

ENTRY NO. 12
 NAME OF MACHINE INR Cyclotron
 INSTITUTION Institute of Nuclear Research, Academia Sinica, Shanghai
 ADDRESS Shanghai China
 TEL 950998 TELEX
 IN CHARGE REPORTED BY Hong-jun Chang

HISTORY AND STATUS 1.2M classical cycl. converted to SFC

DESIGN, date Model tests
 ENG DESIGN, date 1978-1979
 CONSTRUCTION, date 1980-1982
 FIRST BEAM, date (or goal) Nov. 1983
 MAJOR ALTERATIONS

COST, ACCELERATOR
 COST, FACILITY, total
 FUNDED BY

ACCELERATOR STAFF, OPERATION AND DEVELOPMENT

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

RESEARCH STAFF, not included above

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

MAGNET

POLE FACE, diameter (compact) 138 cm, R extraction cm
 R injection cm
 GAP, min 14.6 cm, Field 17.5 kG }
 min 2.24 cm, Field 11.7 kG } at 0.3×10^6
 AVERAGE FIELD at R ext 14.6 kG } Ampere turns
 B max/ < B >
 NUMBER OF SECTORS { compact 3 } Spiral, max 45 deg
 { separated }
 SECTOR ANGLE (SSC) deg
 TRIMMING COILS 9 pairs

CONDUCTOR, material and type mineral insulated cable

STORED ENERGY (cryogenic)
 POWER: main coils 80 max, kW; current stability 5×10^{-5}
 trimming coils 10 max, kW; current stability 1×10^{-4}
 WEIGHT: Fe 120 tons; coils
 COOLING system demineralized water
 ION ENERGY (bending limit) E/A = 32 q²/a² MEV/amu
 (focusing limit) E/A = 30 q/a MeV/amu

ACCELERATION SYSTEM

DEES, number 1 x 180 deg
 BEAM APERTURE 3 cm; DC Bias kV
 TUNED by, coarse short plate fine Var. cap = 6
 RF 10 to 22 MHz, stable $\pm 1 \times 10^{-4}$
 Orb F to MHz
 HARMONICS, RF/Orb F, used 3
 DEE-Gnd, max 70 kV, min gap 34.5 cm
 STABILITY, (pk-pk noise)/(pk RF volt) 5×10^{-3}
 ENERGY GAIN, max 140 kV/turn
 RF PHASE, stable to \pm deg
 RF POWER input, max 100 kW
 FREQUENCY MODULATION, rate /s
 modulator, type
 beam pulse, width

VACUUM SYSTEM

OPERATING PRESSURE 1.5×10^{-5} Torr or mbar
 PUMPS, No, Type, Size 2 x 1250 L/S oil diff.

ION SOURCES

PIG type (internal only)

INJECTION SYSTEM

EXTRACTION SYSTEM 2 sections of electrostatic defl. +
 Foc. Mag. Channel + Mag. Weak. Channel

FACILITIES FOR RESEARCH

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

CHARACTERISTIC BEAMS

PARTICLE	ENERGY (MeV)		CURRENT (μ A)	
	Goal	Achieved	Internal	External
p	10-30	10-30		30
d	10-16	16		
	20-32	32		

SECONDARY

(part/s)

BEAM PROPERTIES

MEASURED CONDITIONS
 PULSE WIDTH RF deg μ A of MeV ions
 PHASE EXC. max RF deg μ A of MeV ions
 EXTRACT eff 50-80% μ A of 10-30 MeV ions
 RESOL $\Delta E/E$ 0.43% 50 nA μ A of 15-30 MeV p ions
 EMITTANCE 0.7
 (π mm. mrad) { axial } μ A of MeV
 { rad }

OPERATING PROGRAMS, time distribution

BASIC NUCLEAR PHYSICS SOLID STATES PHYSICS
 BIOMEDICAL APPLICAT. ISOTOPE PRODUCTIONS

REFERENCES/NOTES

- 1)
- 2)

PLAN VIEW OF FACILITY, COMMENTS, ETC.