ENTRY NO. 13

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 18.10^6 Kcs

COST, FACILITY, total 30.10^6 Kcs

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 min 22 cm, Field 16 kG
AVERAGE FIELD at R ext 18 kG
at 0.4×10^6 Ampere turns

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/ Ø 10

STORED ENERGY (cryogenic) 180 MJ

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

trimming coils 160 max, kW; current stability $5/10^4$

WEIGHT: Fe 117.5 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 1 180 deg

BEAM APERTURE 1.8 cm; DC Bias 0 kV

TUNED by, coarse MP fine VC, auto

RF 8.6 to 26.5 mHz, stable ± $0.1/10^6$

Orb F 10 to 26 mHz

HARMONICS, RF/Orb F, used .....

DEE—Gnd, max 50 kV, min gap $1/10^3$ 3 cm

STABILITY, (pk-pk noise)/(pk RF volt) .....

ENERGY GAIN, max 100 kV/turn

RF PHASE, stable to ± ..... deg

RF POWEP 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 diffusion pumps

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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 .....

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CHARACTERISTIC BEAMS

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

BEAM PROPERTIES

	MEASURED		CONDITIONS			
PULSE WIDTH	3.0	RF deg	..... pμ A of	..... MeV	.....	ions
PHASE EXC. max	.....	RF deg	..... pμ A of	..... MeV	.....	ions
EXTRACT eff	60	%	10 μ A of	33 MeV	p	ions
RESOL ΔE/E	0.5	%	..... pμ A of	..... MeV	.....	ions
EMITTANCE (π mm. mrad)	10 axial 20 rad		..... pμ A of	..... MeV	.....	

OPERATING PROGRAMS, time distribution

BASIC NUCLEAR PHYSICS 50 % SOLID STATES PHYSICS 10 %

BIOMEDICAL APPLICAT 10 % ISOTOPE PRODUCTIONS 30 %

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REFERENCES/NOTES

1)

2)

PLAN VIEW OF FACILITY, COMMENTS, ETC.