ENTRY NO. 16

NAME OF MACHINE: Isochronous Cyclotron U-120 M

INSTITUTION: Institute of Nuclear Physics

ADDRESS: 250 68 ŘEŽ, Czechoslovakia

TEL: TELEX:

IN CHARGE: V.Bejšovec REPORTED BY: V.Bejšovec

HISTORY AND STATUS

DESIGN, date: 1969-1971 Model tests: 1971-1975

ENG DESIGN, date:

CONSTRUCTION, date: 1972-1975

FIRST BEAM, date (or goal): 1976

MAJOR ALTERATIONS:

COST, ACCELERATOR:

COST, FACILITY, total:

FUNDED BY: Czechoslovak Academy of Sciences

ACCELERATOR STAFF, OPERATION AND DEVELOPMENT

SCIENTISTS: 3 ENGINEERS: 3

TECHNICIANS: 4 CRAFTS:

GRAD STUDENTS involved during year:

OPERATED BY: Research staff or: Operators

OPERATION: 120 hr/wk. On target: 100 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): 120 cm, R-extraction: 51 cm

R injection: 0 cm

GAP, min 8.2 cm, Field 20 kG

max 22 cm, Field 16 kG } at 0.4 x 10^6 Ampere turns

AVERAGE FIELD at R ext: 18 kG

B max/<B>: 1.12

NUMBER OF SECTORS: compact 4, separated 0 Spiral, max: 70 deg

SECTOR ANGLE (SSC): deg

TRIMMING COILS:

CONDUCTOR, material and type: Cu, 18x18/ ϕ10

STORED ENERGY (cryogenic): MJ

POWER: main coils 180 max kW: current stability 2/10^5

trimming coils 160 max kW: current stability 5/10^4

WEIGHT: Fe 117 tons: coils 15 tons

COOLING system: DEMINERALIZED WATER

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

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

ACCELERATION SYSTEM

DEES, number: 1 angle: 180 deg

BEAM APERTURE: 1.8 cm; DC Bias: 0 kV

TUNED by, coarse: MP fine: VC, auto

RF: 10 to 26 MHz, stable ±: 1/10^7

Orb F: 10 to 26 MHz

HARMONICS, RF/Orb F, used: 1

DEE–Gnd, max: 50 kV, min gap: 3 cm

STABILITY, (pk-pk noise)/(pk RF volt): 1/10

ENERGY GAIN, max: 100 kV/turn

RF PHASE, stable to ±: deg

RF POWER input, max.: 100 kW

FREQUENCY MODULATION, rate: /s

modulator, type:

beam pulse, width:

VACUUM SYSTEM

OPERATING PRESSURE: 1.10^{-5} Torr or mbar

PUMPS, No, Type, Size: 2 oil diffusion pumps

ION SOURCES

Hot filament ion source

INJECTION SYSTEM

EXTRACTION SYSTEM

Electrostatic

FACILITIES FOR RESEARCH

SHIELDED AREA, fixed: 265 m², movable: m²

TARGET STATIONS: 7 in: 3 rooms

STATIONS served at same time, max:

MAG SPECTROGRAPH, type: multi-angle

COMPUTER model: M 6000 + ADT 4500

OTHER FACILITIES:

CHARACTERISTIC BEAMS

PARTICLE	ENERGY (MeV) Goal	Achieved	CURRENT (pμA) Internal	External
p	13-40	10-36, ext	80	10
d	10-20	10-20	50	10
$^4He^{2+}$	20-40	20-40	30	5
$^3He^{2+}$	17-53	17-53	10	5
SECONDARY			(part/s)	

BEAM PROPERTIES

	MEASURED		CONDITIONS			
PULSE WIDTH	30 RF deg		pμA of	MeV		ions
PHASE EXC, max	RF deg		pμA of	MeV		ions
EXTRACT eff	60 %	10	pμA of 33	MeV	p	ions
RESOL ΔE/E	0.5 %		pμA of	MeV		ions
EMITTANCE						
(π mm-mrad)	10 axial, 20 rad		pμA of	MeV		

OPERATING PROGRAMS, time distribution

BASIC NUCLEAR PHYSICS 50% SOLID STATES PHYSICS 10%

BIOMEDICAL APPLICAT. 10% ISOTOPE PRODUCTIONS 30%

REFERENCES/NOTES

1)

2)

PLAN VIEW OF FACILITY, COMMENTS, ETC.