

ENTRY No. 102

NAME OF MACHINE Electron model relativistic ring cyclotron Date : August 1978
INSTITUTION Joint Institute for Nuclear Research, Lab. Nucl. Probl
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HISTORY AND STATUS

DESIGN, date 1964 Model tests 1964-66
ENG DESIGN, date 1966-67
CONSTRUCTION, date 1967
FIRST BEAM, date (or goal) 1967
MAJOR ALTERATIONS 1974, 1977

COST, ACCELERATOR

COST, FACILITY, total
FUNDED BY

ACCELERATOR STAFF, OPERATION AND DEVELOPMENT

SCIENTISTS 1 ENGINEERS 2
TECHNICIANS 2 CRAFTS 2
GRAD STUDENTS involved during year
OPERATED BY Research staff or Operators
OPERATION 25 hr/wk, On target hr/wk
TIME DISTR. in house 100%, Outside %
BUDGET, op & dev
FUNDED BY

RESEARCH STAFF, not included above

USERS, in house 14 outside
GRAD STUDENTS involved during year
RESEARCH BUDGET, in house
FUNDED BY JINR

MAGNET

POLE FACE, diameter (compact) 240 cm, R extraction 101 cm
R injection cm
GAP, min 8 cm, Field kG }
max 8 cm, Field kG } at
AVERAGE FIELD at R ext kG } Ampere turns
B max/ < B > 2.06

NUMBER OF SECTORS { compact 8 } Spiral, max 60 deg
SECTOR ANGLE (SSC) { separated } deg
TRIMMING COILS

CONDUCTOR, material and type

STORED ENERGY (cryogenic) MJ
POWER: main coils 80 max, kW; current stability 10⁻⁴
trimming coils 20 max, kW; current stability

WEIGHT: Fe tons; coils tons

COOLING system water

ION ENERGY (bending limit) E/A = q²/a² MeV/amu
(focusing limit) E/A = q/a MeV/amu

ACCELERATION SYSTEM

DEES, number 2; angle 45 deg
BEAM APERTURE 2 cm; DC Bias kV
TUNED by, coarse MS fine VC auto
RF 39.5 to MHz, stable ± 5.10⁻⁶
Orb F 39.5 to MHz
HARMONICS, RF/Orb F, used 1
DEE - Gnd, max kV, min gap cm
STABILITY, (pk-pk noise)/(pk RF volt) 5.10⁻²
ENERGY GAIN, max 2 kV/turn
RF PHASE, stable to ± 5 deg
RF POWER input, max 40 kW
FREQUENCY MODULATION, rate /s
modulator, type
beam pulse, width

VACUUM SYSTEM

OPERATING PRESSURE 1 μ Torr
PUMPS, No, Type, Size
9 diffusion pumps

ION SOURCES

electron injector (6 keV)

INJECTION SYSTEM

EXTRACTION SYSTEM

Closed orbit expansion

FACILITIES FOR RESEARCH

SHIELDED AREA, fixed m²; movable m²
TARGET STATIONS in rooms
STATIONS served at same time, max
MAG SPECTROGRAPH, type
COMPUTER model
OTHER FACILITIES

CHARACTERISTIC BEAMS

PARTICLE	ENERGY (MeV)		CURRENT (μA)	
	Goal	Achieved	Internal	External
e ⁻	0.4		1000	
SECONDARY				(part/s)

BEAM PROPERTIES

MEASURED		CONDITIONS	
PULSE WIDTH	20 RF deg	100 μ A of 0.4 MeV e ⁻	
PHASE EXC, max	RF deg	μ A of MeV ions	
EXTRACT eff	%	μ A of MeV ions	
RESOL ΔE/E	%	μ A of MeV ions	
EMITTANCE			
(π mm. mrad)	{ axial } { rad }	μ A of MeV ions	

OPERATING PROGRAMS, time distribution

BASIC NUCLEAR PHYSICS SOLID STATES PHYSICS
BIOMEDICAL APPLICAT. ISOTOPE PRODUCTIONS
Machine research 100%

REFERENCES/NOTES

PLAN VIEW OF FACILITY, NOTEWORTHY FEATURES, COMMENTS