

ENTRY NO. C21 Date
 Name of Machine JULIC
 Institution Institut für Kernphysik des Forschungszentrums Jülich GmbH (KFA)
 Address Postfach 1913, D-5170 Jülich, Germany
 Tel 02461/613980 Telex Fax 02461/613930 EMAIL
 In Charge: R. Maier Reported by: W. Bräutigam

HISTORY

MILESTONE DATES:
 Design 1963 Model Tests 1963 - 1965
 Construction 1966 - 1969 First Beam int. 1968
 DESIGN/CONSTRUCTION BY: ext. 1969
 in house others AEG Frankfurt
 COST: Accelerator 19.10 DM Facility 29.10 DM
 FUNDED BY: Kernforschungsanlage Jülich

STATUS

STAFF: Machine
 Scientists (a) Engineers (a)
 Technicians (a) Students (a)
 Research (in house/external)
 Scientists / Engineers /
 Technicians / Students /
 BUDGET: Machine (b) Funded by
 Research (b) Funded by
 TIME DISTRIBUTION:
 Basic Research (in house/external) (c) % / %
 Applied Program (in house/external) (c) % / %
 Development % Maintenance %

MAGNET

POLE PARAMETERS:
 Diameter 330 cm R_{extract} 154 cm R_{inject} cm
 HILL PARAMETERS: Gap (min) 8.4 cm B_{max} 1.92 T
 (@ AT) Gap (max) cm B_{min} T
 VALLEY PARAMETERS: Gap (min) 2.4 cm B_{max} 0.7 T
 (@ AT) Gap (max) cm B_{min} T
 AVERAGE FIELD: < B >_{min} 0.95 T < B >_{max} 1.35 T
 NUMBER OF SECTORS: compact/ ~~separated~~ 3 /
 sector angle deg. spiral (max) 20 deg.
 FIELD TRIMMING: Trim Coils 9
 Harmonic Coils -
 Other -
 CURRENT: Main Coils 400 Amps Stability 2 · 10⁻⁶
 Trim Coils 9 Amps Stability 1 · 10⁻⁴
 Stored Energy (cryogenic) MJ
 WEIGHT: Iron 700 tons Conductor 12 tons
 ION ENERGY: Bending Limit E/A = 180 q²/A² MeV/u
 Focussing Limit E/A = q/A MeV/u

ACCELERATION SYSTEM

FUNDAMENTAL ACCELERATION:
 Description: 3 dees, angle 40 deg
 No. of Gaps/turn 6 dE/dn(max) 0.24 MeV/q
 Voltage(max) 0.045 MV Harmonic f_{rf}/f_{ion} 3
 Freq 20 - 30 MHz Power in(max) 0.1 MW
 Stability: Phase < ± 0.5 deg Voltage < ± 1 · 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 · 10⁻⁷ mbar
 PUMPS: No. and type 3 cryo 10000 l/s each
 2 turbo 2200 l/s each

ION SOURCE(S)

Type	Intensity (mA)	ε _n = βγc (πmm mrad)	Ion Species
(a) ECR 14 GHz			heavy ions
(b) ECR 2.45 GHz			H ₂ ⁺
(c) Neg. Ion. S.			H ₂ ⁻ , D ₂ ⁻
(d)			

INJECTION SYSTEM

axial, magn. comp. Efficiency %

EXTRACTION SYSTEM

el. static defl. screen, t. foc. chan. Efficiency ~ 60 %

CHARACTERISTIC BEAMS

Accelerated Ions	E/A (MeV/u)	Current(part μA)	
		Internal	External
(a) H ₂ ⁺	22.5 - 45		~ 10
(b) p, d, ³ He ²⁺	22.5 - 45		> 10
(c) MB ⁺ , Ne ⁸⁺			
(d) S ¹³⁺ , a.o.			

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

EXTRACTED BEAM PROPERTIES:

For 6 μA of 38 MeV/u H₂⁺ ions
 ΔE/E 0.3 % Δφ 1.4 °
 ε_n = βγc x 2.5 πmm mrad z 5 πmm mrad

FACILITIES FOR RESEARCH

SHIELDED AREA: Fixed m² Moveable m²
 Target Stations: No. Served At Same Time:

MAGNETIC SPECTROMETERS:

OTHER FACILITIES:
 The cyclotron JULIC will serve as injector for
 the new cooler synchrotron COSY Jülich

REFERENCES/NOTES

(a) operation by COSY operating group
 (b) common budget with COSY
 (c) COSY injector

PLAN VIEW OF FACILITY, COMMENTS

see

Cooler Synchrotron COSY-Jülich