ENTRY No. 64

NAME OF MACHINE .. Mini-cyclotron ILEC ..... DATE .. May, 1989 .....
INSTITUTION ..... EINDHOVEN UNIVERSITY OF TECHNOLOGY .....
ADDRESS ..... Cyclotron Lab., EUT, Postbox 513, 5600 MB EINDHOVEN, The Netherlands .....
TEL ..... 47.40.48 .... TELEX ..... 51163 .....
IN CHARGE .. J.A. van der Heide .. REPORTED BY ... J.A. van der Heide .....

HISTORY AND STATUS

DESIGN, date ... 1982 ..... Model tests .....
ENG DESIGN, date ..... 1984 .....
CONSTRUCTION, date ..... 1985 - 1988 .....
FIRST BEAM, date (or goal) ..... 1989 goal .....
MAJOR ALTERATIONS .....
..... Hfl. 400.000 ..
COST, ACCELERATOR .. University made, Materials .....
COST, FACILITY, total ... Hfl. 500.000 .....
FUNDED BY ..... E.U.T. .....

ACCELERATOR STAFF, OPERATION AND DEVELOPMENT

SCIENTISTS ..... 1½ ..... ENGINEERS ..... 1 .....
TECHNICIANS ..... 1 ..... CRAFTS ..... 2 .....
GRAD STUDENTS involved during year ..... 2 .....
OPERATED BY ..... 2 ... Research staff or ... 1 ..... Operators
OPERATION ..... hr/wk, On target ..... hr/wk
TIME DISTR. in house ..... %, Outside ..... %
BUDGET, op & dev ..... k$ 15 .....
FUNDED BY ..... E.U.T. .....

RESEARCH STAFF, not included above

USERS, in house ..... outside .....
GRAD STUDENTS involved during year ..... 5 .....
RESEARCH BUDGET, in house ..... k$ 10 .....
FUNDED BY ..... E.U.T. .....

MAGNET

POLE FACE, diameter (compact) 20. cm, R extraction 16,7 cm
R injection ..... cm
GAP, min ... 3,3 .. cm, Field ..... 18 ..... kG } at 50.000 ... Ampere turns
max ... 5,0 .. cm, Field ..... 12 ..... kG }
AVERAGE FIELD at R ext ..... 14,3 ... kG
B max/ <B> ..... 1.26 .....
NUMBER OF SECTORS { compact .. 4 .. } Spiral, max 0. deg
{ separated ..... }
SECTOR ANGLE (SSC) ..... 40° ..... deg
TRIMMING COILS .... no. circular coils .....
..... 4. sets of harmonic coils .....
CONDUCTOR, material and type ..... copper .....
STORED ENERGY (cryogenic) ..... MJ
POWER : main coils .. 9 ... max, kW ; current stability . 10^{-5}.
trimming coils .. 0.5 max, kW ; current stability . 10^{-4}.
WEIGHT : Fe ..... 2.8 ..... tons ; coils .... 0.25 ..... tons
COOLING system ..... water .....
ION ENERGY (bending limit) E/A = ... 3 ... q^2/a^2 MeV/amu
(focusing limit) E/A = ... q^2/a^2 MeV/amu

ACCELERATION SYSTEM

DEES, number .... 2 ..... ; angle ..... 40° ..... deg
BEAM APERTURE .... 1.5 ... cm ; DC Bias ... 0 ..... kV
TUNED by, coarse .. fixed ..... fine ..... trim cap .....
RF .. fixed .... to .. 42 ..... mHz, stable ± 10^{-6} .....
Orb F .. fixed ... to .. 21 ..... mHz
HARMONICS, RF/Orb F, used ..... 2 .....
DEE - Gnd, max .. 38 .. kV, min gap ..... 0.6 ..... cm
STABILITY, (pk-pk noise)/(pk RF volt) .....
ENERGY GAIN, max ..... 100 ..... kV/turn
RF PHASE, stable to ± ..... deg
RF POWER input, max ..... 12 ..... kW
FREQUENCY MODULATION, rate ..... /s
modulator, type .....
beam pulse, width .....

VACUUM SYSTEM

OPERATING PRESSURE ..... 10^{-5} ..... Torr or mbar
PUMPS, No, Type, Size .. 1 . oil diffusion pump 3000. l/s ...
.....
.....

ION SOURCES

..... Internal modified Bennet type .....

INJECTION SYSTEM

none .....

EXTRACTION SYSTEM

electrostatic followed by passive magnetic channel ....

FACILITIES FOR RESEARCH

SHIELDED AREA, fixed ... 30 ..... m² ; movable .... 60 ..... m²
TARGET STATIONS ... 3 ..... in .... 2 .... rooms
STATIONS served at same time, max .. 1 .....
MAG SPECTROGRAPH, type .....
COMPUTER model ..... PDP, VAX .....
OTHER FACILITIES ..... Materials analysis .....
..... Microbeam .....
Future injection in EUTERPE storage ring .....

CHARACTERISTIC BEAMS

PARTICLE	ENERGY (MeV) Goal	Achieved	CURRENT (pμA) Internal	External
...p.....	.....3.....	.....	.....	.....
.....	.....	.....	.....	.....
.....	.....	.....	.....	.....
.....	.....	.....	.....	.....
SECONDARY				(part/s)
.....	.....	.....	.....	.....
.....	.....	.....	.....	.....

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	%	pμ A of .... MeV ... ions
RESOL ΔE/E	%	pμ A of .... MeV ... ions

EMITTANCE

(π mm. mrad) { ... axial } ..... pμA of ..... MeV ... ions
{ .... rad }

OPERATING PROGRAMS, time distribution

BASIC NUCLEAR PHYSICS .. SOLID STATES PHYSICS ....
BIOMEDICAL APPLICAT. .... ISOTOPE PRODUCTIONS ....
.....
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REFERENCES/NOTES 1) J.A. van der Heide, M.J.M. Kruip, P. Magendans, W. van Genderen, W.KLeeven and H.L. Hagedoorn Nucl. Instr. and Meth. A240 (1985) 32-35
2) R. de Regt, J.A. van der Heide, W.Kleeven and H.L. Hagedoorn: Proc. Eur.Part.Acc.Conf. Rome, June 7-11, 1988.
3) W.J.G.M. Kleeven: Thesis, Eindhoven Univ. Tech. 1988

PLAN VIEW OF FACILITY, NOTEWORTHY FEATURES, COMMENTS

Two /2 resonators (42 MHz) for acceleration and two flattop systems (126 MHz). The pole faces are copper plated to form grounded parts of the RF circuit.