

ENTRY NO. 42

NAME OF MACHINE MILAN SUPERCONDUCTING CYCLOTRON
INSTITUTION UNIVERSITY OF MILAN - INFN (ITALIAN NATIONAL INSTITUT FOR NUCLEAR PHYSICS)
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IN CHARGE E. ACERBI REPORTED BY E. ACERBI

HISTORY AND STATUS

DESIGN, date 1975-76 Model tests 1977
ENG DESIGN, date 1979
CONSTRUCTION, date Started Feb, 1981
FIRST BEAM, date (or goal) 1988 (goal)
MAJOR ALTERATIONS

COST, ACCELERATOR \$ 5.10^6
COST, FACILITY, total \$ 10.10^6
FUNDED BY INFN

ACCELERATOR STAFF, OPERATION AND DEVELOPMENT

SCIENTISTS ENGINEERS
TECHNICIANS CRAFTS
GRAD STUDENTS involved during year
OPERATED BY Research staff or Operators
OPERATION hr/wk, On target hr/wk
TIME DISTR, in house %, outside %
BUDGET, op & dev
FUNDED BY

RESEARCH STAFF, not included above

USERS, in house outside
GRAD STUDENTS involved during year
RESEARCH BUDGET, in house
FUNDED BY

MAGNET

POLE FACE, diameter (compact) 180 cm, R-extraction 86.7 cm
R injection 16-25 cm
GAP, min 8.6 cm, Field 56 kG
max 91.6 cm, Field 40 kG at 6.55.10^6
AVERAGE FIELD at R ext 48 kG Amperre turns
B max / < B > 1.17

NUMBER OF SECTORS {compact 3 separated } Spiral, max 69 deg

SECTOR ANGLE (SSC) deg
TRIMMING COILS 20 Conductor; copper 6x6 mm^2
3 mm hole
CONDUCTOR, material and type Main coil; NbTi in Cu matrix
STORED ENERGY (cryogenic) 40 MJ
POWER: main coils 0 max kW: current stability 10^-5
trimming coils 60 max kW: current stability 10^-4
WEIGHT: Fe 176 tons: coils 9.7 tons
COOLING system LHe bath
ION ENERGY (Bending limit) E/A = .800 q^2/A^2 MeV/amu
(Focusing limit) E/A = .200 q/A MeV/amu

ACCELERATION SYSTEM

DEES, number 3 angle 58 deg
BEAM APERTURE 2.5 cm; DC Bias kV
TUNED by, coarse Short circuit fine Tuning capacitor
RF 15 to 49 MHz, stable +/- 1 10^-6
Orb F 5 to 24.1 MHz
HARMONICS, RF/Orb F, used 1 and 2
DEE-Gnd, max 100 kV, min gap 1.5 cm
STABILITY, (pk-pk noise)/(pk RF volt) 10^-4
ENERGY GAIN, max 600 x (Z/A) kV/turn
RF PHASE, stable to +/- 2 deg
RF POWER input, max 180 kW
FREQUENCY MODULATION, rate /s
modulator, type
beam pulse, width

VACUUM SYSTEM

OPERATING PRESSURE 10^-7 Torr or mbar
PUMPS, No, Type, Size 4 Cryopumps

ION SOURCES

ECR external source

INJECTION SYSTEM

Radial from 16 MV Tandem and axial from ECR source.

EXTRACTION SYSTEM

Electrostatic deflectors (2) - Magnetic channels (7)

FACILITIES FOR RESEARCH

SHIELDED AREA, fixed m^2; movable m^2
TARGET STATIONS in rooms
STATIONS served at same time, max
MAG SPECTROGRAPH, type
COMPUTER model
OTHER FACILITIES

CHARACTERISTIC BEAMS

Table with columns: PARTICLE, ENERGY (MeV) Goal, Achieved, CURRENT (pA) Internal, External. Rows include q/A=0.5, 100 MeV/n, 10^12 pps and U^38+, 20 MeV/n, 10^11 pps.

BEAM PROPERTIES

Table with columns: MEASURED, CONDITIONS. Rows include PULSE WIDTH, PHASE EXC, EXTRACT eff, RESOL DELTA E/E, EMITTANCE.

OPERATING PROGRAMS, time distribution

BASIC NUCLEAR PHYSICS SOLID STATES PHYSICS
BIOMEDICAL APPLICAT ISOTOPE PRODUCTIONS

REFERENCES/NOTES

- 1) E. Acerbi et al. IX Int. Conf. on Cycl. 169 (1981)
2) E. Acerbi et al. X Int. Conf. on Cycl. 251 (1984)

PLAN VIEW OF FACILITY, COMMENTS, ETC.