

ENTRY NO. 75

NAME OF MACHINE SIN Injector Cyclotron Date: Sept. 1986
 INSTITUTION Swiss Institute for Nuclear Research
 ADDRESS CH-5234 Villigen, Switzerland
 TEL (0)56/99'31'11. TELEX 59 276 sin ch
 IN CHARGE U. Schryber REPORTED BY T. Stambach

HISTORY AND STATUS

DESIGN, date 1967/69 Model tests 1968/71
 ENG DESIGN, date 1969/73 Philips Company
 CONSTRUCTION, date 1970/73 Netherlands
 FIRST BEAM, date (or goal) Jan. 1, 1974
 MAJOR ALTERATIONS --

COST, ACCELERATOR 14 MSFr. (1975)
 COST, FACILITY, total 134 MSFr. (1975)
 FUNDED BY Swiss Federal Government.

ACCELERATOR STAFF, OPERATION AND DEVELOPMENT

SCIENTISTS 0,5 ENGINEERS 1
 TECHNICIANS 2, CRAFTS 2
 GRAD STUDENTS involved during year

OPERATED BY Research staff or *) Operators
 OPERATION *) hr/wk. On target 60% hr/wk

TIME DISTR. in house %

BUDGET, op & dev *)

FUNDED BY *)

RESEARCH STAFF, not included above VE-mode only

USERS, in house none outside 13
 GRAD STUDENTS involved during year ca. 15

RESEARCH BUDGET, in house

FUNDED BY

MAGNET

POLE FACE, diameter (compact) 250 cm, R-extraction 105 cm
 R injection 1.5 cm

GAP, min 24 cm, Field kG
 max 45 cm, Field kG at 650'000

AVERAGE FIELD at R ext 16.5 kG Ampere turns
 B max / < B > 1.25

NUMBER OF SECTORS {compact 4 } Spiral, max 55 deg
 {separated}

SECTOR ANGLE (SSC) deg

TRIMMING COILS 12 concentric

4 sets harmonic

CONDUCTOR, material and type Al, 24x24mm, hollow

STORED ENERGY (cryogenic) MJ

POWER: main coils 400 max kW) phase stabilized

trimming coils 100 max kW) to $1 \cdot 10^{-6}$

WEIGHT: Fe 470 tons coils 20 tons

COOLING system demin. water

ION ENERGY * (Bending limit) E/A = 135 q^2/A^2 MeV/amu

(Focusing limit) E/A = 135 q/A MeV/amu

ACCELERATION SYSTEM VE- and Inj.-mode:

DEES, number 1, 180 deg

BEAM APERTURE 2 to 4 cm; DC Bias 1.5 and 0 kV

TUNED by, coarse moved short fine hydr. trimplate (cap.)

RF 4,6 to 17 & 50 MHz, stable $\pm 6E-6$ & $2E-6$

Orb F 4,6 to 17 MHz

HARMONICS, RF/Orb F, used 1,3 VE-mode; 3 Inj.-mode

DEE-Gnd, max 80 kV, min gap 5 cm

STABILITY, (pk-pk noise)/(pk RF volt) E=2 & 2E=4

ENERGY GAIN, max 160 kV/turn

RF PHASE, stable to ± 1 deg. & ≤ 0.1 deg

RF POWER input, max 100 kW

FREQUENCY MODULATION, rate /s

modulator, type

beam pulse, width

VACUUM SYSTEM

OPERATING PRESSURE without gas: $1E-6$ Torr or mbar

PUMPS, No, Type, Size cryogenic panel (Philips)

20'000 l/s oil-diff. pump (Balzers)

12'000 l/s oil-diff. pump (Balzers)

ION SOURCES

Livingston, W-filament with LaB₆-pellet

Atomic beam pol. p, d; ANAC ionizer

INJECTION SYSTEM

axial injection system, magn. quad.

EXTRACTION SYSTEM

electrostatic, electromagn. and passive magn.

FACILITIES FOR RESEARCH VE-mode only

SHIELDED AREA, fixed 500 m²; movable -- m²

TARGET STATIONS 7 in 2 rooms

STATIONS served at same time, max 1

MAG SPECTROGRAPH, type

COMPUTER model PDP.11/40

OTHER FACILITIES

CHARACTERISTIC BEAMS

PARTICLE ENERGY (MeV) CURRENT (pμA)

Inj.-mode p Goal Achieved Internal External

VE-mode p 10-72 25-60 20-50

α 20-130 20-120 4 3

¹⁴N⁺⁺⁺⁺ 100 10 nA

SECONDARY (part/s)

*) see SIN 590 MeV Ring Cyclotron (this compilation)

PLAN VIEW OF FACILITY: see next entry
 SIN 590 MeV Ring Cyclotron