

ENTRY NO. 4

NAME OF MACHINE AVF Cyclotron - CGR-MeV 520 DATE 20.7.78
 INSTITUTION Université de Liège - Bât B30 - Sart Tilman
 ADDRESS 4000 LIEGE - Belgique

IN CHARGE L. WINAND - D. LAMOTTE REPORTED by D. LAMOTTE

HISTORY AND STATUS

DESIGN, date 1972 MODEL tests 1973
 ENG. DESIGN, date 1973
 CONSTRUCTION, date 1973-1975
 FIRST BEAM date (or goal) 21.3.1975
 MAJOR ALTERATIONS _____

OPERATION, 40 hr/wk; On Target 30 hr/wk
 TIME DIST., in house _____ %, outside _____ %
 USERS' SCHEDULING CYCLE _____ weeks
 COST, ACCELERATOR _____
 COST, FACILITY, total _____
 FUNDED BY Government and University

ACCELERATOR STAFF, OPERATION and DEVELOPMENT

SCIENTISTS 1 ENGINEERS 1
 TECHNICIANS 2 CRAFTS 1
 GRAD STUDENTS involved during year 2
 OPERATED BY _____ Res staff or _____ Operators
 BUDGET, op & dev _____
 FUNDED BY University

RESEARCH STAFF, not included above

USERS, in house 10 outside 10
 GRAD STUDENTS involved during year 3
 RES. BUDGET, in house _____
 FUNDED BY IISN-FNRS-FRSM-UNIVERSITY

FACILITIES FOR RESEARCH

SHIELDED AREA, fixed 680 m²
 movable _____ m²
 TARGET STATIONS 8 in 5 rooms
 STATIONS served at same time, max 1
 MAG SPECTROGRAPH, type _____
 COMPUTER, model NORD 10S
 OTHER FACILITIES hot chemistry, biological and medical laboratories, workshops, animal house.

REFERENCES/NOTES

MAGNET

POLE FACE diameter 120 cm; R extraction 52.5 cm
 GAP, min 8.6 cm; Field 17.0 kG } at $.136 \times 10^6$
 max 14.0 cm; Field 10.6 kG } ampere turns
 AVERAGE FIELD at R ext 14.0 kG
 CURRENT STABILITY ± 20 parts/ 10^6 ; $B_{max}/(B)$ 1.20
 NUMBER OF SECTORS 4; SPIRAL, max 34 deg
 POLE FACE COIL PAIRS: AVF _____ /sec;
 Harmonic correction 4 coils
 Rad grad _____ /sec or Circ coils 7
 WEIGHT: Fe 29 tons; Coils _____ tons
 CONDUCTOR, Material and type Cu
 STORED ENERGY _____ MJ
 COOLING SYSTEM demineralized water
 POWER: Main coils 60 max, kW
 Trimming coils 10 max, kW
 YOKE/POLE AREA 48 %
 SECTOR ANGLE (Sep Sec) _____ deg
 ION ENERGY (Bending limit) E/A = 26.7 q²/A² MeV
 (Focusing limit) E/A = _____ q/A MeV

ACCELERATION SYSTEM

DEES, number 2 angle 50 deg
 BEAM APERTURE 2.5 cm; DC BIAS _____ kV
 TUNED by, coarse s.c.piston fine panel
 RF 19.5 to 40.5 mHz, stable \pm 1 / 10^6
 Orb F 4.9 to 20.2 mHz; GAIN, max 100 kV/turn
 HARMONICS, RF/Orb F, used 2-3-4
 DEE-Gnd, max 35 kV, min gap .25 cm
 STABILITY, (pk-pk noise)/(pk RF volt) .002
 RF PHASE stable to \pm .1 deg
 RF POWER input, max 25 kW
 RF PROTECT circuit, speed _____ μ sec
 Type _____
 FREQUENCY MODULATION, rate _____ /sec
 MODULATOR, type _____
 BEAM PULSE, width _____

VACUUM SYSTEM

PUMPS, No., Type, Size diffusion Balzers 32001
/sec, DA 60 m³/h
 OPERATING PRESSURE 1 μ Torr,
 PUMPDOWN TIME 2.5 hrs

ION SOURCES/INJECTION SYSTEM

Livingston-Jones; axial

EXTRACTION SYSTEM

Electrostatic deflector, passive
 CONTROL SYSTEM corrector
in progress

ENTRY NO. 4 (cont.)

CHARACTERISTIC BEAMS

	Particle	Goal (MeV)	Achieved (MeV)
ENERGY	p	6-20	3-22
	d	3-11.5	3-13.5
	³ He	6-29	6-30
CURRENT		(μA)	(μA)
	Internal		
	p	300	
	d	200	
	External		
	p	70	100
d	70	100	
⁴ He	50	60	
		(part/s)	(part/s)
Secondary			

BEAM PROPERTIES

	Measured	Conditions
Pulse Width	RF deg	μA of MeV
Phase Exc, max	RF deg	μA of MeV
Extract Eff	60-70 %	30 μA of 10 MeV d
Res, ΔE/E	%	μA of MeV
Emittance		
(mm-mrad)	{ axial } { radial }	μA of MeV

OPERATING PROGRAMS, time dist

Basic Nuclear Physics	%
Solid State Physics	%
Bio-Medical Applications	%
Isotope Production	%
Development	%
	%
	%

PLAN VIEW OF FACILITY, NOTEWORTHY FEATURES, OPERATION SUMMARY, ADDITIONAL REFERENCES

