ENTRY No. 1

NAME OF MACHINE Ghent Univ. isochronous cyclotron DATE : 9/7/81
INSTITUTION Institute for Nuclear Sciences, Rijksuniversiteit Gent
ADDRESS Proeftuinstraat 86, B-9000 Gent, Belgium
TEL 091/22.87.21 TELEX nr. 12.754 RUGENT
IN CHARGE J. Hoste REPORTED BY C. Vandecasteele

HISTORY AND STATUS

DESIGN, date 1974 Model tests
ENG DESIGN, date 1975
CONSTRUCTION, date 1976-77
FIRST BEAM, date (or goal) 17/6/77
MAJOR ALTERATIONS

COST, ACCELERATOR
COST, FACILITY, total
FUNDED BY NFWO[a] and University

ACCELERATOR STAFF, OPERATION AND DEVELOPMENT

SCIENTISTS 1 ENGINEERS
TECHNICIANS 3 CRAFTS 1
GRAD STUDENTS involved during year
OPERATED BY Research staff or Operators
OPERATION 60 hr/wk, On target 45 hr/wk
TIME DISTR. in house %, Outside %
BUDGET, op & dev
FUNDED BY IIKW[b] and University

RESEARCH STAFF, not included above

USERS, in house 12 outside 3
GRAD STUDENTS involved during year 2
RESEARCH BUDGET, in house
FUNDED BY IIKW

MAGNET

POLE FACE, diameter (compact) 120 cm, R extraction 52.5 cm
R injection cm
GAP, min 8.6 cm, Field 17.5 kG
max 14 cm, Field 11.0 kG } at 150x10^3 Ampere turns
AVERAGE FIELD at R ext 14.8 kG
B max/ <B> 1.18
NUMBER OF SECTORS { compact / separated 4 } Spiral, max 34 deg
SECTOR ANGLE (SSC) deg
TRIMMING COILS 7
CONDUCTOR, material and type Cu
STORED ENERGY (cryogenic) MJ
POWER : main coils 65 max, kW ; current stability
trimming coils 10 max, kW ; current stability
WEIGHT : Fe 28 tons ; coils tons
COOLING system demineralized water
ION ENERGY (bending limit) E/A = 29 q^2/a^2 MeV/amu
(focusing limit) E/A = q/a MeV/amu

ACCELERATION SYSTEM

DEES, number 2 ; angle 50 deg
BEAM APERTURE 2.5 cm ; DC Bias kV
TUNED by, coarse piston fine panel
RF 20 to 41 mHz, stable ± $1 \cdot 10^{-6}$
Orb F 5.1 to 20.2 mHz
HARMONICS, RF/Orb F, used 2 - 3 - 4
DEE - Gnd, max 30 kV, min gap 2 cm
STABILITY, (pk-pk noise)/(pk RF volt) $5 \cdot 10^{-4}$
ENERGY GAIN, max kV/turn
RF PHASE, stable to ± 0.2 deg
RF POWER input, max 30 kW
FREQUENCY MODULATION, rate /s
modulator, type
beam pulse, width

VACUUM SYSTEM

OPERATING PRESSURE $20 \cdot 10^{-6}$ Torr or mbar
PUMPS, No, Type, Size Balzers BP 800 011
PF 7310 DIF 320 3000 l/s

ION SOURCES

Livingston-Jones ; axial

INJECTION SYSTEM

EXTRACTION SYSTEM

Electrostatic deflector ; V_{max} = 50 kV

FACILITIES FOR RESEARCH

SHIELDED AREA, fixed 85 m² ; movable m²
TARGET STATIONS 3 in 3 rooms
STATIONS served at same time, max 1
MAG SPECTROGRAPH, type
COMPUTER model
OTHER FACILITIES Hot chemistry lab., measuring room with 2 Ge(Li) detect. ; IN-90 γ-spectrometer ; pneumatic transfer system for Act. Anal., PIXE set-up

CHARACTERISTIC BEAMS

PARTICLE	ENERGY (MeV) Goal	Achieved	CURRENT (pμA) Internal	External
p	6-21	2.5-24		50
d	3-13.5	3-14.5		70
^{3}He	6-31	6-32		30
α	10-27	10-29		50
SECONDARY			(part/s)	
neutrons				

BEAM PROPERTIES

	MEASURED		CONDITIONS
PULSE WIDTH	RF deg	pμ A of	MeV ions
PHASE EXC, max	RF deg	pμ A of	MeV ions
EXTRACT eff 60-70	%	25 pμ A of 7	MeV d ions
RESOL ΔE/E	%	pμ A of	MeV ions
EMITTANCE			
(π mm. mrad) { axial / rad }		pμA of	MeV ions

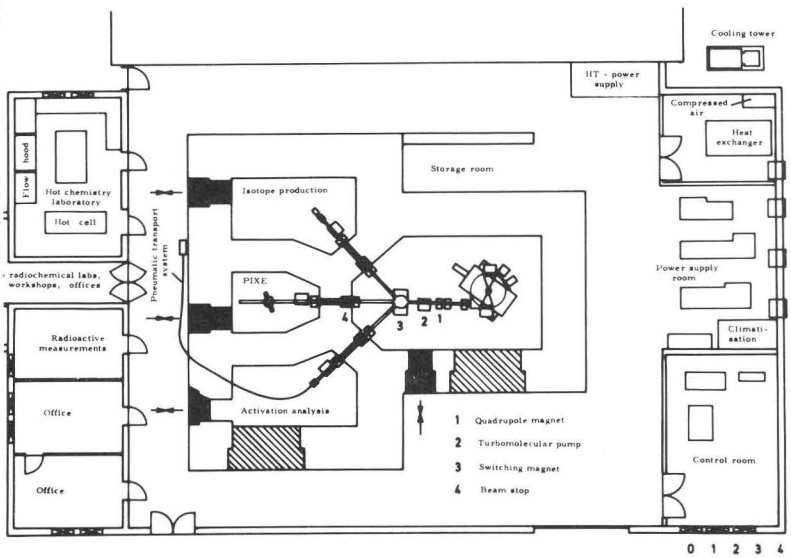
OPERATING PROGRAMS, time distribution

BASIC NUCLEAR PHYSICS SOLID STATES PHYSICS
BIOMEDICAL APPLICAT. ISOTOPE PRODUCTIONS 50%
PIXE 25% Activation analysis 25%

REFERENCES/NOTES

The cyclotron building is being expanded. Starting from March 1982. 3 additional target stations and a unit for neutron therapy will be available.

PLAN VIEW OF FACILITY, NOTEWORTHY FEATURES, COMMENTS



a) National Fund for Scientific Research

b) Interuniversity Institute for Nuclear Sciences