

ENTRY NO. C20 Date June 92
 Name of Machine Bonn Isochronous Cyclotron
 Institution University of Bonn, Institut für Strahlen- und Kernphysik
 Address Nußallee 14 - 16, W-5300 Bonn 1, Germany
 Tel (02 28) 73-22 01 Telex Fax (02 28) 73 37 28 EMAIL
 In Charge: T. Mayer-Kuckuk Reported by: H. Wahl

HISTORY
MILESTONE DATES:
 Design 1965 Model Tests 1966 - 67
 Construction 1967 - 69 First Beam Dec. 1968
DESIGN/CONSTRUCTION BY:
 in house ~~BMFT~~ 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 % / - %
 Development 5 % Maintenance 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.s AT) Gap (max) 8,6 cm B_{min} 0,64 T
VALLEY PARAMETERS: Gap (min) 24,0 cm B_{min} 0,70 T
 (@ 0,46 e.s 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 q²/A² MeV/u
 Focussing 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) 0,45 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 · 10⁻⁶ mbar
PUMPS: No. and type 1 oil-diffusion, 60 cm,
 12,000 l/s

ION SOURCE(S)
 Type Intensity (mA) ε_n = βγε (πmm 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 Efficiency 80 %
 channel, foc. channel

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) α	7 - 14	4	3
(d) 12C ⁴⁺ , 14N 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
 ε_n = βγε x 6 πmm mrad z 6 πmm 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 347
 (a) F. Hinterberger et al., Nucl. Instr. 130(1975)335+
 (b) M. Agena et al., IEEE NS 26,2156, (1979)

PLAN VIEW OF FACILITY, COMMENTS

