

ENTRY NO. C11 Date 26.6.1992
 Name of Machine K130 cyclotron
 Institution Department of Physics, University of Jyväskylä (JYFL)
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HISTORY

MILESTONE DATES:
 Design 1988 Model Tests None 1)
 Construction 1988-90 First Beam 1992 1)
 DESIGN/CONSTRUCTION BY:
 in house other
 COST: Accelerator ab. 7 million US\$ Facility ab. 20 million US\$
 FUNDED BY: Government of Finland

STATUS

STAFF: Machine
 Scientists 5 Engineers 4
 Technicians 3 Students 5
 Research (in house/external)
 Scientists / Engineers /
 Technicians / Students /
 BUDGET: Machine 1 million US\$/year Funded by Government of Finland through Univ.
 Research Funded by
 TIME DISTRIBUTION:
 Basic Research (in house/external) 60 % / %
 Applied Program (in house/external) 20 % / %
 Development 10 % Maintenance 10 %

MAGNET

POLE PARAMETERS:
 Diameter 240 cm R_{extract} 95 cm R_{inject} -3 cm
 HILL PARAMETERS: Gap (min) 33 cm B_{max} 2.12 T
 (@ 400,000 AT) Gap (max) 33 cm B_{min} T
 VALLEY PARAMETERS: Gap (min) 17.4 cm B_{max} T
 (@ 400,000 AT) Gap (max) 17.4 cm B_{min} 1.26 T
 AVERAGE FIELD: < B >_{min} 0.35 T < B >_{max} 1.77 T
 NUMBER OF SECTORS: compact/separated 3 /
 sector angle 51-81 deg. spiral (max) 58 deg.
 FIELD TRIMMING: Trim Coils 15
 Harmonic Coils 4 sets in valleys
 Other
 CURRENT: Main Coils 1000 Amps Stability 10⁻⁵
 Trim Coils 70 Amps Stability
 Stored Energy (cryogenic) MJ
 WEIGHT: Iron 308 tons Conductor 15 tons
 ION ENERGY: Bending Limit E/A = .130 q²/A² MeV/u
 Focussing Limit E/A = .90 q/A MeV/u

ACCELERATION SYSTEM

FUNDAMENTAL ACCELERATION:
 Description: λ/4 resonator; 2 dees
 No. of Gaps/turn 4 dE/dn(max) 0.195 MeV/q
 Voltage(max) 0.05 MV Harmonic f_{rf}/f_{ion} 1.2, 3
 Freq 10-21 MHz Power in(max) 0.2 MW
 Stability: Phase Voltage
 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: 10⁻⁷
 PUMPS: No. and type 2 cryo. pumps
 5000 l/s. (for nitrogen)

ION SOURCE(S)

Type	Intensity (mA)	ε _n = βγc (πmm mrad)	Ion Species
(a)			
(b) ECR	max 1		gaseous
(c)			
(d)			

INJECTION SYSTEM

Axial, spiral inflector, buncher Efficiency %
 (1st+2nd)

EXTRACTION SYSTEM

electrostatic defl. + EMC+2. passive... Efficiency %
 channels

CHARACTERISTIC BEAMS

Accelerated Ions	E/A (MeV/u)	Current(part μA)	
		Internal	External
(a) p	70		
(b) α	55 MeV		
(c) 40Ar	6.0		
(d)			
Secondary Particles		E (MeV)	part/sec
(a)			
(b)			
(c)			

EXTRACTED BEAM PROPERTIES:

For μA of MeV/u ions
 ΔE/E % Δφ °rf
 ε_n = βγc x πmm mrad z πmm mrad

FACILITIES FOR RESEARCH

SHIELDED AREA: Fixed m² Moveable 425 m²
 Target Stations: 9 No. Served At Same Time: 1
 MAGNETIC SPECTROMETERS: gas filled recoil separator
 on-line mass separator
 OTHER FACILITIES: gamma and electron spectrometers

REFERENCES/NOTES

- (a) 1. Magnet design by JYFL; design and construction by
- (b) Scanditronix AB, Sweden

PLAN VIEW OF FACILITY, COMMENTS

