ENTRY NO. FM-5
NAME OF MACHINE Goettingen Synchrocyclotron
INSTITUTION University of Göttingen, II. Physikalisches Institut
ADDRESS D-3400 Göttingen, Bunsenstr. 7-9
TEL 0551/397645 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 4.2.10^6 DM
COST, FACILITY, total 5.9.10^6
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 50 hr/wk. On target 40 hr./wk
TIME DISTR. in house 90 % Outside 10 %
BUDGET, op & dev
FUNDED BY Land Niedersachsen

RESEARCH STAFF, not included above
USERS, in house 20 outside 5
GRAD STUDENTS involved during year 10
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 } at .5·10^5 Ampere turns
min cm, Field kG }
AVERAGE FIELD at R ext 14.2 kG
B max/ < B > 0.99
NUMBER OF SECTORS { compact } Spiral, max deg
{ separated }
SECTOR ANGLE (SSC) deg
TRIMMING COILS
CONDUCTOR, material and type Aluminium
STORED ENERGY (cryogenic) .5 MJ
POWER: main coils 250 max, kW; current stability 3·10^{-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 q²/a² MEV/amu
(focusing limit) E/A = q/a MeV/amu

ACCELERATION SYSTEM
DEES, number 1 180 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 POWEP 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
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
X	54	55.4	0.5	
α	27	22.7	15	1
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 5 %	pµ A of MeV ions
RESOL ΔE/E ≤ 1 %	pµ A of MeV ions
EMITTANCE (π mm. mrad) 100 axial, 100 rad	pµ A 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.