

ENTRY No. 42

NAME OF MACHINE . ISPRA CYCLOTRON DATE
INSTITUTION . JOINT RESEARCH CENTRE - ADVANCED MATERIALS INSTITUTE
ADDRESS . . . 21020 ISPRA (VA) ITALY
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IN CHARGE . . . CASTIGLIONI, M REPORTED BY . . . CASTIGLIONI, M

HISTORY AND STATUS

DESIGN, date Model tests
ENG DESIGN, date . . . MC-40 SCANDITRONIX
CONSTRUCTION, date
FIRST BEAM, date (or goal) . . . 1982
MAJOR ALTERATIONS

COST, ACCELERATOR . . . 9×10^6 SKR
COST, FACILITY, total . . . 1.1×10^7 SKR (EXCL. BLD.)
FUNDED BY . . . E.E.C.

ACCELERATOR STAFF, OPERATION AND DEVELOPMENT
SCIENTISTS . . . 1 ENGINEERS . . . 2
TECHNICIANS . . . 1 CRAFTS . . . 2

GRAD STUDENTS involved during year
OPERATED BY Research staff or . . . 5 Operators
OPERATION 55 . . . hr/wk, On target . . . 44 . . . hr/wk
TIME DISTR. in house 70%, Outside 30%
BUDGET, op & dev . . . 2.0×10^5 ECU
FUNDED BY . . . E.E.C.

RESEARCH STAFF, not included above
USERS, in house . . . 6 outside 6
GRAD STUDENTS involved during year
RESEARCH BUDGET, in house . . . 4.5×10^5 ECU
FUNDED BY . . . E.E.C.

MAGNET
POLE FACE, diameter (compact) 135. cm, R extraction 50. cm
R injection cm
GAP, min . . . 10. cm, Field . . . 21.2. kg }
max . . . 18. cm, Field . . . 13.3. kg } at 241,000.
AVERAGE FIELD at R ext . . . 17.9. kg } Ampere turns
B max/ < B > . . . 1.19

NUMBER OF SECTORS { compact . . . 3 . . . } Spiral, max 45 deg
SECTOR ANGLE (SSC) deg

TRIMMING COILS . . . A CIRCULAR COILS
A SETS OF HARMONIC COILS
CONDUCTOR, material and type . . . Cu

STORED ENERGY (cryogenic) MJ
POWER : main coils . . 100. max, kW ; current stability 10^{-5}
trimming coils . . 10. max, kW ; current stability 10^{-4}

WEIGHT : Fe . . . 67. tons ; coils . . 2.4 tons
COOLING system . . . DEMINERALIZED WATER
ION ENERGY (bending limit) E/A = . . 40 . . . q²/a² MeV/amu
(focusing limit) E/A = q²/a² MeV/amu

ACCELERATION SYSTEM

DEES, number . . . 2 ; angle . . . 90 deg
BEAM APERTURE . . . 2 cm ; DC Bias . . . 0 kV
TUNED by, coarse . . . MOV. SHORT fine . . . VAR. CAPACITOR
RF . . . 12.5 . . . to . . . 27 mHz, stable $\pm 10^{-6}$
Orb F . . . 6.25 . . . to . . . 27 mHz
HARMONICS, RF/Orb F, used . . . 1 AND 2
DEE - Gnd, max . . 44. . . kV, min gap cm
STABILITY, (pk-pk noise)/(pk RF volt) . . . 10^{-3}
ENERGY GAIN, max . . . 176 kV/turn
RF PHASE, stable to \pm . . . 0.5 deg
RF POWER input, max . . . 60 kW
FREQUENCY MODULATION, rate /s
modulator, type
beam pulse, width . . . 15 - 20 deg

VACUUM SYSTEM

OPERATING PRESSURE . . . 2×10^{-6} Torr or mbar
PUMPS, No, Type, Size . . . 2 TURBO. MOLECULAR
LEYBOLD HERAEUS TYPE 3500

ION SOURCES

INTERNAL COLD CATHODE, AXIALLY MOUNTED

INJECTION SYSTEM

EXTRACTION SYSTEM

ELECTROSTATIC DEFLECTOR, MAGNETIC CHANNEL

FACILITIES FOR RESEARCH

SHIELDED AREA, fixed . . 280 m² ; movable m²

TARGET STATIONS 6. in . . . 3 rooms

STATIONS served at same time, max . 1

MAG SPECTROGRAPH, type

COMPUTER model

OTHER FACILITIES . HELIUM JET COOLING SYSTEM FOR TARGET

CHARACTERISTIC BEAMS

PARTICLE	p	ENERGY (MeV)		CURRENT (pA)	
		Goal	Achieved	Internal	External
PROTONS		38	100	65	65
DEUTERONS		19	100	65	65
ALPHAS		38	60	30	30

SECONDARY (part/s)

BEAM PROPERTIES

MEASURED	CONDITIONS		
	RF deg	pA of	MeV . . . ions
PULSE WIDTH			
PHASE EXC, max			
EXTRACT eff			
RESOL $\Delta E/E$			
EMITTANCE			

(π mm. mrad) { axial } pA of MeV . . . ions
rad

OPERATING PROGRAMS, time distribution
BASIC NUCLEAR PHYSICS SOLID STATES PHYSICS
BIOMEDICAL APPLICAT. 5% . . . ISOTOPE PRODUCTIONS 10%
RADIATION DAMAGE AND ALPHA IMPLANTATION IN FUSION
REACTOR MATERIALS 85%
REFERENCES/NOTES

PLAN VIEW OF FACILITY, NOTEWORTHY FEATURES, COMMENTS