

ENTRY No. 15

NAME OF MACHINE INR Cyclotron DATE
 INSTITUTION Institute of Nuclear Research, Academia Sinica, Shanghai
 ADDRESS Shanghai, China
 TEL 950998 TELEX
 IN CHARGE REPORTED BY Hong-jun Chang

HISTORY AND STATUS

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 146 cm, Field 17.5 kG }
 max 224 cm, Field 11.7 kG } at 0.3×10^6
 AVERAGE FIELD at R ext 14.6 kG } Ampere turns
 B max/

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) MJ
 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 tons
 COOLING system demineralized water
 ION ENERGY (bending limit) E/A = 32 q²/a² MeV/amu
 (focusing limit) E/A = 30 q²/a² MeV/amu

ACCELERATION SYSTEM

DEES, number 1x180; angle deg
 BEAM APERTURE 3 cm; DC Bias kV
 TUNED by, coarse short plate fine var. cap.
 RF 10 to 22 MHz, stable $\pm 1 \times 10^{-6}$
 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 rooms
 STATIONS served at same time, max
 MAG SPECTROGRAPH, type
 COMPUTER model
 OTHER FACILITIES

CHARACTERISTIC BEAMS

PARTICLE	ENERGY (MeV)		CURRENT (pμA)	
	Goal	Achieved	Internal	External
p	10-30	10-30		30
d	10-16	20		
α	20-32	40		

SECONDARY (part/s)

BEAM PROPERTIES

MEASURED CONDITIONS
 PULSE WIDTH RF deg pμA of MeV ions
 PHASE EXC, max RF deg pμA of MeV ions
 EXTRACT eff 50-80 % pμA of 10-30 MeV ions
 RESOL ΔE/E 0.43 % pμA of 15-30 MeV ions
 EMITTANCE -0-7
 (π mm. mrad) { axial } pμA of MeV ions
 { rad }

OPERATING PROGRAMS, time distribution
 BASIC NUCLEAR PHYSICS SOLID STATES PHYSICS
 BIOMEDICAL APPLICAT. ISOTOPE PRODUCTIONS

REFERENCES/NOTES

PLAN VIEW OF FACILITY, NOTEWORTHY FEATURES, COMMENTS