ENTRY NO. 51

NAME OF MACHINE ...EINDHOVEN AVF cyclotron
INSTITUTION ...Eindhoven University of Technology (EUT)
ADDRESS ...Cyclotron laboratory, EUT, Eindhoven, The Netherlands
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IN CHARGE ...H.L.Hagedoorn. REPORTED BY ...W...van Genderen

HISTORY AND STATUS

DESIGN, date ...1960... Model tests ...1960...
ENG DESIGN, date ...1961-1962...
CONSTRUCTION, date ...1962-1963...
FIRST BEAM, date (or goal) april 1963...
MAJOR ALTERATIONS ...moved to EUT 1968...
...
COST, ACCELERATOR ...gift from Philips...
COST, FACILITY, total ...M$3 (1968)...
FUNDED BY ...EUT...

ACCELERATOR STAFF, OPERATION AND DEVELOPMENT

SCIENTISTS ...1... ENGINEERS ...2...
TECHNICIANS ...3... CRAFTS ...
GRAD STUDENTS involved during year ...1...
OPERATED BY ... Research staff or ...1... Operators
OPERATION ...70... hr/wk. On target ...50... hr./wk
TIME DISTR. in house ...100... % Outside ... %
BUDGET, op & dev ...k$50...
FUNDED BY ...EUT...

RESEARCH STAFF, not included above

USERS, in house ...10... outside ...
GRAD STUDENTS involved during year ...20...
RESEARCH BUDGET, in house ...k$80...
FUNDED BY ...EUT...

MAGNET

POLE FACE, diameter (compact) ...130... cm, R extraction ...52 cm
R injection ...2... cm
GAP, min ...15... cm, Field ...20... kG
min ...30... cm, Field ...10... kG } at 0.4 x 10^6 Ampere turns
AVERAGE FIELD at R ext ...15... kG
B max/ < B > ...1.3...
NUMBER OF SECTORS { compact ...3... separated ... } Spiral, max 35 deg
SECTOR ANGLE (SSC) ... deg
TRIMMING COILS 10 pairs of circular correction coils and 3 sets of harmonic coils...
CONDUCTOR, material and type ...Al...
STORED ENERGY (cryogenic) ... MJ
POWER: main coils ...130... max, kW; current stability 10^{-5}...
trimming coils ...20... max, kW; current stability 10^{-5}...
WEIGHT: Fe ...80... tons; coils ...10 tons
COOLING system ...water...
ION ENERGY (bending limit) E/A = ...30... q^2/a^2 MEV/amu
(focusing limit) E/A = ... q/a MeV/amu

ACCELERATION SYSTEM

DEES, number ...1...180... deg
BEAM APERTURE ...2... cm; DC Bias ...0.7... kV
TUNED by, coarse ...MS... fine ...VC...
RF ...5... to ...23.3... mHz, stable ± 10^{-5}...
Orb F ...5... to ...23.3... mHz
HARMONICS, RF/Orb F, used ...1...
DEE—Gnd, max ...50... kV, min gap ...0.8... cm
STABILITY, (pk-pk noise)/(pk RF volt) ...10^{-5}...
ENERGY GAIN, max ...100... kV/turn
RF PHASE, stable to ± ...1... deg
RF POWEP input, max ...100... kW
FREQUENCY MODULATION, rate ... /s
modulator, type ...
beam pulse, width ...

VACUUM SYSTEM

OPERATING PRESSURE ...10^{-6}... Torr or mbar
PUMPS, No, Type, Size ...1, oil diffusion, 8000 l/sec...
...
...

ION SOURCES

internal Livingston ...type...

INJECTION SYSTEM

trochoidal median plane injector for polarized protons

EXTRACTION SYSTEM

electrostatic, 80°, 60 kV/4mm, followed by magnetic channel

FACILITIES FOR RESEARCH

SHIELDED AREA, fixed ...120... m^2; movable ...230... m^2
TARGET STATIONS ...6... in ...6... rooms
STATIONS served at same time, max ...1...
MAG SPECTROGRAPH, type ...
COMPUTER model ...PDP 11/03, PDP 11/23...
OTHER FACILITIES ...isotope production
PIXE analysis facility
...micro beam...

CHARACTERISTIC BEAMS

PARTICLE	ENERGY (MeV) Goal	Achieved	CURRENT (pμA) Internal	External
p		2.5-29.5	500	50
d		3 -15	500	50
^{4}He		6 -30	50	30
^{3}He		5 -40	50	30
SECONDARY		(part/s)		

BEAM PROPERTIES

MEASURED		CONDITIONS
PULSE WIDTH	...36... RF deg	... pμ A of ... MeV ... ions
PHASE EXC. max	5... RF deg	... pμ A of ... MeV ... ions
EXTRACT eff	...80... %	... pμ A of ... MeV ... ions
RESOL ΔE/E	..0.3... %	... pμ A of ... MeV ... ions
EMITTANCE (π mm. mrad)	...10... axial, ...6... rad	...1... pμ A of ...26... MeV ...P ions

OPERATING PROGRAMS, time distribution

BASIC NUCLEAR PHYSICS ...45... SOLID STATES PHYSICS...
BIOMEDICAL APPLICAT...5... ISOTOPE PRODUCTIONS ...30...
PIXE 10, microbeam 10...
...

REFERENCES/NOTES

1) Schutte, EUT thesis (1973
2) Van Heusden, EUT thesis (1976)
3) Botman, EUT thesis (1981)

PLAN VIEW OF FACILITY, COMMENTS, ETC.