Entry: C 20 **Date:** june 1998

Machine Name: SARA (post-accelerator) **Institution:** IN2P3/CNRS

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HISTORY

Design by: ISN

Construction time: 1978-1981

First beam: 1981

CHARACTERISTIC BEAMS

ions / energy (MeV/n) / **current** (pps) / **power** (W) :

- $_{20}Ne^{10+}$ /38 MeV/n 4.10^{11} pps
- $_{32}S^{15+}$ / 26 MeV/n $1.3\ 10^{11}$ pps
- $_{40}Ca^{18+}$ / 34 MeV 4.10^{10} pps
- $_{84}Kr^{26+}$ / 13 MeV/n $4.8\ 10^{10}$ pps

transmission efficiency (total)

- **typical:** 70% - **best:** 70 %

transverse emittance (rms)

- **vertical:** 10 π mmmrad
- **horizontal:** 20 π mmmrad

longitudinal emittance (rms) 0.5 % ΔE/E,. 10 deg RF

USES

basic research: % **therapy:** %

development: % **isotope production:** %

other applications: % **maintenance:** %

beam tuning: %

total time: h/year

TECHNICAL DATA

a) magnet

type: 4 separated sectors

Kb: 160 MeV/n **Kf:** MeV/n

average field (min-max): 0.9 (0/1.6) T

number of magnet sectors: 4

- **angle:** 48 deg
- **spiral (max):** 0 deg

pole parameters

- **diameter:** m
- **injection radius:** 0.9 m
- **extraction radius:** 2.14 m

hill gap: 0.06 m **valley gap:** - m

field trimming

- **trim coils**
  - **number:** 15
  - **current (max):** 200 A
- **harmonic coils**
  - **number:** 2
  - **current (max):** 200 A
- **others**
  - **number:**
  - **current (max):** A

main coils:

- **number:** 4
- **Ampere-turns:** 128000 A.T.
- **current:** 900 A

stored energy: MJ

weight : - **iron:** 400 t - **coils:** t

power

- **main coils (total):** 200 kW
- **trim coils (total max):** kW
- **refrigerator (cryogenic):** kW

b) RF

- acceleration

- **frequency range:** 20 to 32 MHz
- **harmonic modes:** 4.6
- **number of dees:** 4
- **angular aperture:** 34 deg
- **voltage:- average (min-max):** 50 kV
  - **variation with radius:**
- **power in (max):** 30 kW
- **stability: - phase:** 0.1 deg **voltage:** 0.01 %

- other cavities

- **purpose:**
- **frequency range:** MHz
- **region of influence:** m
- **voltage (max):** kV
- **power in (max):** kW
- **stability:- phase:** deg - **voltage:** %

c) injection

- internal source:

- external (radial/axial): see SARA injector

- **elements:** 3 magnets + 1 electrostatic channel
- **source voltage:** kV
- **injection energy:** 2 to 8 MeV/n
- **buncher:**

- injection efficiency: 75 %

d) ion sources/injector

SARA cyclotron

e) extraction

- elements, characteristics:

- 1 electrostatic channel
- 1 magnetic channel
-
-

- efficiency

- **typical:** 75 % - **best:** %

f) vacuum

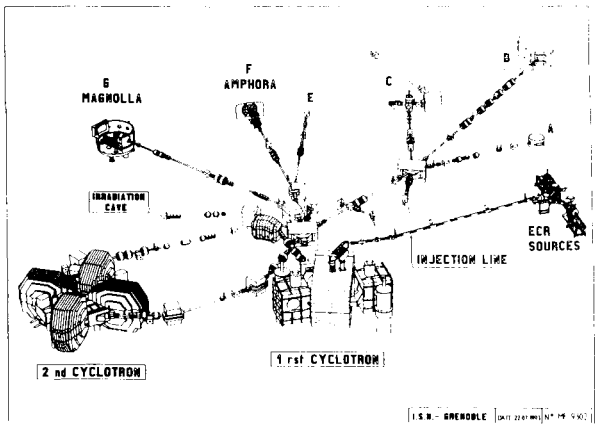
- **pumps:** Cryogenic 6X CTI CT320
- **achieved vacuum** 10^{-4}Pa

REFERENCES

IEE/NS-30 N°4, August 1983

EXPERIMENTAL FACILITIES

PLAN VIEW OF FACILITY



COMMENTS

SARA post - accelerator has stopped operation in 1996