ENTRY NO. C21 **Date** September 95

Name of Machine Bonn Isochronous Cyclotron

Institution University of Bonn, Institut für Strahlen- und Kernphysik

Address Nußallee 14 - 16, 53115 Bonn, Germany

Tel (02 28) 73-22 01 Telex Fax (02 28) 73 37 28 E-MAIL

In Charge: Prof. K. Maier, Prof. R. Maschuw Reported by: Dr. F.E. Blumenber

HISTORY

MILESTONE DATES:

Design 1965 Model Tests 1966 - 67

Construction 1967 - 69 First Beam Dec. 1968

DESIGN/CONSTRUCTION BY:

in house ~~MSK~~ and AEG

COST: Accelerator 5.000,000 DM Facility 8.000,000 DM

FUNDED BY: BMFT

STATUS

STAFF: Machine

Scientists 1 Engineers 2

Technicians 8 Students -

Research (in house/external)

Scientists 20 / 2 Engineers 1 / -

Technicians 3 / - Students 40 / 6

BUDGET: Machine 1.900,000 DM Funded by MWF

Research 600,000 DM Funded by BMFT, MWF, DFG, EG

TIME DISTRIBUTION:

Basic Research (in house/external) 70 % / 5 %

Applied Program (in house/external) 15 % / - %

Maintenance 5 % Development 5 %

MAGNET

POLE PARAMETERS:

Diameter 200 cm $R_{extract}$ 90 cm R_{inject} 3,7 cm

HILL PARAMETERS: Gap (min) 8,4 cm B_{max} 1,85 T

(@ 1,47 e 5 AT) Gap (max) 8,6 cm B_{min} 0,64 T

VALLEY PARAMETERS: Gap (min) 24,0 cm B_{max} 0,70 T

(@ 0,46 e 5 AT) Gap (max) 24,0 cm B_{min} 0,24 T

AVERAGE FIELD: $<B>_{min}$ 0,5 T $<B>_{max}$ 1,27 T

NUMBER OF SECTORS: compact/separated 3 /

sector angle 40 deg. spiral (max) 0 deg.

FIELD TRIMMING: Trim Coils 7/sector

Harmonic Coils

Other

CURRENT: Main Coils 480 Amps Stability 10^{-5}

Trim Coils ± 25 Amps Stability 10^{-5}

Stored Energy (cryogenic) MJ

WEIGHT: Iron 200 Conductor 8

ION ENERGY: Bending Limit E/A = 60 q^2/A^2 MeV/u

Focusing Limit E/A = 30 q/A MeV/u

ACCELERATION SYSTEM

FUNDAMENTAL ACCELERATION:

Description: 3-Dee-system

No. of Gaps/turn 6 dE/dn(max) 0,2 MeV/q

Voltage (max) 0,045 MV Harmonic f_{rf}/f_{ion} 3

Freq 20 - 29 MHz Power in(max) 0,3 MW

Stability: Phase 2 deg Voltage 10^{-4}

OTHER CAVITIES (Flattopping or otherwise):

Description:

Region of Influence: R_{min} cm R_{max} cm

No. of Gaps/turn dE/dn(max) MeV/q

Voltage (max) MV Harmonic f_{rf}/f_{ion}

Freq MHz Power in(max) MW

Stability: Phase Voltage

VACUUM SYSTEM

OPERATING PRESSURE: $2 \cdot 10^{-6}$ mbar

PUMPS: (No. and type) 1 oil-diffusion, 60 cm, 12,000 l/s

ION SOURCE(S)

	Type	Intensity (mA)	@ $\varepsilon_n = \beta\gamma\varepsilon$ (π mm mrad)	Ion Species
(a)	ECR	0,2		up to ^{20}Ne
(b)	polarized I.S. 1.10^{-4}			polarized p,d
(c)				
(d)				

INJECTION SYSTEM

axial hyperbolic inflector Efficiency 30 %

EXTRACTION SYSTEM

electrostat.deflector,screen channel, foc. channel Efficiency 80 %

CHARACTERISTIC BEAMS

Accelerated Ions	E/A (MeV/u)	Current (part μA) Internal	External
(a) p	7 - 14	15	12
(b) d	7 - 14	7	5
(c) Alpha-Particles	7 - 14	4	3
(d) $^{12}C^{4+}$, $^{14}N^{5+}$,	7	0,12	0,1

Secondary Particles	E (MeV)	part/sec
(a)		
(b)		
(c)		

EXTRACTED BEAM PROPERTIES:

For 10 μA of 12 MeV/u d ions

ΔE/E 0,1 % Δφ 6 - 40 °rf

$\varepsilon_n = \beta\gamma\varepsilon$ x 6 π mm mrad z 6 π mm mrad

FACILITIES FOR RESEARCH

SHIELDED AREA: Fixed: 415 m² Moveable - m²

Target Stations: 12 No. Served At Same Time: 1

MAGNETIC SPECTROMETERS: split pole (Scanditronix)

OTHER FACILITIES: isotope production + hot-labors, orange-spectr., off-line-mass-separator

REFERENCES/NOTES

335+347

(a) F. Hinterberger et al., Nucl. Instr. 130 (1975)

(b) M. Agena et al., IEEE NS 26, 2156, (1979)

PLAN VIEW OF FACILITY, COMMENTS