

ENTRY NO. 57

NAME OF MACHINE 1m RADIAL RIDGE CYCLOTRON DATE JULY 1978  
 INSTITUTION UNIVERSITY OF BIRMINGHAM  
 ADDRESS BIRMINGHAM B15 2TT ENGLAND

IN CHARGE G.C. MORRISON REPORTED by W.C. HARDY

**HISTORY AND STATUS**

DESIGN, date 1957 MODEL tests NONE  
 ENG. DESIGN, date 1957-63  
 CONSTRUCTION, date 1958-63  
 FIRST BEAM date (or goal) INT 1961 EXT 1963  
 MAJOR ALTERATIONS \_\_\_\_\_

OPERATION, 100 hr/wk; On Target 90 hr/wk  
 TIME DIST., in house 100 %, outside 0 %  
 USERS' SCHEDULING CYCLE 12 weeks  
 COST, ACCELERATOR £30,000  
 COST, FACILITY, total \_\_\_\_\_  
 FUNDED BY O.S.I.R. (NOW S.R.C.)

**ACCELERATOR STAFF, OPERATION and DEVELOPMENT**

SCIENTISTS 0 ENGINEERS 1  
 TECHNICIANS 6 CRAFTS 0  
 GRAD STUDENTS involved during year 0  
 OPERATED BY 0 Res staff or 4 Operators  
 BUDGET, op & dev £15,000  
 FUNDED BY UNIVERSITY OF BIRMINGHAM AND  
SCIENCE RESEARCH COUNCIL

**RESEARCH STAFF, not included above**

USERS, in house 16 outside 0  
 GRAD STUDENTS involved during year 8  
 RES. BUDGET, in house £40,000  
 FUNDED BY UNIVERSITY OF BIRMINGHAM  
AND SCIENCE RESEARCH COUNCIL  
**FACILITIES FOR RESEARCH**

SHIELDED AREA, fixed 90 m<sup>2</sup>  
 movable 0 m<sup>2</sup>  
 TARGET STATIONS 6 in 1 rooms  
 STATIONS served at same time, max 1  
 MAG SPECTROGRAPH, type NONE  
 COMPUTER, model IBM 11300 + GEC 4080  
 OTHER FACILITIES \_\_\_\_\_

10 MASS IDENTIFICATION SYSTEM USING  
COUNTER TELESCOPES

**REFERENCES/NOTES**

NUCL. INST. METH. 18/19, 25, 1962  
 NUCL. INST. METH. 32, 325, 1965

**MAGNET**

POLE FACE diameter 102 cm; R extraction 46 cm  
 GAP, min 7-6 cm; Field 19 kG } at \_\_\_\_\_ X 10<sup>6</sup>  
 max 14.5 cm; Field 13 kG } ampere turns  
 AVERAGE FIELD at R ext 16 kG }  
 CURRENT STABILITY 10 parts/10<sup>6</sup>; B<sub>max</sub>/(B) 1.2  
 NUMBER OF SECTORS 3; SPIRAL, max 0 deg  
 POLE FACE COIL PAIRS: AVF 0 /sec;  
 Harmonic correction 2  
 Rad grad \_\_\_\_\_ /sec or Circ coils 8  
 WEIGHT: Fe 50 tons; Coils 8 tons  
 CONDUCTOR, Material and type CU. STRIP  
 STORED ENERGY \_\_\_\_\_ MJ  
 COOLING SYSTEM WATER  
 POWER: Main coils 40 max, kW  
 Trimming coils \_\_\_\_\_ max, kW  
 YOKE/POLE AREA 115 %  
 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 1 angle 180 deg  
 BEAM APERTURE 2.3 cm; DC BIAS 0 kV  
 TUNED by, coarse M.S. fine M.S.  
 RF 12 to 16 MHz, stable ± 5 /10<sup>6</sup>  
 Orb F 12 to 16 MHz; GAIN, max 50 kV/turn  
 HARMONICS, RF/Orb F, used 1  
 DEE-Gnd, max 27 kV, min gap 0.3 cm  
 STABILITY, (pk-pk noise)/(pk RF volt) 0.001  
 RF PHASE stable to ± 3 deg  
 RF POWER input, max 45 kW  
 RF PROTECT circuit, speed 1000 μsec  
 Type CIRCUIT BREAKER  
 FREQUENCY MODULATION, rate \_\_\_\_\_ /sec  
 MODULATOR, type \_\_\_\_\_  
 BEAM PULSE, width \_\_\_\_\_

**VACUUM SYSTEM**

PUMPS, No., Type, Size 3 DIFFUSION PUMPS  
1 x 40 cm. 2 x 22 cm.  
 OPERATING PRESSURE 3 μTorr,  
 PUMPDOWN TIME 4 hrs

**ION SOURCES/INJECTION SYSTEM**

INTERNAL (OAK RIDGE TYPE)  
EXTERNAL POLARISED D<sup>+</sup> AND <sup>3</sup>He

**EXTRACTION SYSTEM**

SOURCE  
MAG/ELECTRO REGENERATOR & ELECT. DEF.

**CONTROL SYSTEM**

CONVENTIONAL

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CHARACTERISTIC BEAMS

	Particle	Goal (MeV)	Achieved (MeV)
ENERGY	d	12	12.5
	<sup>4</sup> He	24	25.1
	<sup>3</sup> He	32	34.0
CURRENT		(μA)	(μA)
	Internal		
	d	1000	1000
	<sup>4</sup> He		1000
	<sup>3</sup> He		500
	External		
<sup>4</sup> He		200	
<sup>3</sup> He		50	
POLARISED	d		0.2
POLARISED	<sup>3</sup> He		0.001
		(part/s)	(part/s)
Secondary POLARISED, n			$6 \times 10^7 / \mu A$

BEAM PROPERTIES

	Measured	Conditions
Pulse Width	30 RF deg	10 μA of 34 MeV <sup>3</sup> He
Phase Exc, max	15 RF deg	" μA of " MeV "
Extract Eff	60 %	" μA of " MeV "
Res, ΔE/E	0.4 %	" μA of " MeV "
Emittance	(mm-mrad) { 40 axial } " μA of " MeV "	
	{ 40 radial }	

OPERATING PROGRAMS, time dist

Basic Nuclear Physics	80	%
Solid State Physics	0	%
Bio-Medical Applications	0	%
Isotope Production	0	%
Development	20	%
		%
		%

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

