ENTRY NO. 1

NAME OF MACHINE . IRE CYCLOTRON
INSTITUTION . INSTITUT NATIONAL DES RADIOELEMENTS
ADDRESS . B-6220 FLEURUS BELGIUM
TEL . 071/81.38.61 TELEX . 51121 IRE-B
IN CHARGE . C. PIRART REPORTED BY . C. PIRART

HISTORY AND STATUS

DESIGN, date . 1980 . Model tests
ENG DESIGN, date
CONSTRUCTION, date . 1981-1983
FIRST BEAM, date (or goal) . 1983
MAJOR ALTERATIONS . INTERNAL TARGET 1986
COST, ACCELERATOR . 6.10^6 US$
COST, FACILITY, total . 12.10^6 US$
FUNDED BY . Belgian state

ACCELERATOR STAFF, OPERATION AND DEVELOPMENT

SCIENTISTS . 1 . ENGINEERS . 4
TECHNICIANS . 8 . CRAFTS . 2
GRAD STUDENTS involved during year
OPERATED BY . Research staff or . 6 . Operators
OPERATION . hr/wk. On target . hr/wk
TIME DISTR. in house . 100 . %, outside . %
BUDGET, op & dev
FUNDED BY

RESEARCH STAFF, not included above

USERS, in house . outside
GRAD STUDENTS involved during year
RESEARCH BUDGET, in house
FUNDED BY

MAGNET

POLE FACE, diameter (compact) . 215.6 . cm, R-extraction . 92.4 cm
R injection . cm
GAP, min . 16.6 cm, Field . 21.5 . kG
max . 40.5 cm, Field . 11.5 . kG } at . 4.10^6 Ampere turns
AVERAGE FIELD at R ext . 16 . kG
B max/<B>
NUMBER OF SECTORS { compact . 4 / separated } Spiral, max 53. deg
SECTOR ANGLE (SSC) . deg
TRIMMING COILS . 12 pairs
CONDUCTOR, material and type . Cu 20 X 20 . Ø 13
STORED ENERGY (cryogenic) . MJ
POWER: main coils 400 . max kW: current stability . 10^{-5}
trimming coils . 60 . max kW: current stability . 10^{-3}
WEIGHT: Fe . 200 . tons: coils . 6 . tons
COOLING system demineralized water
ION ENERGY (Bending limit) E/A = . 110 . q^2/A^2 MeV/amu
(Focusing limit) E/A = . 80 . q/A MeV/amu

ACCELERATION SYSTEM

DEES, number . 2 . angle . 86 . deg
BEAM APERTURE . 3.8 . cm; DC Bias . kV
TUNED by, coarse Mov. Panel . fine Mov. Panel. Auto.
RF . 10.6 . to . 23 . MHz, stable ± . 10^{-7}
Orb F . 5.3 . to . 23 . MHz
HARMONICS, RF/Orb F, used . 1.2
DEE–Gnd, max . 50 . kV, min gap . cm
STABILITY, (pk-pk noise)/(pk RF volt) . < 10^{-3}
ENERGY GAIN, max . 200 . kV/turn
RF PHASE, stable to ± . 0.1 . deg
RF POWER input, max. . 2 X 70 . kW
FREQUENCY MODULATION, rate . /s
modulator, type
beam pulse, width

VACUUM SYSTEM

OPERATING PRESSURE . 2.10^{-6} . Torr or mbar
PUMPS, No, Type, Size . 2 X OIL DIF. PUMPS . 12000. l/s

ION SOURCES

Internal Linvingston-Jones

INJECTION SYSTEM

EXTRACTION SYSTEM

DC electrostatic + active magnetic channel

FACILITIES FOR RESEARCH

SHIELDED AREA, fixed . m^2; movable . m^2
TARGET STATIONS . 6 . in . 3 . rooms
STATIONS served at same time, max . 1
MAG SPECTROGRAPH, type .
COMPUTER model . VAX 750 + µVAX + ROSEMOUNT control
OTHER FACILITIES

CHARACTERISTIC BEAMS

PARTICLE	ENERGY (MeV) Goal	Achieved	CURRENT (pµA) Internal	External
p	80	80	500 µA	50 µA
α	110	110	200 µA	50 µA
d	55	55		60 µA
SECONDARY			(part/s)	

BEAM PROPERTIES

	MEASURED		CONDITIONS		
PULSE WIDTH	RF deg		pµA of	MeV	ions
PHASE EXC. max	RF deg		pµA of	MeV	ions
EXTRACT eff	90 %	40	pµA of 65	MeV	p ions
RESOL ΔE/E	%		pµA of	MeV	ions
EMITTANCE					
(π mm-mrad)	axial		pµA of	MeV	
	rad				

OPERATING PROGRAMS, time distribution

BASIC NUCLEAR PHYSICS . SOLID STATES PHYSICS
BIOMEDICAL APPLICAT. . ISOTOPE PRODUCTIONS . 100

REFERENCES/NOTES

1)
2)

PLAN VIEW OF FACILITY, COMMENTS, ETC.