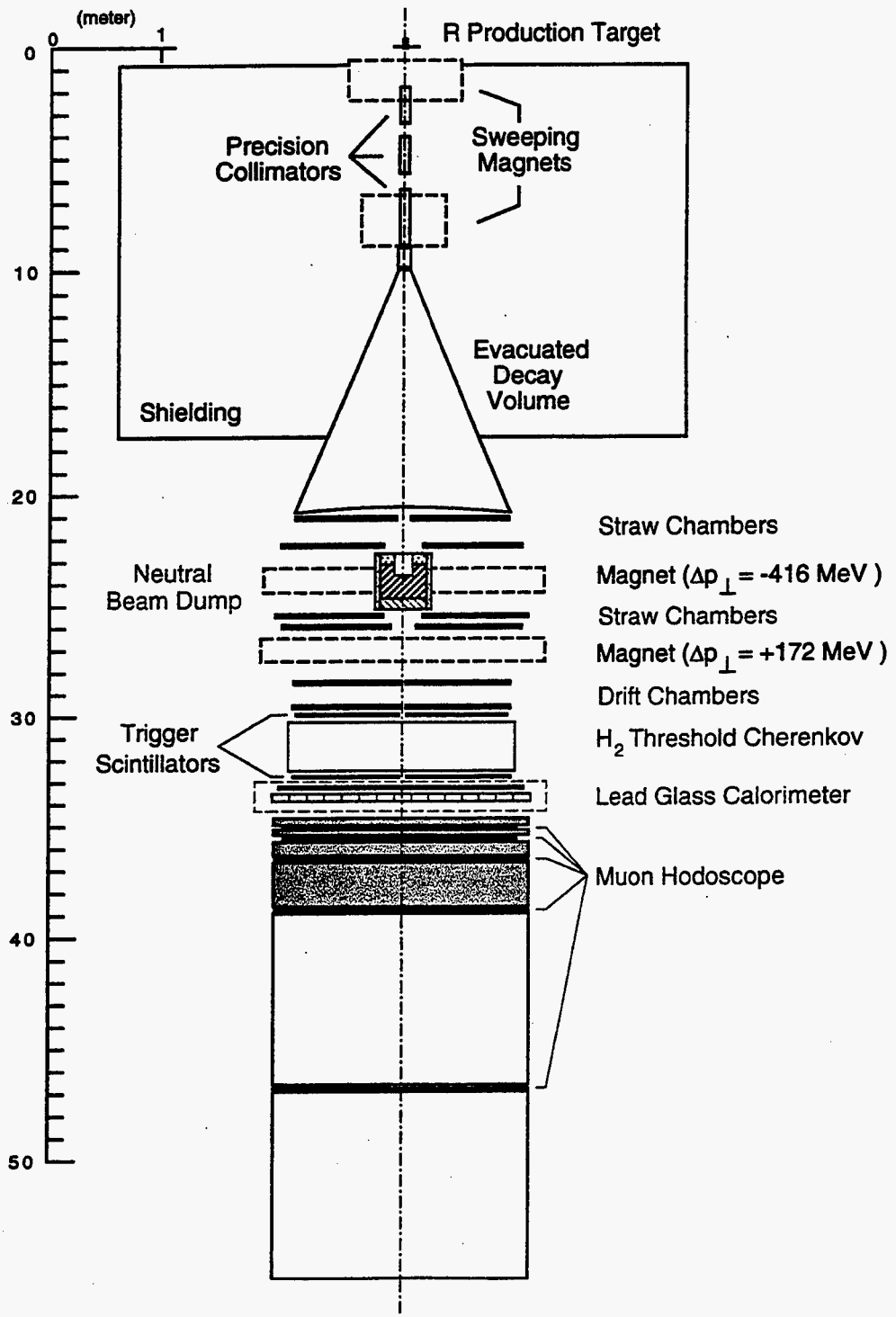
Spokesman: W. R. Binns

- **Caltech** - T. L. Garrard, R. A. Leske, R. A. Mewaldt, S. M. Schindler, M. E. Wiedenbeck
- **Goddard Space Flight Center** - L. M. Barbier, E. R. Christian, J. W. Mitchell, J. F. Ormes, R. E. Streitmatter
- **Pennsylvania State University** - J. J. Beatty, M. Douvernoi
- **Washington University in St. Louis** - W. R. Binns, P. L. Hink, M. H. Israel
- **University of Minnesota** - C. J. Waddington

The purpose of this proposed calibration run at Brookhaven is to test and calibrate detectors to determine if they are capable of making precision measurements of the elemental abundances and energy spectra of galactic cosmic rays with $10 \geq Z \geq 92$. The Advanced Cosmic Ray Composition Experiment for Space Station (ACCESS) has been approved by NASA for a Mission Concept Study over the next two years. The present concept includes detectors which will be used to precisely measure the charge of these ultra-heavy nuclei.

Experimental goals of the ultra-heavy portion of the mission are: to determine whether the chemical fractionation pattern of GCRs is better organized by FIP or volatility; test whether galactic cosmic rays originate from interstellar dust grains, mass loss from main sequence star, freshly synthesized supernova debris, special sources, such as Wolf-Rayet stars; determine whether $Z > 30$ and $Z \geq 30$ nuclei have a common source; test if r-processes that contributed to GCRs were driven further than those that formed the solar system mix by measuring the r/s-process mix as a function of charge.

The detectors are Li-drifted silicon wafer detectors for dE/dx, waveshifter readout plastic scintillators for dE/dx, scintillating fibers for time-of-flight, and waveshifter readout Cerenkov counters.


(meter)
0
1
0
10
20
30
40
50
R Production Target
Precision Collimators
Sweeping Magnets
Evacuated Decay Volume
Shielding
Straw Chambers
Neutral Beam Dump
Magnet ($\Delta p_\perp$ = -416 MeV)
Straw Chambers
Magnet ($\Delta p_\perp$ = +172 MeV)
Drift Chambers
Trigger Scintillators
H_2 Threshold Cherenkov
Lead Glass Calorimeter
Muon Hodoscope

Beam: B5
Status: Completed FY 1997
Hours Charged/Approved: 768/1300

EXPERIMENT 935 - A DECAY SEARCH FOR A LIGHT GLUINO BOUND STATE IN THE B5 LINE

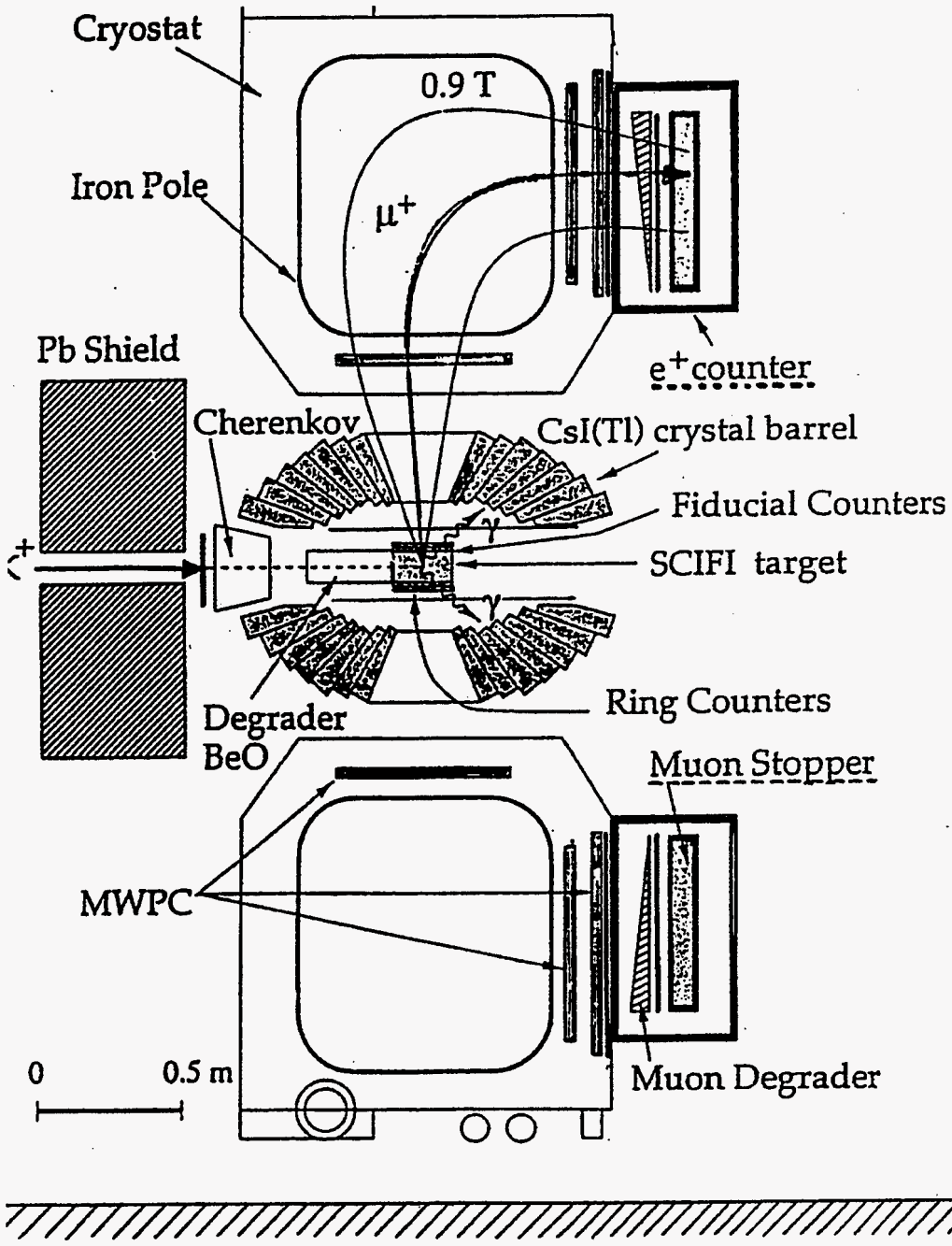
Spokesman: Y. Kuang

- **College of William and Mary**
  M. Eckhause, D. Hancock, K. Hern, J. Kane, Y. Kuang, A. Norman, R. Welsh
- **Rensselaer Polytechnic Institute** - M. Witkowski
- **University of California, Irvine** - M. Bachman, G. Kagel, R. Lee, T. Liu, W. Molzon
- **University of Richmond** - P. Rubin

The experimenters propose to search at the AGS for the supersymmetry-based R^0 hadron in terms of a decay channel involving a photino and two charged pions with a sensitivity in the product of production cross section and branching fraction of 5×10^{-36} cm^2/GeV^2. A positive signal would be a first observation of a sypersymmetric particle.

The detector facility assembled by the E871 collaboration to conduct rare kaon decay studies offers the highest flux neutral beam available and a detector that has acceptable sensitivity to the decay of the R^0-hadron. The E871 detector in its present configuration would be used to look for two-pion vertex events originating in the decay volume. Achieving an improved vacuum decay tank of $< 10^{-6}$ torr is the main modification required for the detector system.

Cross-Section View of the E936 Detector Set Up



Beam: C2
Status: Approved
Hours Charged/Approved: 0/3000

EXPERIMENT 936 - SEARCH FOR T-VIOLATION IN THE $K^+ \to \pi^0 \mu^+ \nu$ DECAY USING STOPPED KAONS

Spokesman: J. Imazato

- **National Laboratory for High Energy Physics (KEK)** - M. Aoki, M. Chapman, J. Imazato
- **Science University of Tokyo** - K. Nakai
- **Virginia Polytechnic Institute and State University** - M. Blecher
- **University of British Columbia and TRIUMF** - M. Hasinoff, J. A. Macdonald
- **University of Montreal** - P. Depommier
- **University of Saskatchewan** - C. Rangacharyulu, B. Shin
- **University of Tsukuba** - I. Arai, Y. Asano

An experiment is proposed to search for T-violation in the $K^+ \to \pi^0 \mu^+ \nu$ decay using a stopped beam method. The muon transverse polarization will be examined with high preision and with small systematic errors.. The experimental setup will be transferred from the KEK E246 T-violation experiment after the completion of data taking early in 1999. After 3000 hours of running at AGS, the sensitivity of $\Delta P_T \simeq 3.5 \times 10^{-4}$ will be obtained corresponding to the sensitivity of $\Delta Im\xi = 1.5 \times 10^{-3}$.

EXPERIMENT 937
Home Page • http://

Beam: D6
Status: Complete in FY 1997
Hours Charged/Approved: 16/48

EXPERIMENT 937 - A STUDY OF THE OCCURRENCE OF RADIATION-INDUCED SOFT ERROR UPSETS (SEU)

Spokesman: R. J. Peterson

- **University of Colorado** - C. J. Gelderloos, R. J. Peterson

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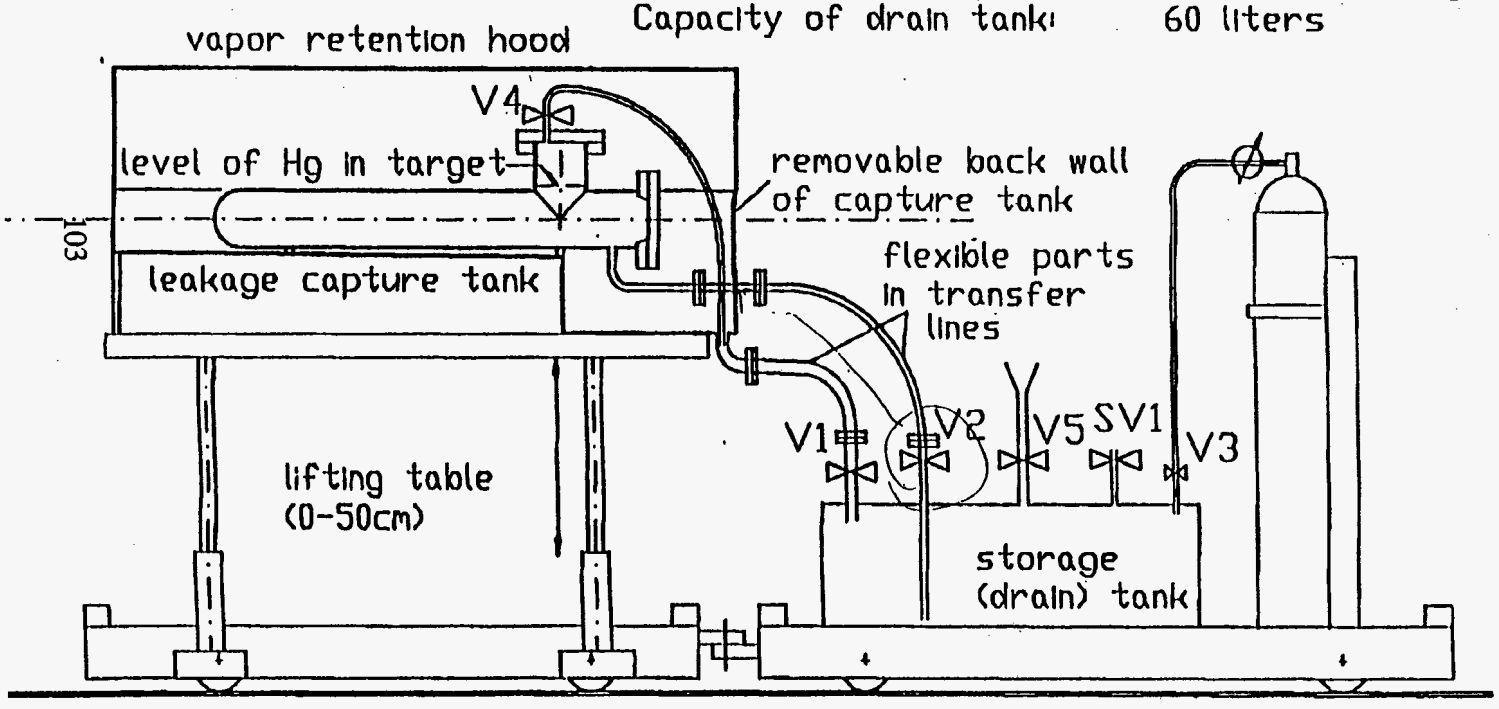
We exposed one sample of a 16 Mbit high density memory chip to negative pion beams of 1.2 and 1.8 Gev/c on the D-line. A plastic scintillator with the same dimensions as the chip was used to monitor the pion fluence. Cross sections for soft errors, changing the bit content of the chip without permanent damage, were found to be much smaller than observed at lower pion momenta. The experiment was truncated by a major equipment problem, and will not be extended because the information obtained is sufficient for the needs to understand avionics failrues in commercial aircraft.

BNL-AGS Target Test Experiment

Schematic section along beam center line

Volume of target container 40 liters (544Kg Hg)
Total Mercury in system 50 liters (680kg Hg)
Capacity of drain tank 60 liters



Beam: U
Status: In Progress
Hours Charged: 38

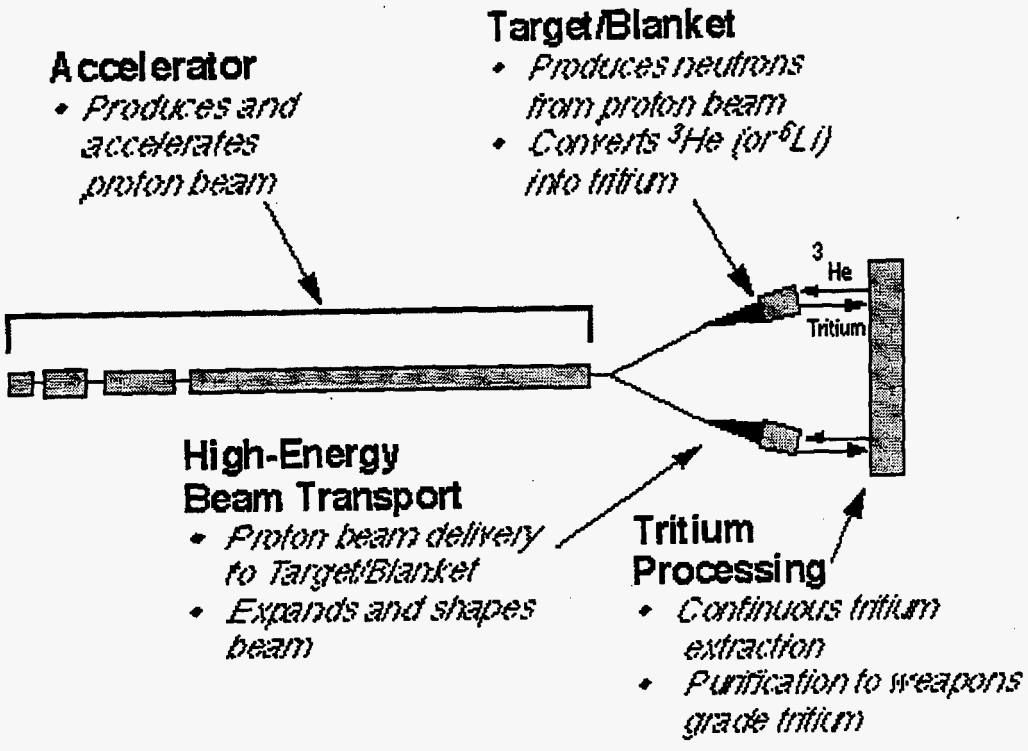
EXPERIMENT 938 - SPALLATION NEUTRON TARGET STUDIES AT THE AGS

Spokesmen - G. Bauer, J. Haines, J. B. Hastings, N. Watanabe

- **Argonne National Laboratory** - J. M. Carpenter
- **Brookhaven National Laboratory** - J. B. Hastings
- **Forschungszentrum Jülich** - H. Conrad
- **High Energy Accelerator Research Organization (KEK)** - H. Ikeda
- **Japan Atomic Energy Research Institute** - N. Watanabe
- **Los Alamos National Laboratory** - G. Russell
- **Oak Ridge National Laboratory** - J. Haines
- **Paul Scherrer Institute** - G. Bauer

There is a worldwide effort in planning and designing the next generation neutron source; the focus is on spallation source with average power of up to 5 MW and single pulse energies of 100 kjoules. The design issues center around the heavy metal target; liquid mercury is the current first choice. The AGS is a unique resource to study in detail neutron production, pressure wave mitigation and other issues in target design. It is the **only** proton source in the world with the energy per pulse equal to the proposed future sources.

The experiment will initially measure the neutron production and energy deposition in liquid mercury as a function of incident proton energy. The pressure wave behavior under peak power loading will then be measured and proposed mitigation measures evaluated. Finally, the performance of a liquid mercury target in conjunction with a lead reflector and moderators will be measured to study the complete system performance. The total proton flux required at a given proton energy is minimal (typically a few time 10^{14}) for the first two proposed measurement periods.


Accelerator
• Produces and accelerates proton beam
Target/Blanket
• Produces neutrons from proton beam
• Converts ^{3}He (or ^{6}Li) into tritium
^{3}He
Tritium
High-Energy Beam Transport
• Proton beam delivery to Target/Blanket
• Expands and shapes beam
Tritium Processing
• Continuous tritium extraction
• Purification to weapons grade tritium

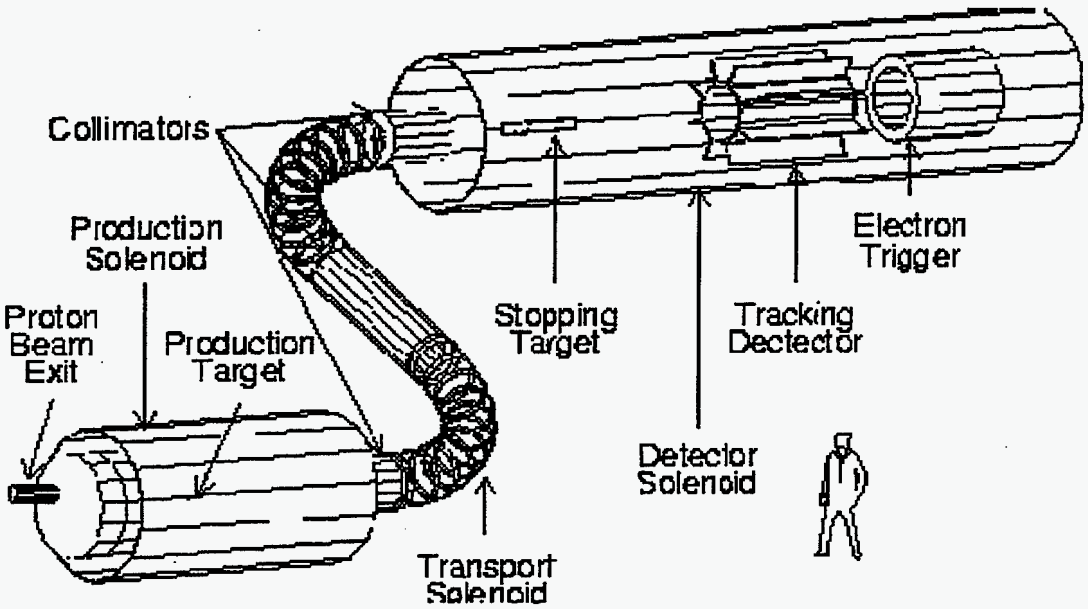
Beam: U
Status: In Progress
Hours Charged: 51

EXPERIMENT 939 -EXPERIMENTS FOR THE DOE ACCELERATOR PRODUCTION OF TRITIUM (APT) PROJECT

Spokesmen: N. S.P. King and A. L. Hanson

- **Bechtel Nevada** - R. Thompson, R. Liljestrand
- **Brookhaven National Laboratory** - G. Greene, A. L. Hanson, L. Snead, M.Todosow
- **CEA** - J. Frehaut
- **Lawrence Livermore National Laboratory** - G. Henry, D. Slaughter
- **LNS-CNRS** - S. Leray
- **Los Alamos National Laboratory**
  K. Alrick, F. Cverna, N. S. P. King, G. L. Morgan, L. Waters, J. Ullmann
- **U. S. Department of Energy** - T. Ward

The purpose of this experiment is to advance the R&D work for the accelerator production of tritium in the national program now underway in this subject. Using fast extracted protons, various materials will be exposed to proton beams of 800, 1200, 1600 and 2000 MeV to measure the production cross sections for $^{27}Al(p,3n)^{24}Na$.


Collimators
Production Solenoid
Proton Beam Exit
Production Target
Stopping Target
Tracking Dectector
Electron Trigger
Detector Solenoid
Transport Solenoid

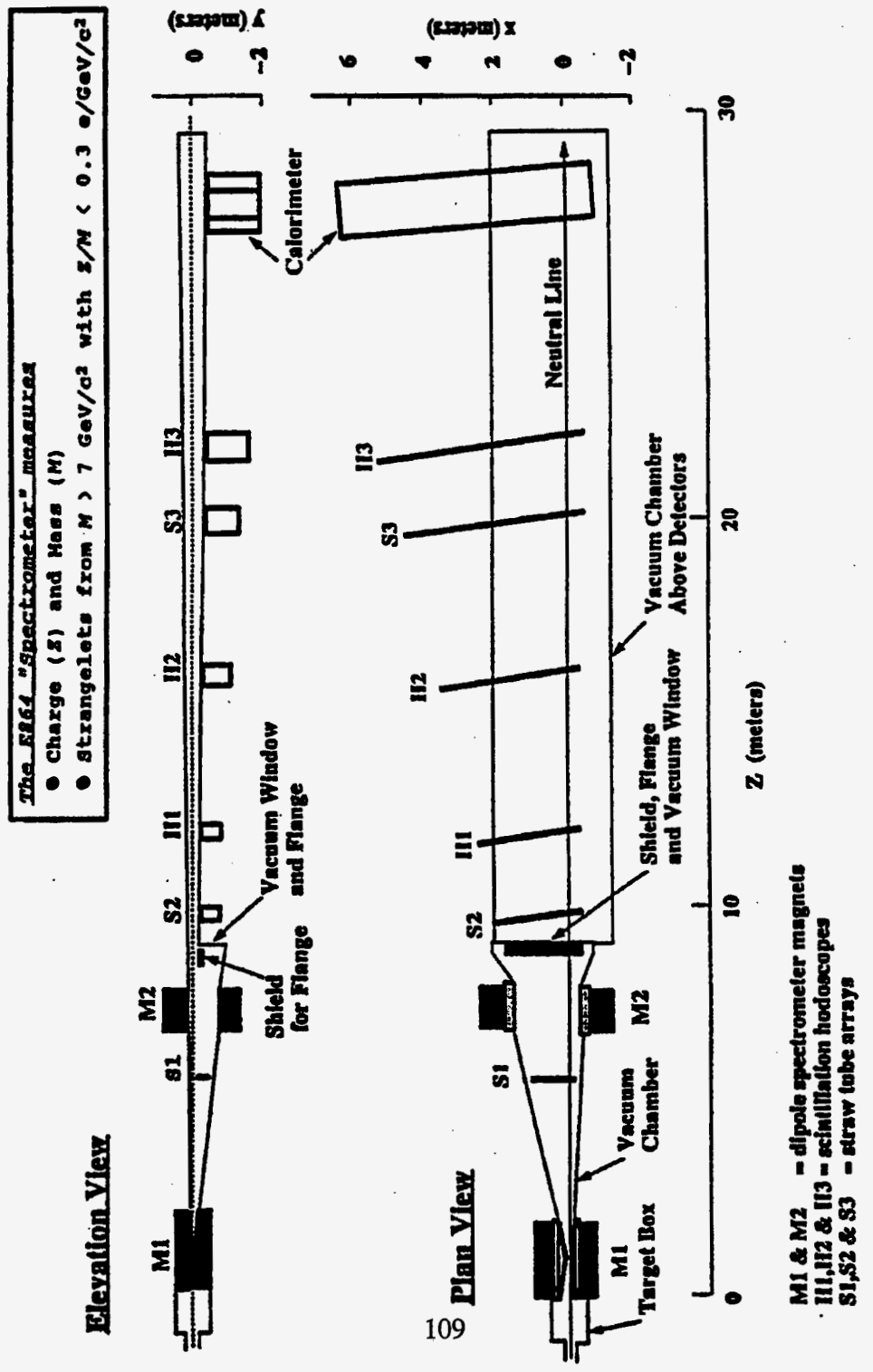
Beam:
Status: Approved
Hours Charged: 0/4000

EXPERIMENT 940 -A SEARCH FOR $\mu^-N \rightarrow e^-N$ WITH SENSITIVITY BELOW 10^{-16}
MUON-ELECTRON CONVERSION (MECO)
Spokesmen: W. Molzon

- **Institute for Nuclear Research** - R. M. Djikibaev, V. M. Lobashev, A. N. Toropin
- **New York University** - A. Mincer, P. Nemethy, J. Sculli
- **Purdue Univeristy** - S. Carabello, D. Koltick
- **University of California at Irvine** - M. Bachman, G. Kagel, R. Lee, T. J. Liu, W. Molzon, M. Overlin
- **University of Houston** - A. Empl, E. V. Hungerford, K. J. Lan, B. W. Mayes, L. S. Pinsky, J Wilson, M. Youn
- **University of Pennsylvania** - W. D. Wales

This experiment proposes to search for the process $\mu^-N \rightarrow e^-N$ with a significantly improved sensitivity with respect to past and proposed future searches. Interest is in searching for violations of additive quantum numbers associated with each type of lepton. Violation of these quantum numbers is commonly referred to as lepton flavor violation (LFV). The process will provide direct evidence of muon and electron number violation.

The experiment will be conducted in a new μ beam line produced using a pulsed proton beam. The proton energy will be chosen in the range 8-20 GeV to optimize the μ flux per unit time and minimize operating costs of the experiment. The expected sensitivity, normalized to the kinematically similar process of μ capture on the nucleus, is one event for a branching fraction of 2×10^{-17}.


The E864 "Spectrometer" measures
• Charge (Z) and Mass (M)
• Strangelets from M > 7 GeV/c² with Z/M < 0.3 e/GeV/c²
Elevation View
Plan View
M1
M2
S1
S2
S3
H1
H2
H3
Vacuum Window and Flange
Shield for Flange
Calorimeter
Neutral Line
Vacuum Chamber Above Detectors
Shield, Flange and Vacuum Window
Vacuum Chamber
Target Box
y (meters)
x (meters)
Z (meters)
M1 & M2 = dipole spectrometer magnets
H1,H2 & H3 = scintillation hodoscopes
S1,S2 & S3 = straw tube arrays

Beam:A3
Status: Scheduled FY98
Hours Charged: 0/400

EXPERIMENT 941 - STUDY OF CHARGED AND NEUTRAL LEADING PARTICLES IN P+A COLLISIONS AT THE BNL-AGS

Spokesmen: H. Huang, R. Majka

- **Columbia University** - J. Nagle
- **Iowa State University** - B. Fadem, J. Hill, R. Hoversten, J. Lajoie, A. Petridis, H. Skank, G. Sleege, F. Whohn,
- **Massachusetts Institute of Technology** - I. Pless, G. Van Buren
- **Vanderbilt University** - V. Grene, C. Magbuire, T. Miller, J. Reid, A. Rose
- **Wayne State University** - S. Bennett, T. Cormier, P. Fachini, H. Jaradat, M. Munhoz, C. Pruneau
- **Yale University** - S. Batsouli, A. Chikanian, E. Finch, N. George, R. Majka, J. Sandweiss, J. Slaughter, Z. Xu
- **University of Massachusetts** - M. Rabin
- **University of California at Los Angeles** - K. Barish, H. Huang, H. Long, E. Yamamoto

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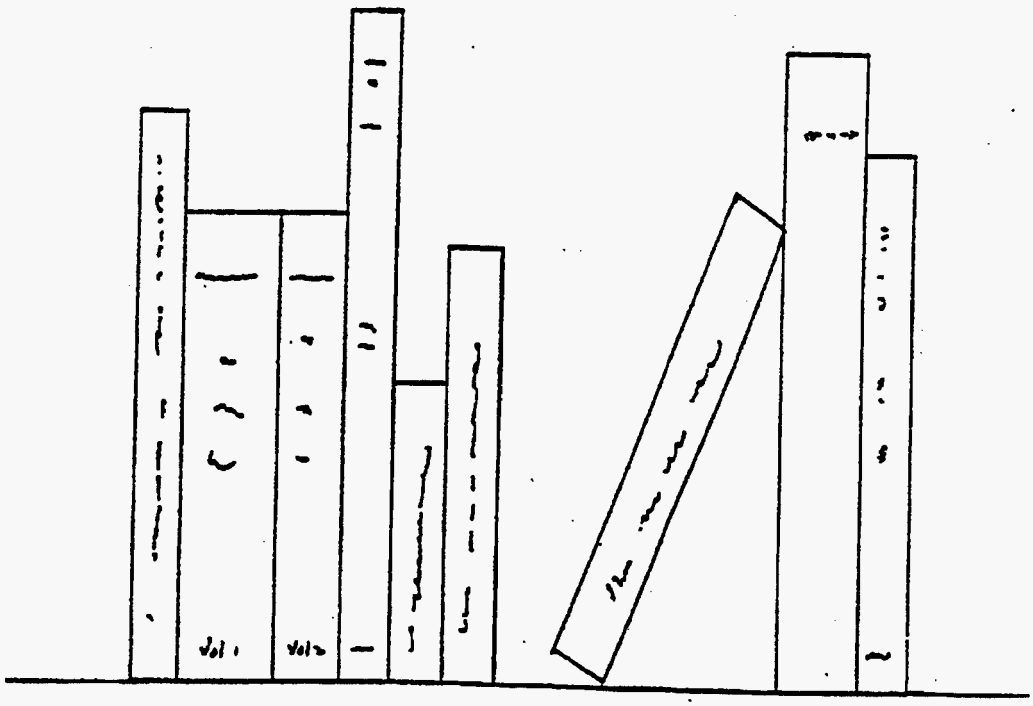
Although charged leading particles in p+A collisions have been studied extensively at the beginning of the era for ultra-relativistic heavy ion collisions, neutral leading particles have not been measured accurately and systematically. Neutral leading particles represent a significant fraction of the cross sections for incident proton fragmentation. When the incident proton is descried by it quark content and is broken up during nuclear collisions, the emerging leading particles can be combinations of neutron + π^+ or proton $+\pi^0$ in the framework of a diquark-quark breakup scenario. This experiment plans to measure both charged and neutral leading particles in p+Pt, p+Cu, p+al and p+Be collisions at the beam momenta of 18 and 12 GeV/c with the E864 spectrometer.

The experiment will be conducted in a new μ beam line produced using a pulsed proton beam. The proton energy will be chosen in the range 8-20 GeV to optimize the μ flux per unit time and minimize operating costs of the experiment. The expected sensitivity, normalized to the kinematically similar process of μ capture on the nucleus, is one event for a branching fraction of 2×10^{-17}.

List of Publications of AGS Experiments



Publications - AGS Experiments 1982 - 1998

This listing was originally prepared using the SLAC data base SPIRES; we now rely on the experimenters themselves to supply us with information. It is easy to miss publications in such a wide search and we apologize for any left out or misidentified. Please let us know about these as well as keeping us posted on your recent publications of AGS experiments.

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List of AGS Experimenters

- Name
- Affiliation
- Experiment(s)

A

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