

ENTRY No. 35

NAME OF MACHINE A.V.F. CYCLOTRON - MILAN DATE JULY 1981
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HISTORY AND STATUS

DESIGN, date 1961 Model tests 1961-62
ENG DESIGN, date 1961-62
CONSTRUCTION, date 1961-62
FIRST BEAM, date (or goal) int: 1965 - ext 1965
MAJOR ALTERATIONS NEW DEE 1967

COST, ACCELERATOR 7.10^5
COST, FACILITY, total 1.10^6
FUNDED BY INFN - MINISTRY OF PUBLIC EDUCATION

ACCELERATOR STAFF, OPERATION AND DEVELOPMENT

SCIENTISTS 5 ENGINEERS 2
TECHNICIANS 5 CRAFTS 7
GRAD STUDENTS involved during year 3
OPERATED BY Research staff or 4 Operators
OPERATION 120 hr/wk, On target 100 hr/wk
TIME DISTR. in house 70 % Outside 30 %
BUDGET, op & dev 200.00/yr
FUNDED BY I.N.F.N.

RESEARCH STAFF, not included above

USERS, in house 6 outside 8
GRAD STUDENTS involved during year 5
RESEARCH BUDGET, in house 2 x 10^5
FUNDED BY I.N.F.N.

MAGNET

POLE FACE, diameter (compact) 166 cm, R extraction 72 cm
R injection cm
GAP, min 11 cm, Field 19.5 kG
max 31 cm, Field 8 kG } at 3.6.10^5
AVERAGE FIELD at R ext 13.9 kG } Ampere turns
B max/ <B> 1.47
NUMBER OF SECTORS { compact 3 } Spiral, max deg
{ separated }
SECTOR ANGLE (SSC) deg
TRIMMING COILS none in USE

CONDUCTOR, material and type
STORED ENERGY (cryogenic) MJ
POWER: main coils 80 max, kW; current stability 10
trimming coils max, kW; current stability
WEIGHT: Fe 181 tons; coils tons
COOLING system WATER
ION ENERGY (bending limit) E/A = p. only. q^2/a^2 MeV/amu
(focusing limit) E/A = q/a MeV/amu

ACCELERATION SYSTEM

DEES, number 1; angle 170 deg
BEAM APERTURE 4 cm; DC Bias kV
TUNED by, coarse MP AUTO fine VC AUTO
RF 15 to 22 MHz, stable +/- 10
Orb F 19 to 21 MHz
HARMONICS, RF/Orb F, used h = 1
DEE - Gnd, max 50 kV, min gap 4 cm
STABILITY, (pk-pk noise)/(pk RF volt) 3.10^-4
ENERGY GAIN, max 100 kV/turn
RF PHASE, stable to +/- 10 deg
RF POWER input, max 30 kW
FREQUENCY MODULATION, rate /s
modulator, type
beam pulse, width

VACUUM SYSTEM

OPERATING PRESSURE 2.10^-6 Torr or mbar
PUMPS, No, Type, Size 3 x 10,000 liters/sec
Diffusion pumps

ION SOURCES

H internal ion source

INJECTION SYSTEM

EXTRACTION SYSTEM

STRIPPING OF H BEAMS

FACILITIES FOR RESEARCH

SHIELDED AREA, fixed m^2; movable 600 m^2
TARGET STATIONS 7 in 6 rooms
STATIONS served at same time, max 1
MAG SPECTROGRAPH, type
COMPUTER model PDP 11-45
OTHER FACILITIES HIGH LEVEL ISOTOPE PRODUCTION
VAULT - ANALYSING MAGNET E/E = 3.10^-4

CHARACTERISTIC BEAMS

Table with columns: PARTICLE, ENERGY (MeV), CURRENT (pA) Internal, External. Rows for H- and P- ions.

SECONDARY

(part/s)

BEAM PROPERTIES

MEASURED CONDITIONS
PULSE WIDTH 7.25 RF deg 10^-3 pA of 18-45 MeV H- ions
PHASE EXC, max 70 RF deg 10^-3 pA of 30 MeV H- ions
EXTRACT eff 100 % 1 pA of 18-45 MeV H- ions
RESOL Delta E/E 5 % 1 pA of 30 MeV H- ions
EMITTANCE
(pi mm. mrad) { 40 axial } 1 pA of 30 MeV H- ions
{ 35 rad }

OPERATING PROGRAMS, time distribution (%)

BASIC NUCLEAR PHYSICS 70 SOLID STATES PHYSICS
BIOMEDICAL APPLICAT. 5 ISOTOPE PRODUCTIONS 20
MACHINE DEVELOPMENT: 5%

REFERENCES/NOTES

PLAN VIEW OF FACILITY, NOTEWORTHY FEATURES, COMMENTS

Beam pulsing device (selection of 1 out 2, 3, 4, 5 pulses allowed) installed end of 1979.