ENTRY No. 29

NAME OF MACHINE CV 28 DATE

INSTITUTION Physikalisch-Technische Bundesanstalt
ADDRESS Bundesallee 100, D-3300 Braunschweig, Federal Republic of Germany
TEL 0531-5927121 TELEX 9 52 822 ptb d
IN CHARGE R. Böttger REPORTED BY R. Böttger

HISTORY AND STATUS

DESIGN, date 1969 Model tests 1972
ENG DESIGN, date 1970
CONSTRUCTION, date 1972 - 1974
FIRST BEAM, date (or goal) 1973
MAJOR ALTERATIONS New pumping system, new deflector, RF-modulator power amplifier, new main magnet coils and
COST, ACCELERATOR 3. - 10^6 DM power system
COST, FACILITY, total 25. - 10^6 DM
FUNDED BY Federal Republic of Germany

ACCELERATOR STAFF, OPERATION AND DEVELOPMENT

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

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) 96.5cm, R extraction 42. cm
R injection cm
GAP, min 5.08 cm, Field 14 kG
max 11.64 cm, Field 21 kG
at 2.2 - 10^5 Ampere turns
AVERAGE FIELD at R ext 17.4 kG
B max/ <B>
NUMBER OF SECTORS compact 3 separated Spiral, max deg
SECTOR ANGLE (SSC) deg
TRIMMING COILS 4

CONDUCTOR, material and type
STORED ENERGY (cryogenic) MJ
POWER : main coils 85. max, kW ; current stability 10^{-6}
trimming coils 6. max, kW ; current stability 10^{-5}
WEIGHT : Fe 20 tons ; coils 2 tons
COOLING system Destilled water
ION ENERGY (bending limit) E/A = 28. q^2/a^2 MeV/amu
(focusing limit) E/A = 28. q^2/a^2 MeV/amu

ACCELERATION SYSTEM

DEES, number 2 ; angle 90 deg
BEAM APERTURE 3 cm ; DC Bias 0.4 kV
TUNED by, coarse MSP+ fine VC
RF 6.5 to 26.2 MHz, stable ± 10^{-5}
Orb F 6.5 to 26.2 MHz
HARMONICS, RF/Orb F, used fundamental
DEE - Gnd, max 35. kV, min gap 10^{-4} cm
STABILITY, (pk-pk noise)/(pk RF volt) 5. - 10.
ENERGY GAIN, max 120 kV/turn
RF PHASE, stable to ± 3 deg
RF POWER input, max 75 kW
FREQUENCY MODULATION, rate /s
modulator, type Internal pulsing system
beam pulse, width < 1. ns (fwhm)

VACUUM SYSTEM

OPERATING PRESSURE $2 \cdot 10^{-5}$ Torr or mbar
PUMPS, No, Type, Size 2 turbomolecular pumps
1 cryo-pump

ION SOURCES

PIG ion source

+MSP - Movable shorting plane
VC - Variable capacitor

INJECTION SYSTEM

None

EXTRACTION SYSTEM

DC electrostatic with magnetic channel

FACILITIES FOR RESEARCH

SHIELDED AREA, fixed 625. + 225 m² ; movable m²
TARGET STATIONS 5 in 2 rooms
STATIONS served at same time, max
MAG SPECTROGRAPH, type
COMPUTER model
OTHER FACILITIES Time-of-flight facility for fast neutrons

CHARACTERISTIC BEAMS

PARTICLE	ENERGY (MeV) Goal	Achieved	CURRENT (pμA) Internal	External
p	2. - 24	1.5 - 24	> 350	100.
d	3. - 14	2. - 14	> 300	100.
^{3}He	5. - 36	4. - 36	> 150	15. - 50.
^{4}He	6. - 28	4. - 28	> 150	10. - 50.
SECONDARY				(part/s)

BEAM PROPERTIES

MEASURED		CONDITIONS
PULSE WIDTH 6.	RF deg	1 pμ A of 10^{10} MeV p ions
PHASE EXC, max	RF deg 1	pμ A of 10^{10} MeV d ions
EXTRACT eff 70.	%	pμ A of MeV ions
RESOL ΔE/E 0.3	%	pμ A of MeV ions
EMITTANCE (π mm. mrad)	.7. axial .10. rad	10^{10} pμA of 10^{10} MeV d ions

OPERATING PROGRAMS, time distribution

BASIC NUCLEAR PHYSICS 100 % SOLID STATES PHYSICS
BIOMEDICAL APPLICAT. ISOTOPE PRODUCTIONS

REFERENCES/NOTES

1) Nucl. Instrum. Meth., 169 (1980) 349 - 358

2) R. Böttger et al., "A Multi-Angle Time-of-Flight Spectrometer for Fast Neutron Scattering Experiments. Proc. of the Intern. Conf. on Nuclear Data for Science and Technology, Ed. K.H. Böckhoff, Reidel Publ. Comp., Dordrecht (1983) 836 - 839

3) Nucl. Instrum. Meth., 193 (1982) 635 - 644