**ENTRY NO. 29** MC - 35, Scanditronix
NAME OF MACHINE
INSTITUTION Medizinische Hochschule Hannover, Abt. Nuklearmedizin u. spez. Biophysik
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IN CHARGE Dr. D. Junker REPORTED BY Dr. H.-J. Helmeke/Dr. D. Junker

**HISTORY AND STATUS**
DESIGN, date Model tests 1976
ENG DESIGN, date
CONSTRUCTION, date
FIRST BEAM, date (or goal) 21.01.1977
MAJOR ALTERATIONS
COST, ACCELERATOR
COST, FACILITY, total
FUNDED BY

**ACCELERATOR STAFF, OPERATION AND DEVELOPMENT**
SCIENTISTS 2 ENGINEERS 1
TECHNICIANS 1 CRAFTS
GRAD STUDENTS involved during year
OPERATED BY Research staff or 2 Operators
OPERATION 20 hr/wk. On target 8 hr/wk
TIME DISTR. in house 100 %, outside %
BUDGET, op & dev
FUNDED BY

**RESEARCH STAFF,** not included above
USERS, in house 3 outside
GRAD STUDENTS involved during year
RESEARCH BUDGET, in house
FUNDED BY

**MAGNET**
POLE FACE, diameter (compact) 130 cm, R-extraction 51 cm
R injection cm
GAP, min 10 cm, Field 20.3 kG
max 18 cm, Field 12.6 kG at 800/280 Ampere turns
AVERAGE FIELD at R ext 17.2 kG
B max/<B>
NUMBER OF SECTORS compact 3 / separated Spiral, max 50 deg
SECTOR ANGLE (SSC) deg
TRIMMING COILS 4 harmonic
8 circular
CONDUCTOR, material and type Cu-coils, H-type
STORED ENERGY (cryogenic) MJ
POWER: main coils 100 max kW: current stability $10^{-5}$
trimming coils 10 max kW: current stability $10^{-4}$
WEIGHT: Fe 53 tons: coils 2,3 tons
COOLING system water
ION ENERGY (Bending limit) E/A = $q^2/A^2$ MeV/amu
(Focusing limit) E/A = q/A MeV/amu

**ACCELERATION SYSTEM**
DEES, number 2 angle 90 deg
BEAM APERTURE cm; DC Bias kV
TUNED by, coarse resonator fine flaps
RF 12 to 24 MHz, stable ± quartz oscillator
Orb F to MHz $10^{-6}$
HARMONICS, RF/Orb F, used
DEE–Gnd, max 40 kV, min gap cm
STABILITY, (pk-pk noise)/(pk RF volt)
ENERGY GAIN, max kV/turn
RF PHASE, stable to ± automatically regulated deg
RF POWER input, max. 100 kW
FREQUENCY MODULATION, rate /s
modulator, type
beam pulse, width

**VACUUM SYSTEM**
OPERATING PRESSURE < $10^{-5}$ Torr ~~or mbar~~
PUMPS, No, Type, Size
two diffusion pumps
tree prevakuum pumps

**ION SOURCES**
PIG - type

**INJECTION SYSTEM**

**EXTRACTION SYSTEM**
electrostatic deflector and magnetic channel

**FACILITIES FOR RESEARCH**
SHIELDED AREA, fixed 65 m²; movable m²
TARGET STATIONS 1 1 with six targets rooms
STATIONS served at same time, max
MAG SPECTROGRAPH, type
COMPUTER model
OTHER FACILITIES

**CHARACTERISTIC BEAMS**

| PARTICLE | ENERGY (MeV) Goal | Achieved | CURRENT (μA) Internal | External |
|---|---|---|---|---|
| protons | | 7,5 - 35 | | 65 2) |
| deuterons | | 3,8 - 18 | | 65 |
| helium-3 | | 5,6 - 47 | | 30 |
| helium-4 | | 7,5 - 36 | | 30 |
| SECONDARY | | | (part/s) | guarenteed |

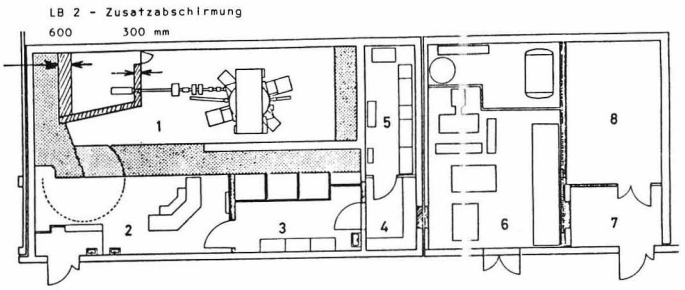
**BEAM PROPERTIES**

| | MEASURED | | CONDITIONS | | |
|---|---|---|---|---|---|
| PULSE WIDTH | RF deg | pμA of | MeV | | ions |
| PHASE EXC. max | RF deg | pμA of | MeV | | ions |
| EXTRACT eff | ≥85 % | 60 μA of | 35 MeV | $p^+$ | ions |
| RESOL ΔE/E | 0,5 % guaren- | pμA of | 35 MeV | $p^+$ | ions |
| EMITTANCE | teed | | | | |
| ( mm-mrad) | 30 axial 1) | pμA of | 35 MeV | He-4 | |
| | 30 rad | | | | |

**OPERATING PROGRAMS,** time distribution
BASIC NUCLEAR PHYSICS SOLID STATES PHYSICS
BIOMEDICAL APPLICAT. ISOTOPE PRODUCTIONS 100%
C-11, N-13, O-15, F-18, Rb-81,J-123 (1985/86)

**REFERENCES/NOTES**
1) guarenteed axial and rad.: 50 mm mrad
2) max. measured : 35 MeV $p^+$ = 100 μA
35 MeV He-4 = 55 μA

**PLAN VIEW OF FACILITY, COMMENTS, ETC.**




1 ZYKLOTRON UND BESTRAHLUNGSRAUM
2 SCHALTRAUM MIT EINGANGSSCHLEUSE
3 TARGET - LABOR
4 TARGET - VORBEREITUNG
5 HILFSMASCHINENRAUM (Zyklotronelektronik)
6 MASCHINENRAUM (Stromversorgung Zyklotron, Lüftung, Kühl- und Ab-wasser)
7 VORBEREITUNG FÜR PATIENTEN
8 APPLIKATIONSRAUM

NORD

1 5 10m

ZYKLOTRON 1 : 150