

ENTRY NO: C-25
Machine Name: Kazakhstan isochronous cyclotron U-150M
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HISTORY

Designed By: D.V. Efremov Institute, Leningrad
Construction Dates: 1965-1967
First Beam Date: 1967, 1972 (after upgrading)

CHARACTERISTIC BEAMS

ions	/ energy(MeV/N)	/current(pps)	/power(w)
protons	6-30	1,87 x 10E14	15 000
deuterons	6,2-12,5	2,5x10E14	7 500
He-3	6,2-20,6	4,5x10E13	6 200
He-4	6,2-12,5	6,25x10E13	7 500

transmission efficiency(source to extract beam)

typical: 30% - **best:** 60%

tranverse emittance

emittance definition: 50%

vertical: 16π mm mrad

horizontal: 16π mm mrad

longitudinal: 0,6%x35 deg RF(Δ) E/E)%xdeg RF

USES

basic research: 38% **therapy:** %
development: 5% **isotope production:** 40%
other: 5% **maintenance:** 10%
beam tuning: 2% **Total Time:** 1700h/year

TECHNICAL DATA

a)magnet: **type:** compact

Kb: 50MeV/A **Kf:** 30MeV/A

average field (min/max): 1,92/1,22 T

number of magnet sectors: 3

hill angular width: 60hill angular width

spiral (max): 25 deg

pole parameters

diameter: 1,5 m

injection radius: m

extraction radius: 0,665 m

hill gap: 0,21m **valley gap:** 0,35m

trim coils

-number: 9x2

-current(max): 600x9 A-turns

harmonic coils

-number: 2xNsectorsx2

-current(max): 3x1042 A-turns

main coils

number: 1x2

total ampere-turns: 1200x420 A-turns

current: 1200 A

stored energy: 0,23MJ

weight - iron: 250t **coils:** 16t

power

main coils (total): 230 kW

trim coils (total max): 50 kW

refrigerator (cryogenic): kW

b)RF

acceleration

frequency range: 8,5-19,0MHz

harmonic modes: 1-3

number of dees: 2

number of cavities: 2

dee angular width: 180degrees

voltage

at injection: kV(peak to ground, max)

at extraction: kV(peak to ground, max)

peak: 80kV(peak to ground, max)

line power(max): 200kW

stability

phase: 3 deg

voltage: 1%

injection

c)ion source: Penning type

external injection:

components:

source bias voltage: kV

injection energy: MeV/N

buncher:

injection efficiency: %

d)injector:

e)extraction

radially focusing dc deflector, magnetic channel

efficiency

typical: 30%

best: 60%

f)vacuum

pumps: diffusion

achieved vacuum: 4x10exp-4Pa

REFERENCES

A.A. Arzumanov, L.M. Nemenov, Nucl.Instr.Meth.166(1973),201

EXPERIMENTAL FACILITIES

Experimental facility for measurement of mass and energy distribution of pair fission fragments. Experimental facility for measurement of double differential cross section of nuclear reactions with emission of light charge particles.

COMMENTS