

ENTRY No. 18

NAME OF MACHINE S.A.R.A. DATE July 15th, 1981
 INSTITUTION INSTITUT DES SCIENCES NUCLEAIRES
 ADDRESS 53, avenue des Martyrs 38026 GRENOBLE CEDEX - FRANCE
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 IN CHARGE J.M. LOISEAUX REPORTED BY J.M. LOISEAUX

HISTORY AND STATUS

DESIGN, date 1976 Model tests 1977
 ENG DESIGN, date 1977
 CONSTRUCTION, date 1978 - 1981
 FIRST BEAM, date (or goal) Autumn 1981
 MAJOR ALTERATIONS

COST, ACCELERATOR \$ 1.6 10⁶
 COST, FACILITY, total \$ 6 10⁶
 FUNDED BY I.N2.P3. / CNRS

ACCELERATOR STAFF, OPERATION AND DEVELOPMENT
 SCIENTISTS 1 ENGINEERS 10
 TECHNICIANS 30 CRAFTS 4

GRAD STUDENTS involved during year
 OPERATED BY Research staff or Operators
 OPERATION hr/wk, On target hr/wk
 TIME DISTR. in house 5 % , Outside %
 BUDGET, op & dev 6.10 \$ (including injector)
 FUNDED BY I.N2.P3. / CNRS

RESEARCH STAFF, not included above
 USERS, in house 50 outside 10
 GRAD STUDENTS involved during year 4
 RESEARCH BUDGET, in house
 FUNDED BY I.N2.P3. / CNRS

MAGNET
 POLE FACE, diameter (compact) cm, R extraction 2000 cm
 R injection <88> cm
 GAP, min 6 cm, Field 16.5 kG }
 max cm, Field kG } at 100.10³
 AVERAGE FIELD at R ext kG } Ampere turns
 B max/

NUMBER OF SECTORS { compact } Spiral, max deg
 separated 4 }
 SECTOR ANGLE (SSC) 48 deg
 TRIMMING COILS 15 pole face + 2 harmonics

CONDUCTOR, material and type Copper 14 x 14 Ø 7
 STORED ENERGY (cryogenic) MJ
 POWER: main coils 400 max, kW ; current stability 4.10⁻⁶
 trimming coils 20 max, kW ; current stability 5.10⁻⁵
 WEIGHT: Fe 400 tons ; coils 5 tons
 COOLING system water
 ION ENERGY (bending limit) E/A = 1.60 q²/a² MeV/amu
 (focusing limit) E/A = q/a MeV/amu

ACCELERATION SYSTEM
 DEES, number 2 ; angle 34 deg
 BEAM APERTURE 3 cm ; DC Bias kV
 TUNED by, coarse 2 x 2 pannels
 RF 21 to 32 MHz, stable ± 10⁻⁶
 Orb F 3.5 to 8 MHz
 HARMONICS, RF/Orb F, used 4, 5, 6
 DEE - Gnd, max 100 kV, min gap cm
 STABILITY, (pk-pk noise)/(pk RF volt) 10⁻⁴
 ENERGY GAIN, max 400 kV/turn
 RF PHASE, stable to ± .1 deg
 RF POWER input, max 2 x 60 kW
 FREQUENCY MODULATION, rate /s
 modulator, type
 beam pulse, width

VACUUM SYSTEM
 OPERATING PRESSURE 5.10⁻⁷ Torr or mbar
 PUMPS, No, Type, Size 6 oil diffusion 5000 l/s

ION SOURCES
 See S.A.R.A. Injector

INJECTION SYSTEM

Compact Cyclotron

EXTRACTION SYSTEM

2 Electrostatic deflectors+ 1 magnetic

FACILITIES FOR RESEARCH

SHIELDED AREA, fixed 300 m²; movable 500 m²
 TARGET STATIONS 6 in 7 rooms
 STATIONS served at same time, max 1
 MAG SPECTROGRAPH, type Narrow range 0.9 GeV/C
 COMPUTER model PDP 11/34 on line + PDP 11/34
 OTHER FACILITIES

CHARACTERISTIC BEAMS

PARTICLE	ENERGY (MeV)		CURRENT (µA)	
	Goal	Achieved	Internal	External
16 O +	40	MeV/A		
20 Ne 10 +	40	MeV/A		
40 Ar	19	MeV/A		

SECONDARY (part/s)

BEAM PROPERTIES

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

OPERATING PROGRAMS, time distribution

BASIC NUCLEAR PHYSICS .. SOLID STATES PHYSICS ..
 BIOMEDICAL APPLICAT. ISOTOPE PRODUCTIONS ..

REFERENCES/NOTES

9th Internal Conference on Cyclotrons and their
 applications 1981

PLAN VIEW OF FACILITY, NOTEWORTHY FEATURES, COMMENTS

Injector is described in entry n° 17.