

ENTRY NO. 6

NAME OF MACHINE IEA Isochronons, Variable Energy Cyclotron DATE 1/5/79
INSTITUTION Instituto de Energia Atômica
ADDRESS C.P. - 11.049 - Pinheiros CEP-05508 - SÃO PAULO - BRASIL

IN CHARGE Prof. Dr. R.R. Pieroni REPORTED by Dr. G. Lucki

HISTORY AND STATUS

DESIGN, date before 70 MODEL tests July 1977
ENG. DESIGN, date 1971
CONSTRUCTION, date 1976 - 1977
FIRST BEAM date (or goal) Sept. 1979 (goal)
MAJOR ALTERATIONS none

OPERATION, 40(*) hr/wk; On Target 20-30(*) hr/wk
TIME DIST., in house 100 %, outside _____ %
USERS' SCHEDULING CYCLE 12 weeks
COST, ACCELERATOR \$ 1,1 x 10⁶
COST, FACILITY, total \$ 2,0 x 10⁶
FUNDED BY São Paulo State Government
Brasil

ACCELERATOR STAFF, OPERATION and DEVELOPMENT

SCIENTISTS 2 ENGINEERS 2
TECHNICIANS 4 CRAFTS -
GRAD STUDENTS involved during year _____
OPERATED BY _____ Res staff or 2 Operators
BUDGET, op & dev _____
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RESEARCH STAFF, not included above

USERS, in house 8 outside -
GRAD STUDENTS involved during year 2 - 4
RES. BUDGET, in house _____
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FACILITIES FOR RESEARCH

SHIELDED AREA, fixed 84 m²
movable 158 m²
TARGET STATIONS 3 in 3 rooms
STATIONS served at same time, max 1
MAG SPECTROGRAPH, type _____
COMPUTER, model _____
OTHER FACILITIES 1 Sample holder for
radioisotope production -
In project stage: 1 irradiation
device for Radiation Damage Studies
in Metals and Alloys.

REFERENCES/NOTES

(=) - programmed operation time

MAGNET

POLE FACE diameter 96 cm; R extraction 42 cm
GAP, min 5.6 cm; Field 21 kG } at _____ X 10⁶
max _____ cm; Field _____ kG } ampere turns
AVERAGE FIELD at R ext 18,5 kG
CURRENT STABILITY 10 parts/10⁶; B_{max}/(kB) _____
NUMBER OF SECTORS 3; SPIRAL, max 50 deg
POLE FACE COIL PAIRS: AVF _____ /sec;
Harmonic correction 3
Rad grad 120 /sec or Circ coils _____
WEIGHT: Fe 23 tons; Coils 1.14 tons
CONDUCTOR, Material and type Cu
STORED ENERGY _____ MJ
COOLING SYSTEM Demineralized Water
POWER: Main coils 60 max, kW
Trimming coils _____ max, kW
YOKE/POLE AREA _____ %
SECTOR ANGLE (Sep Sec) _____ deg
ION ENERGY (Bending limit) E/A = _____ q²/A² MeV
(Focusing limit) E/A = _____ q/A MeV

ACCELERATION SYSTEM

DEES, number 2 angle 180 deg
BEAM APERTURE 2 cm; DC BIAS 2.5 kV
TUNED by, coarse MSP fine V C
RF 6.0 to 25.5 MHz, stable ± 40 /10⁶
Orb F _____ to _____ MHz; GAIN, max 100 kV/turn
HARMONICS, RF/Orb F, used _____
DEE-Gnd, max _____ kV, min gap _____ cm
STABILITY, (pk-pk noise)/(pk RF volt) _____
RF PHASE stable to ± _____ deg
RF POWER input, max 75 kW
RF PROTECT circuit, speed 5 μsec
Type Series Mod. Tube
FREQUENCY MODULATION, rate _____ /sec
MODULATOR, type _____
BEAM PULSE, width _____

VACUUM SYSTEM

PUMPS, No., Type, Size 2 Diff. Pumps
OPERATING PRESSURE 50 μTorr,
PUMPDOWN TIME 1 hrs

ION SOURCES/INJECTION SYSTEM

Electrostatic Injector

EXTRACTION SYSTEM

Electrostatic Deflector + electrostatic channel

CONTROL SYSTEM

ENTRY NO. 6 (cont.)

CHARACTERISTIC BEAMS

	Particle	Goal (MeV)	Achieved (MeV)
ENERGY	protons	24	
	deuterons	14	
	He ³⁺⁺	36	
	He ⁴⁺⁺	28	
CURRENT		(μA)	(μA)
	Internal		
External	protons	60	
	deuterons	100	
	He ³⁺⁺	50	
	He ⁴⁺⁺	40	
		(part/s)	(part/s)
Secondary			

BEAM PROPERTIES

	Measured	Conditions
Pulse Width	RF deg	μA of MeV
Phase Exc, max	RF deg	μA of MeV
Extract Eff	%	μA of MeV
Res, ΔE/E	%	μA of MeV
Emittance	(mm-mrad) { axial } μA of MeV	
	radial	

OPERATING PROGRAMS, time dist

Basic Nuclear Physics	10	%
Solid State Physics	---	%
Bio-Medical Applications	---	%
Isotope Production	40	%
Development	10	%
Materials Science	40	%

PLAN VIEW OF FACILITY, NOTEWORTHY FEATURES, OPERATION SUMMARY, ADDITIONAL REFERENCES

