POSSIBLE SINGLE PARTICLE TEST BEAMS

ROB EDGECOCK / RAL

* INTERNATIONAL WORKING GROUP ON MUON BEAMLINES
* EXISTING MUON BEAMS
* POSSIBLE FUTURE BEAMS

(1) INTERNATIONAL WORKING GROUP (IWG) ON MUON BEAMLINES

* SUGGESTED AT VFACTOD

* PROPOSED MEMBERSHIP:

NORBERT HOLTKAMP (FNAL) → CHAIR ELECT
KIRK MACDONALD (PRINCETON)
R.E. (RAL)
COLIN JOHNSON (CERN)
YOSHIHARU MORI (KEK)
A.N. OTHER 1 (PSI)
A.N. OTHER 2 (TRIUMF)

* CHARGE:

(1) SURVEY EXISTING BEAM LINES

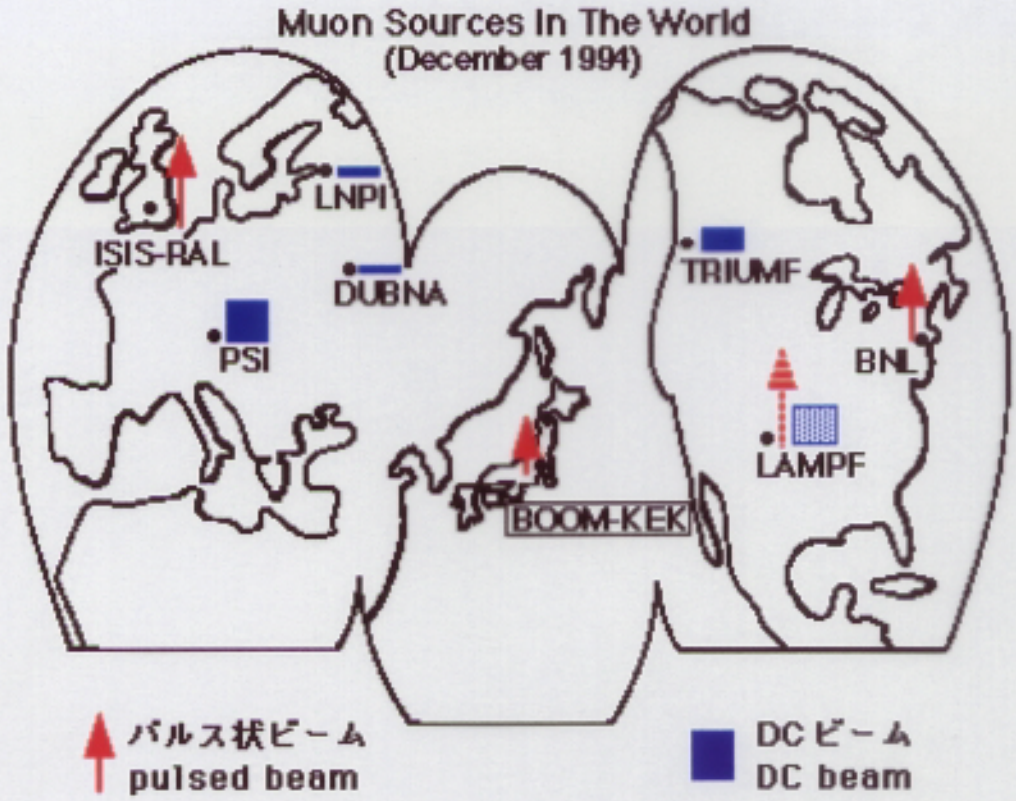
(2) DETERMINE TEST BEAM REQUIREMENTS

(3) CHECK IF EXISTING BEAMS SATISFY REQUIREMENTS OR WHETHER A NEW BEAMLINE IS NEEDED

(4) IF NEW BEAM REQUIRED, DETERMINE COST, TIMESCALE AND PERSONPOWER FOR CONSTRUCTION

(5) DO THIS AND WRITE A REPORT BY END NOV 2000

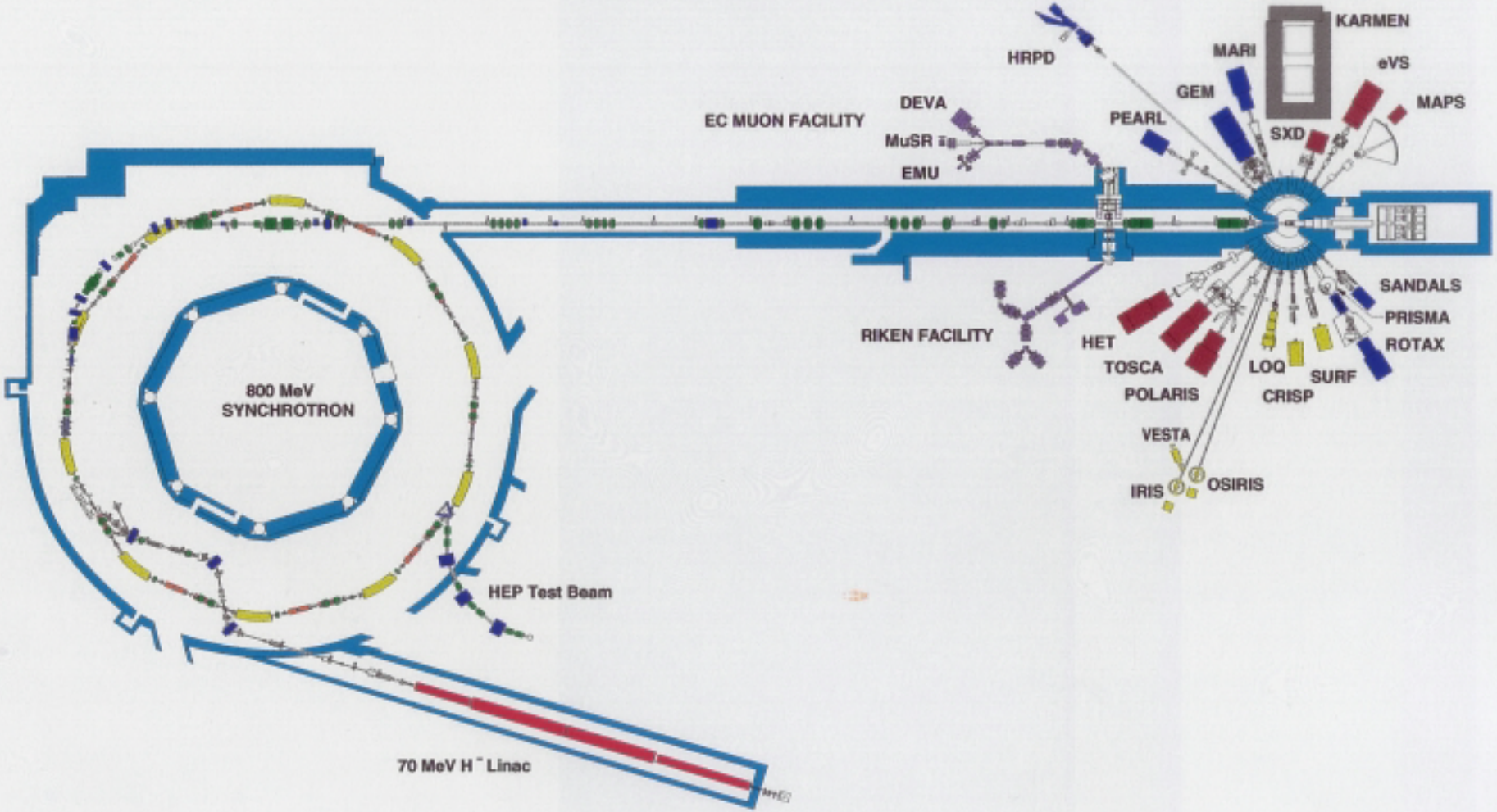
(2) EXISTING MUON BEAMLINES



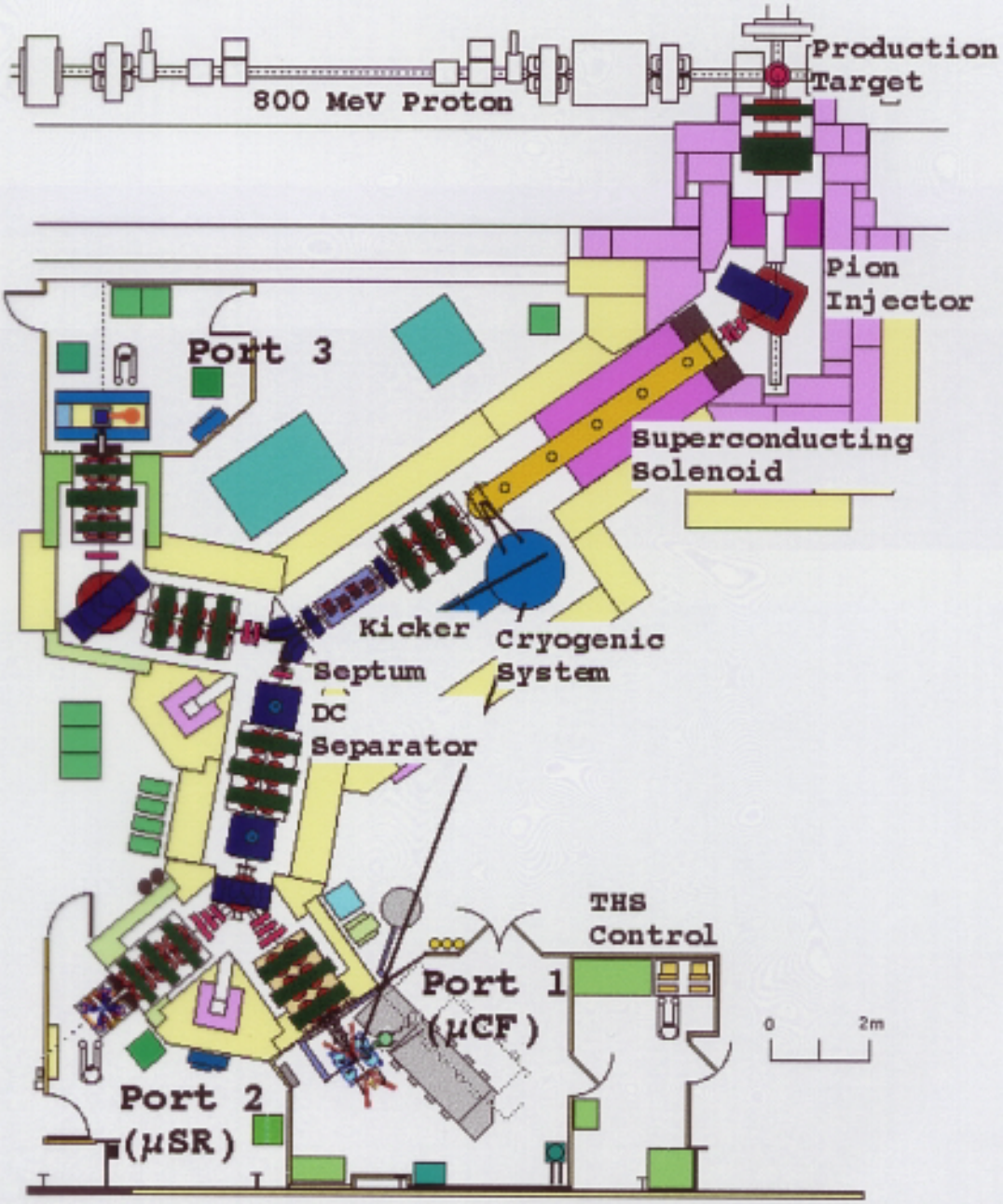
COVERED HERE :

* ISIS RAL
* TRIUMF
* PSI
* KEK
* BNL

* MUON BEAMS AT RAL



* SCHEMATIC OF RIKEN BEAMS AT RAL



RIKEN-RAL Muon Facility

* PARAMETERS :

STARTED	:	1994
MOMENTUM RANGE	:	20 - 120 MeV/c
" RESOLUTION	:	~2%
INTENSITY	:	$\sim 2 \times 10^6$ μ/s
TIME STRUCTURE	:	PULSED — 2 PULSES 100ns LONG, SEPARATED BY 230 ns ; 50 Hz

π/μ : ~1%

* MAIN PROBLEM ⟶ SPACE!

* FUTURE UPGRADES :

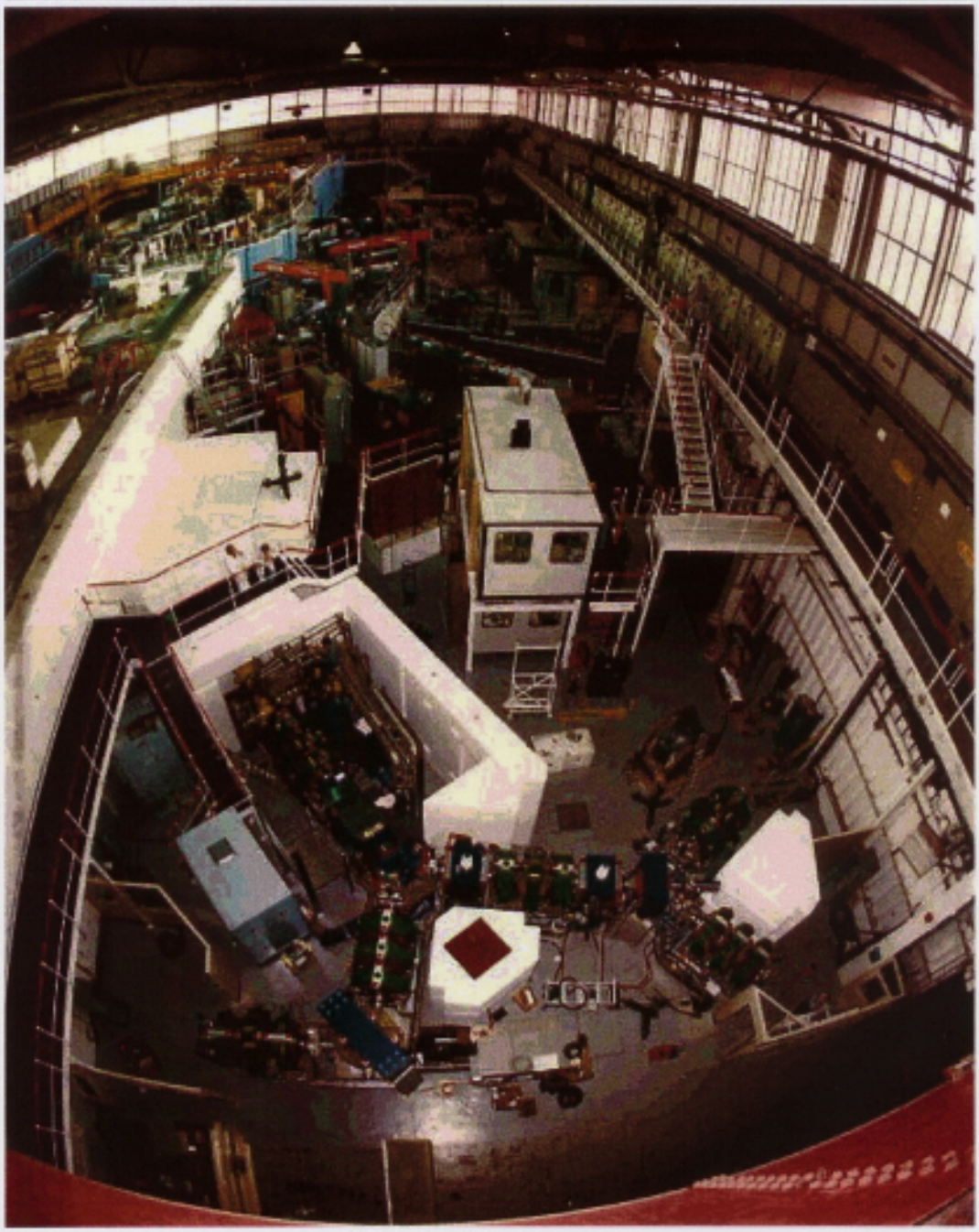
  * 4TH PORT, MORE SPACE

  * ISIS : 200 - 300 μA.

    2ND TARGET STATION

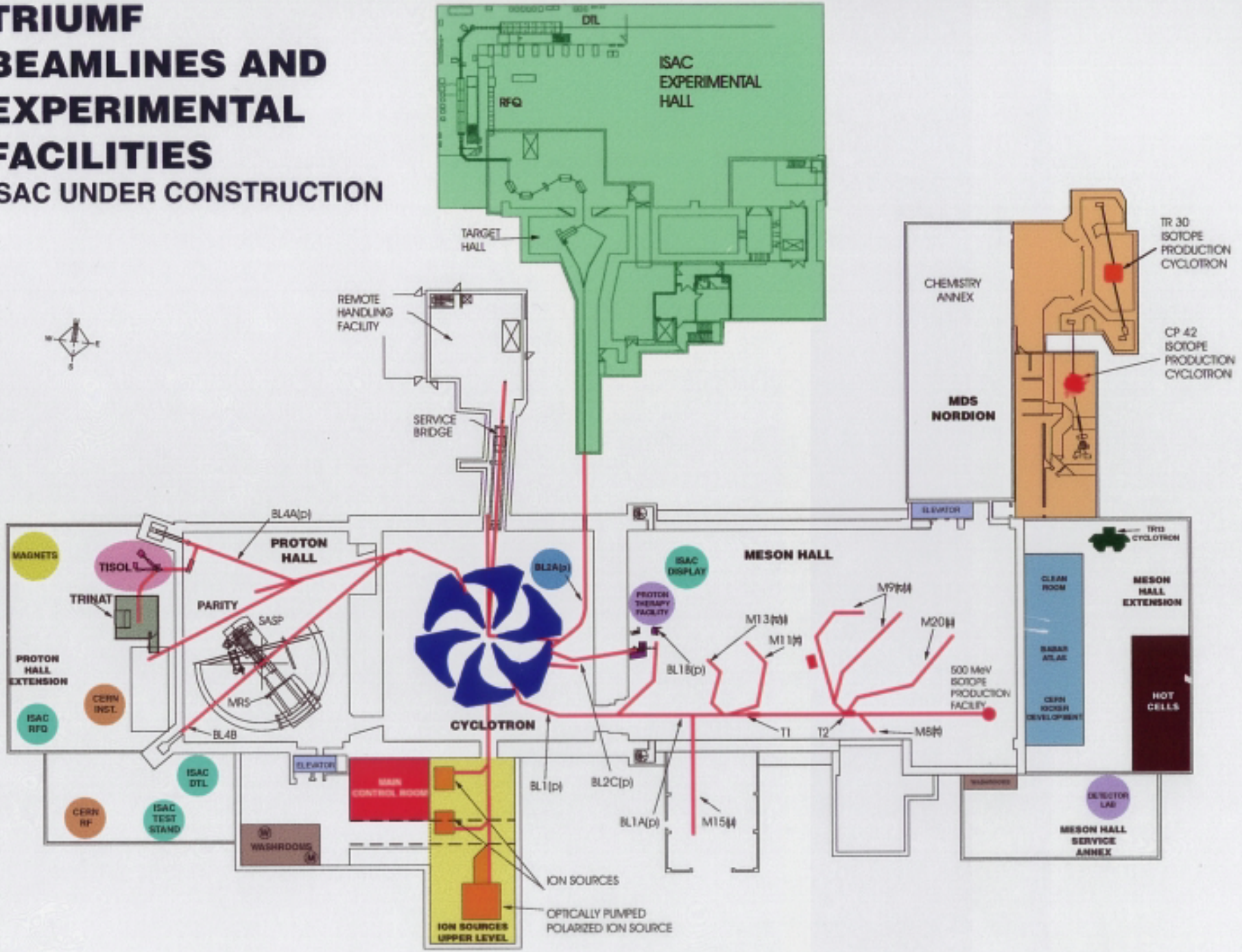
    ⇒ POSSIBLE μ FACILITY FOR PRISM, ETC, STUDIES

* ISIS EXPERIMENTAL HALL, SHOWING RIKEN FACILITY



TRIUMF BEAMLINES AND EXPERIMENTAL FACILITIES

ISAC UNDER CONSTRUCTION

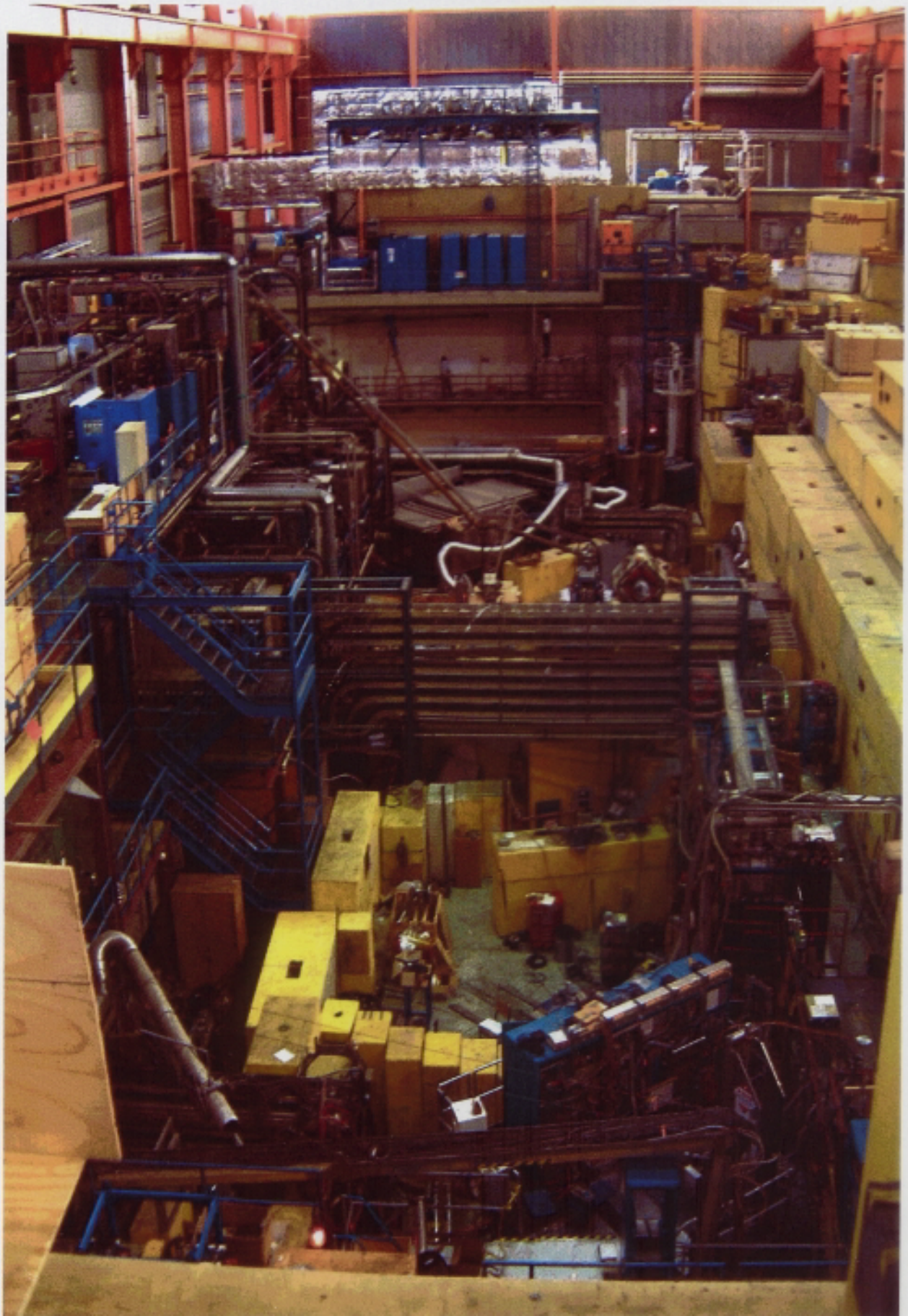


TRIUMF BEAM LINES:

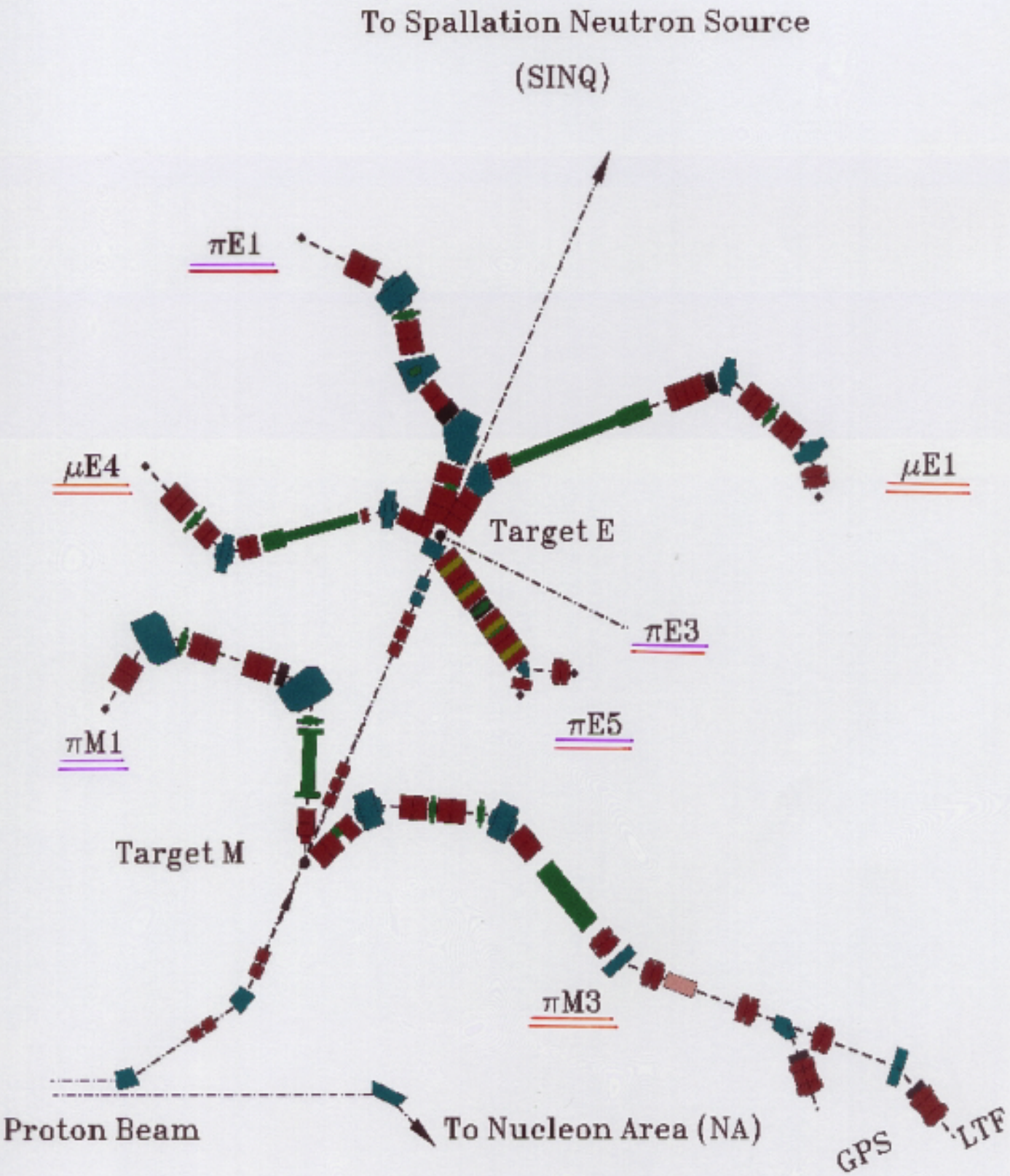
BEAMLINE	TYPE	MOMENTUM RANGE (MeV/c)	INTENSITY	MOMENTUM BITE
M13	π/μ	20-30	1.8×10^5	2.5%
M11	π	100-400	2.4×10^5	1%
M9B	μ	20-100	1.4×10^6	3.4%
M15	μ	19-40	1.9×10^6	3.5%
M20	μ	20-200*	2.1×10^6	3.8%

AFTER RE-DESIGN, HAS ONLY EVER BEEN USED FOR SURFACE MUONS. CAN GO TO 80 MeV/c BACKWARD AND 170 MeV/c FORWARD DECAY MUONS

TIME STRUCTURE: CW - PERIOD 43ns, 1.9ns BEAM PULSE



* PSI BEAM LINES



BEAMLINE	TYPE	MOMENTUM RANGE (MeV/c)	INTENSITY	MOMENTUM BITE
πM1	π	100 - 500	10^6	2-9%
πM3	μ	5 - 35	3×10^6	1%
πE1	μ/π	10 - 500	10^7 (?)	8%
πE3	μ/π	10 - 250	10^6	3.4%
πE5	μ/π	10 - 120	10^9	10%
μE1	μ	85 - 125	10^7	1%
μE4	μ	30 - 100	2×10^7	3%

TIME STRUCTURE : CW : BUNCH PERIOD = 19.75ns, PULSE LENGTH = 0.3ns

AGS Experimental Area

FY96 Physics Program – As Run

30 Sep 96

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

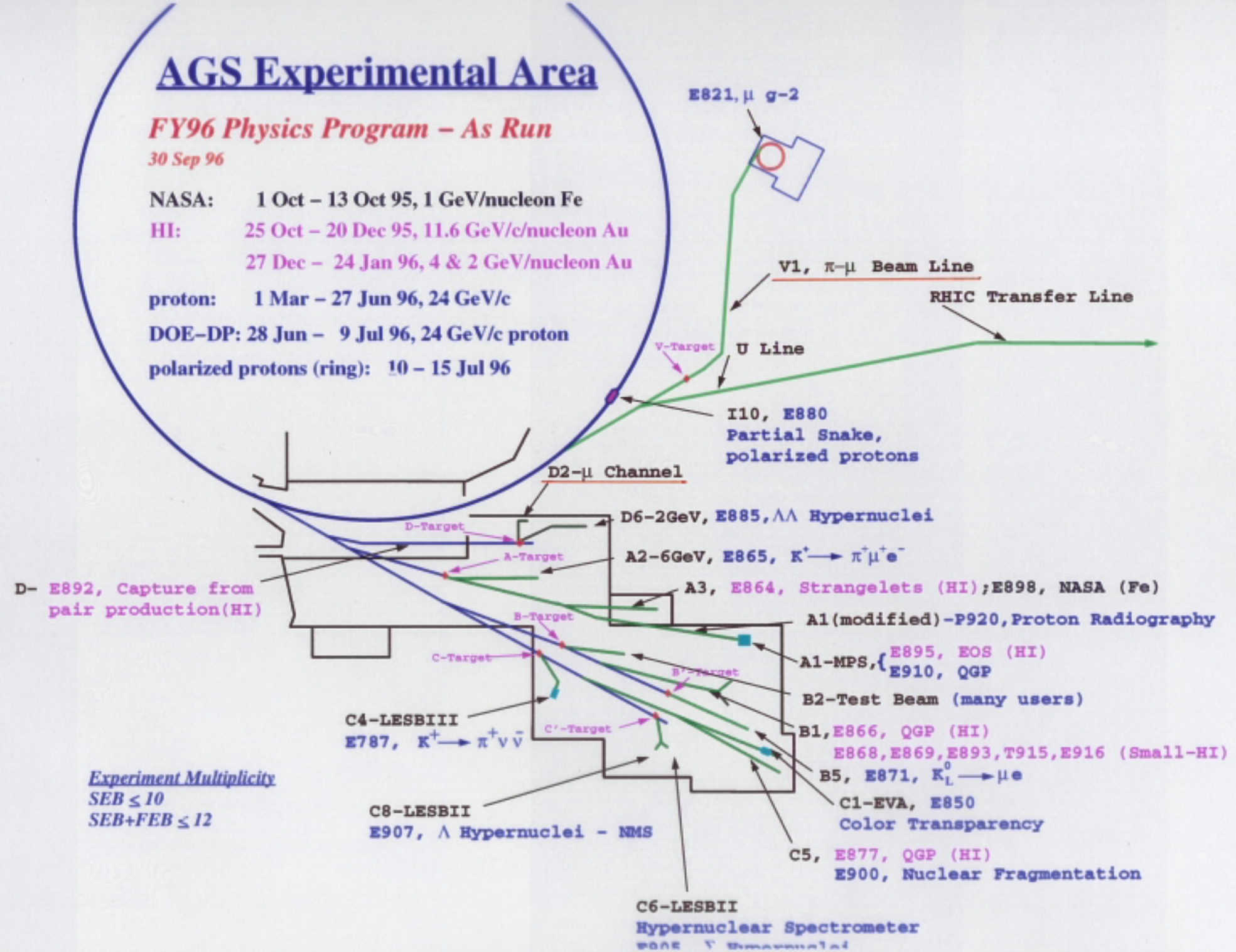
HI: 25 Oct – 20 Dec 95, 11.6 GeV/c/nucleon Au

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

* BROOKHAVEN BEAMLINES

BEAM LINE	TYPE	MOMENTUM RANGE	INTENSITY	MOMENTUM BITE
V1	π/μ	< 3000	7×10^5	0-6 %
D2	μ	25-150	2×10^6	30 %

* PULSED

: FUTURE

→ MECO BEAMLINE : 10^{12} μ's IN 6 PULSES OVER 2-5μs

PEAKED ~ 50 MeV/c

* BOOM-HEH

- SURFACE MUON BEAMS ?
- PULSED

* FUTURE :

- M-ARENA AT JHF
- PRISM

SUMMARY

BEAM	TYPE	MOMENTUM (MeV/c)	INTENSITY (μ/s)	MOMENTUM BITE	PURITY = $\frac{\pi}{\mu}$
-RIKEN	PULSED	20-120	2×10^6	2%	0.01
UMF-					
M11	CW	100-400	2×10^5	1%	10-50
M20	CW	20-170	2×10^6	3.8%	?
-					
E1	CW	10-500	10^7(?)	8%	100(?)
E3	CW	10-250	10^6	3.4%	?
E5	CW	10-120	10^9	10%	10
E1	CW	85-125	10^7	1%	SMALL
E4	CW	30-100	2×10^7	3%	"
-02	PULSED	25-150	2×10^6	30%	?