

ENTRY No. 36

NAME OF MACHINE Karlsruhe Compact Cyclotron DATE
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IN CHARGE H. Schweickert REPORTED BY H. Schweickert

HISTORY AND STATUS

DESIGN, date Model tests
ENG DESIGN, date CP42H Cyclotron Corporation
CONSTRUCTION, date 1979-1982
FIRST BEAM, date (or goal) 1983
MAJOR ALTERATIONS

COST, ACCELERATOR 2 Mio. \$
COST, FACILITY, total 7.0 Mio. \$
FUNDED BY Federal Government, TT-Project

ACCELERATOR STAFF, OPERATION AND DEVELOPMENT
SCIENTISTS ENGINEERS 2
TECHNICIANS 2 CRAFTS 2

GRAD STUDENTS involved during year
OPERATED BY Research staff or Operators
OPERATION 100 hr/wk, On target 90 hr/wk
TIME DISTR. in house 100% % Outside %

BUDGET, op & dev 200 T\$.
FUNDED BY Beam Recharges.
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) 120 cm, R extraction 53 cm
R injection cm
GAP, min 5 cm, Field 24 kG
max 12 cm, Field 16 kG at 92,400
AVERAGE FIELD at R ext 18.4 kG Ampere turns
B max/ <B> 1.3

NUMBER OF SECTORS compact 3 separated 3 Spiral, max 64 deg
SECTOR ANGLE (ISS) deg
TRIMMING COILS

CONDUCTOR, material and type Hollow Copper
STORED ENERGY (cryogenic) MJ
POWER: main coils 100 max, kW; current stability 10(-5)
trimming coils max, kW; current stability

WEIGHT: Fe 35 tons; coils 9 tons
COOLING system Recirculated Water
ION ENERGY (bending limit) E/A = 42 q^2/a^2 MeV/amu
(focusing limit) E/A = q^2/a^2 MeV/amu

ACCELERATION SYSTEM

DEES, number 2; angle 90 deg
BEAM APERTURE 1.8 cm; DC Bias 1.5 kV
TUNED by, coarse fine Capacitors, Trimmer
RF to 26.8 MHz, stable +/- 0.5 kHz
Orb F 26.8 MHz

HARMONICS, RF/Orb F, used 1
DEE - Gnd, max 35 kV, min gap 0.5 cm
STABILITY, (pk-pk noise)/(pk RF volt) 10(-4)
ENERGY GAIN, max 100 kV/turn

RF PHASE, stable to +/- deg
RF POWER input, max 100 kW
FREQUENCY MODULATION, rate /s
modulator, type
beam pulse, width

VACUUM SYSTEM

OPERATING PRESSURE 6 x 10^-6 H2 Torr or mbar
PUMPS, No, Type, Size
Four 10-inches Diff. Pumps

ION SOURCES

INJECTION SYSTEM

EXTRACTION SYSTEM Charge Exchange Foil

FACILITIES FOR RESEARCH
SHIELDED AREA, fixed m^2; movable m^2
TARGET STATIONS 6 in 3 rooms

STATIONS served at same time, max
MAG SPECTROGRAPH, type
COMPUTER model DEC-PDP 11/03, 2 x DG Nova 4, Camac
OTHER FACILITIES

CHARACTERISTIC BEAMS

Table with columns: PARTICLE, ENERGY (MeV) Goal, Achieved, CURRENT (pA) Internal, External. Row for H- with values 11-42, 15-42.

SECONDARY (part/s)

BEAM PROPERTIES

MEASURED CONDITIONS
PULSE WIDTH 40 RF deg 200 pA of 42 MeV H- ions
PHASE EXC, max RF deg pA of MeV ions
EXTRACT eff 100% pA of MeV ions
RESOL dE/E 1% pA of MeV ions
EMITTANCE

(pi mm. mrad) {10 axial} pA of MeV ions
{10 rad}

OPERATING PROGRAMS, time distribution
BASIC NUCLEAR PHYSICS SOLID STATES PHYSICS
BIOMEDICAL APPLICAT. ISOTOPE PRODUCTIONS 50%
Engineering 30%; Materials Research 20%

REFERENCES/NOTES

- 1) G.O. Hendry et al., Design and Performance of a Compact H- Cyclotron, Proc. 10th Int. Conf. on Cyclotrons and their Applications (Michigan, USA, 1984)
2) Modern Gas-Target Technology for the Product of High Quality Radiopharmaceuticals Bechtold, V.; Schweickert, H.; these Proceedings
3) The Applicational Conference of Cyclotrons in Mechanical Engineering Fehsenfeld, P.; Kleinrahm, A.; these Proceedings

PLAN VIEW OF FACILITY, NOTEWORTHY FEATURES, COMMENTS

