

NAME OF MACHINE SARA Injector DATE April 1989
 INSTITUTION INSTITUT DES SCIENCES NUCLEAIRES
 ADDRESS 53, Avenue des Martyrs 38026 GRENOBLE Cedex FRANCE
 TEL 76.28.40.00 TELEX 320301F TELECOPIE 76.28.40.04
 IN CHARGE D. BARNEQUOUD/M. FRUINEAU REPORTED BY M. FRUINEAU

HISTORY AND STATUS

DESIGN, date 1962 Model tests 1963
 ENG DESIGN, date 1963-1965
 CONSTRUCTION, date 1963-1967
 FIRST BEAM, date (or goal) July 1968
 MAJOR ALTERATIONS

COST, ACCELERATOR \$2.10⁶
 COST, FACILITY, total \$6.10⁶
 FUNDED BY I.N2.P3/C.N.R.S.

ACCELERATOR STAFF, OPERATION AND DEVELOPMENT
 SCIENTISTS 1 ENGINEERS 9
 TECHNICIANS 28 CRAFTS 1

GRAD STUDENTS involved during year
 OPERATED BY Research staff or 9 Operators
 OPERATION 144 hr/wk, On target 130 hr/wk
 TIME DISTR. in house % Outside %
 BUDGET, op & dev \$10⁶ Total SARA
 FUNDED BY I.N2.P3/C.N.R.S.

RESEARCH STAFF, not included above
 USERS, in house LYON 60 outside 40
 GRAD STUDENTS involved during year 10
 RESEARCH BUDGET, in house \$0.16.10⁶
 FUNDED BY I.N2.P3/C.N.R.S.

MAGNET
 POLE FACE, diameter (compact) 212 cm, R extraction cm
 R injection 4 cm
 GAP, min 16 cm, Field 19 kG }
 max 36 cm, Field 12 kG } at .360.10³
 AVERAGE FIELD at R ext 16 kG } Ampere turns
 B max/ 1.2

NUMBER OF SECTORS { compact 4 } Spiral, max 40 deg
 separated }
 SECTOR ANGLE (SSC) deg
 TRIMMING COILS 11 circular
 4 harmonic

CONDUCTOR, material and type Copper 18 x 13 mm bore 0.10
 STORED ENERGY (cryogenic) MJ
 POWER: main coils 270 max, kW; current stability 1.10⁻⁵
 trimming coils 10 max, kW; current stability 1.10⁻⁵
 WEIGHT: Fe 200 tons; coils 2 tons
 COOLING system Water
 ION ENERGY (bending limit) E/A = .90 q²/a² MeV/amu
 (focusing limit) E/A = q²/a² MeV/amu

ACCELERATION SYSTEM
 DEES, number 2; angle 80 deg
 BEAM APERTURE 4 cm; DC Bias kV
 TUNED by, coarse 2 panels fine 8
 RF 10.5 to 20 MHz, stable ± 10
 Orb F 3.5 to 15 MHz
 HARMONICS, RF/Orb F, used (1), 2, 3
 DEE - Gnd, max 60 kV, min gap 4 cm
 STABILITY, (pk-pk noise)/(pk RF volt) 10
 ENERGY GAIN, max 240 kV/turn
 RF PHASE, stable to ± 0.10 deg
 RF POWER input, max 2 x 30 kW
 FREQUENCY MODULATION, rate /s
 modulator, type
 beam pulse, width

VACUUM SYSTEM
 OPERATING PRESSURE 10⁻⁶ Torr or mbar
 PUMPS, No, Type, Size 2 NRC oil diffusion

ION SOURCES
 2 ECR external

INJECTION SYSTEM

Pseudo cylindrical inflector for axial injection

EXTRACTION SYSTEM

Electrostatic deflector + magnetic channel

FACILITIES FOR RESEARCH

SHIELDED AREA, fixed 300 m²; movable 500 m²
 TARGET STATIONS 7 in 6 rooms
 STATIONS served at same time, max 1
 MAG SPECTROGRAPH, type Narrow band 0.9 GeV/C
 COMPUTER model 68010 based VME Multiprocessor system
 OTHER FACILITIES Helium jet on line isotope separator
 0.2-5 m reaction chamber
 4 π particle multidetector

CHARACTERISTIC BEAMS

PARTICLE	ENERGY (MeV)		CURRENT (pA)	
	Goal	Achieved	Internal	External
20 Ne ⁶⁺		5.3 MeV/A		2.4 eμA
40 Ca ¹¹⁺		6.8 MeV/A		1.5 eμA

SECONDARY

(part/s)

BEAM PROPERTIES

MEASURED CONDITIONS
 PULSE WIDTH 5 RF deg 5 μA of 63 MeV C³⁺ ions
 PHASE EXC, max RF deg μA of MeV ions
 EXTRACT eff 70 % 5 μA of 63 MeV C³⁺ ions
 RESOL ΔE/E 0.4 % μA of MeV ions
 EMITTANCE
 (π mm. mrad) { 15 axial } 5 μA of 63 MeV C³⁺ ions
 { 17 rad }

OPERATING PROGRAMS, time distribution
 BASIC NUCLEAR PHYSICS 90 % SOLID STATES PHYSICS 10. %
 BIOMEDICAL APPLICAT. ISOTOPE PRODUCTIONS

REFERENCES/NOTES

- Annales de radioelectricité TXXI April 1966 p. 121-150
 New developments at SARA, these proceedings.

PLAN VIEW OF FACILITY, NOTEWORTHY FEATURES, COMMENTS

See following entry.

