ENTRY NO. FM-5

NAME OF MACHINE: Goettingen Synchrocyclotron
INSTITUTION: University of Göttingen, II. Physikalisches Institut
ADDRESS: D-3400 Göttingen, Bunsenstr. 7-9
TEL 0551/397632 TELEX
IN CHARGE Prof. Schmidt-Ott REPORTED BY

HISTORY AND STATUS

DESIGN, date 1958 Model tests
ENG DESIGN, date
CONSTRUCTION, date 1960-1962
FIRST BEAM, date (or goal) int. beam 1962
MAJOR ALTERATIONS ext. beam 1962
partally removed 1980
COST, ACCELERATOR $4.2 \cdot 10^6$ DM
COST, FACILITY, total $5.9 \cdot 10^6$
FUNDED BY Fed. Rep. Germany, Land Niedersachsen

ACCELERATOR STAFF, OPERATION AND DEVELOPMENT

SCIENTISTS 1 ENGINEERS 1
TECHNICIANS 2 CRAFTS
GRAD STUDENTS involved during year
OPERATED BY Research staff or 2 Operators
OPERATION 30 hr/wk. On target 25 hr/wk
TIME DISTR. in house 90 %, outside 10 %
BUDGET, op & dev
FUNDED BY Land Niedersachsen

RESEARCH STAFF, not included above

USERS, in house 10 outside 3
GRAD STUDENTS involved during year 7
RESEARCH BUDGET, in house
FUNDED BY Land Niedersachsen

MAGNET

POLE FACE, diameter (compact) 180 cm, R-extraction 75 cm
R injection 0 cm
GAP, min 35 cm, Field 14.5 kG
max cm, Field kG } at $.5 \cdot 10^5$
AVERAGE FIELD at R ext 14.2 kG Ampere turns
B max/<B> 0.99
NUMBER OF SECTORS { compact / separated } Spiral, max deg
SECTOR ANGLE (SSC) deg
TRIMMING COILS
CONDUCTOR, material and type Aluminium
STORED ENERGY (cryogenic) .5 MJ
POWER: main coils 250 max kW: current stability $3 \cdot 10^{-4}$
trimming coils max kW: current stability
WEIGHT: Fe 250 tons: coils 2 tons
COOLING system demineralized water
ION ENERGY (Bending limit) E/A = 13.9 q^2/A^2 MeV/amu
(Focusing limit) E/A = q/A MeV/amu

ACCELERATION SYSTEM

DEES, number 1 angle 180 deg
BEAM APERTURE >10 cm; DC Bias -.5 kV
TUNED by coarse fixed fine variable
RF 10.6 to 11.1 MHz, stable ±
Orb F to MHz
HARMONICS, RF/Orb F, used 1
DEE–Gnd, max 20 kV, min gap 7 cm
STABILITY, (pk-pk noise)/(pk RF volt)
ENERGY GAIN, max 13 kV/turn
RF PHASE, stable to ± - deg
RF POWER input, max. 12 kW
FREQUENCY MODULATION, rate 2000 /s
modulator, type rotating capacitor
beam pulse, width 25 μs

VACUUM SYSTEM

OPERATING PRESSURE 10^{-6} Torr or mbar
PUMPS, No, Type, Size diff. pump
6000 l/s; 1000 l/s

ION SOURCES

gas discharge

INJECTION SYSTEM

-

EXTRACTION SYSTEM

magn. channel in cyclotron

FACILITIES FOR RESEARCH

SHIELDED AREA, fixed 160 m²; movable m²
TARGET STATIONS 1 in rooms
STATIONS served at same time, max 1
MAG SPECTROGRAPH, type -
COMPUTER model 11/34; 11/23
OTHER FACILITIES gastransport from internal target

CHARACTERISTIC BEAMS

PARTICLE	ENERGY (MeV) Goal	Achieved	CURRENT (pμA) Internal	External
α	54	55.4	0.5	
d	27	22.7	15	1
SECONDARY			(part/s)	

BEAM PROPERTIES

	MEASURED	CONDITIONS
PULSE WIDTH	RF deg	pμA of MeV ions
PHASE EXC. max	RF deg	pμA of MeV ions
EXTRACT eff	5 %	pμA of MeV ions
RESOL ΔE/E	<1 %	pμA of MeV ions
EMITTANCE (π mm-mrad)	100 axial, 100 rad	pμA of MeV

OPERATING PROGRAMS, time distribution

BASIC NUCLEAR PHYSICS 70 SOLID STATES PHYSICS 25
BIOMEDICAL APPLICAT. ISOTOPE PRODUCTIONS
development 5

REFERENCES/NOTES

1) Philips Techn. Rev. Vol 12, No 3
2) CERN-report 63-19, 80

PLAN VIEW OF FACILITY, COMMENTS, ETC.