

ENTRY NO. 18

NAME OF MACHINE Cyclotron 520 DATE 1.3.1979  
 INSTITUTION Atomic Energy Commission - Department of Biology  
 ADDRESS Hôpital d'Orsay, 91406 Orsay, France

IN CHARGE Kellershohn C. REPORTED BY Crouzel C.

**HISTORY AND STATUS**

DESIGN, date 1973 MODEL tests \_\_\_\_\_  
 ENG. DESIGN, date 1973  
 CONSTRUCTION, date 1974  
 FIRST BEAM date (or goal) May 1975  
 MAJOR ALTERATIONS \_\_\_\_\_  
 OPERATION, \_\_\_\_\_ hr/wk; On Target \_\_\_\_\_ hr/wk  
 TIME DIST., in house \_\_\_\_\_ %, outside \_\_\_\_\_ %  
 USERS' SCHEDULING CYCLE \_\_\_\_\_ weeks  
 COST, ACCELERATOR \_\_\_\_\_  
 COST, FACILITY, total \_\_\_\_\_  
 FUNDED BY \_\_\_\_\_

**ACCELERATOR STAFF, OPERATION and DEVELOPMENT**

SCIENTISTS \_\_\_\_\_ ENGINEERS \_\_\_\_\_  
 TECHNICIANS \_\_\_\_\_ CRAFTS \_\_\_\_\_  
 GRAD STUDENTS involved during year \_\_\_\_\_  
 OPERATED BY \_\_\_\_\_ Res staff or \_\_\_\_\_ Operators  
 BUDGET, op & dev \_\_\_\_\_  
 FUNDED BY \_\_\_\_\_

**RESEARCH STAFF, not included above**

USERS, in house \_\_\_\_\_ outside \_\_\_\_\_  
 GRAD STUDENTS involved during year \_\_\_\_\_  
 RES. BUDGET, in house \_\_\_\_\_  
 FUNDED BY \_\_\_\_\_

**FACILITIES FOR RESEARCH**

SHIELDED AREA, fixed \_\_\_\_\_ m<sup>2</sup>  
 movable \_\_\_\_\_ m<sup>2</sup>  
 TARGET STATIONS 3 in 2 rooms  
 STATIONS served at same time, max 1  
 MAG SPECTROGRAPH, type \_\_\_\_\_  
 COMPUTER, model \_\_\_\_\_  
 OTHER FACILITIES \_\_\_\_\_  
Isotope production

**REFERENCES/NOTES**

**MAGNET**

POLE FACE diameter 120 cm; R extraction 52 cm  
 GAP, min 8.6 cm; Field 17 kG } at 136 X 10<sup>6</sup>  
 max 14 cm; Field 10.6 kG } ampere turns  
 AVERAGE FIELD at R ext 14 kG }  
 CURRENT STABILITY 20 parts/10<sup>6</sup>; B<sub>max</sub>/ $\langle B \rangle$  1.21  
 NUMBER OF SECTORS 4; SPIRAL, max 34 deg  
 POLE FACE COIL PAIRS: AVF \_\_\_\_\_ /sec;  
 Harmonic correction 4  
 Rad grad \_\_\_\_\_ /sec or Circ coils \_\_\_\_\_  
 WEIGHT: Fe 28 tons; Coils \_\_\_\_\_ tons  
 CONDUCTOR, Material and type \_\_\_\_\_  
 STORED ENERGY \_\_\_\_\_ MJ  
 COOLING SYSTEM Water  
 POWER: Main coils 65 max, kW  
 Trimming coils 10 max, kW  
 YOKE/POLE AREA \_\_\_\_\_ %  
 SECTOR ANGLE (Sep Sec) \_\_\_\_\_ deg  
 ION ENERGY (Bending limit) E/A = \_\_\_\_\_ q<sup>2</sup>/A<sup>2</sup> MeV  
 (Focusing limit) E/A = \_\_\_\_\_ q/A MeV

**ACCELERATION SYSTEM**

DEES, number 2 angle 50 deg  
 BEAM APERTURE 2 cm; DC BIAS 1 kV  
 TUNED by, coarse yes fine yes  
 RF 20 to 62 MHz, stable  $\pm$  1 /10<sup>6</sup>  
 Orb F 6 to 20 MHz; GAIN, max 100 kV/turn  
 HARMONICS, RF/Orb F, used 2, 3, 6  
 DEE-Gnd, max 35 kV, min gap 2 cm  
 STABILITY, (pk-pk noise)/(pk RF volt) 0.001  
 RF PHASE stable to  $\pm$  0.1 deg  
 RF POWER input, max 20 kW  
 RF PROTECT circuit, speed \_\_\_\_\_  $\mu$ sec  
 Type \_\_\_\_\_  
 FREQUENCY MODULATION, rate \_\_\_\_\_ /sec  
 MODULATOR, type \_\_\_\_\_  
 BEAM PULSE, width \_\_\_\_\_

**VACUUM SYSTEM**

PUMPS, No., Type, Size Diffusion pump  
 OPERATING PRESSURE \_\_\_\_\_  $\mu$ Torr,  
 PUMPDOWN TIME \_\_\_\_\_ hrs

**ION SOURCES/INJECTION SYSTEM**

Levingston

**EXTRACTION SYSTEM**

electrostatic deflector

**CONTROL SYSTEM**

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CHARACTERISTIC BEAMS

	Particle	Goal (MeV)	Achieved (MeV)
ENERGY	p	24	
	d	13	
	$\alpha$	26	
	$^3\text{He}$	33	
CURRENT		( $\mu\text{A}$ )	( $\mu\text{A}$ )
	Internal		
	p	200	
	d	400	
	$\alpha - ^3\text{He}$	100	
External	p	70	
	d	70	
	$\alpha - ^3\text{He}$	50	
		(part/s)	(part/s)
Secondary			

BEAM PROPERTIES

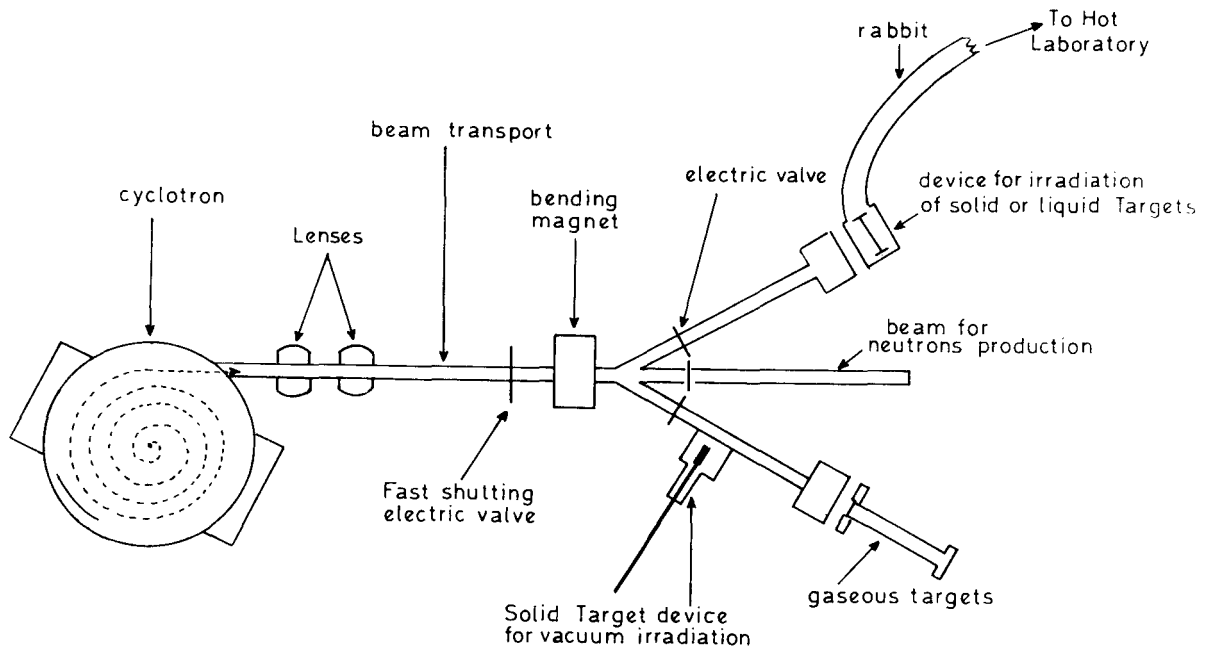
	Measured	Conditions
Pulse Width	RF deg	$\mu\text{A}$ of MeV
Phase Exc, max	RF deg	$\mu\text{A}$ of MeV
Extract Eff	%	$\mu\text{A}$ of MeV
Res, $\Delta E/E$	%	$\mu\text{A}$ of MeV
Emittance	(mm-mrad) { axial } $\mu\text{A}$ of MeV	
	{ radial }	

OPERATING PROGRAMS, time dist

Basic Nuclear Physics	_____ %
Solid State Physics	_____ %
Bio-Medical Applications	} 100 _____ %
Isotope Production	
Development	_____ %
	_____ %
	_____ %

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

Machine constructed by CGR-MeV



Plan of irradiation devices at the SHFJ Cyclotron - fig1