

ENTRY NO: C-42
Machine Name: PSI 590 MeV Ring Cyclotron
Date: 6/8/01 4:28:28 AM
Institution: Paul Scherrer Institute
Address CH-5232 Villigen PSI, Switzerland
In Charge of Cyclotron: Pierre A. Schmelzbach, Stefan Adam
Telephone: ++41-56-310 33 93
Fax: ++41-56-310 33 83
Person Reporting: Stefan Adam
Web: www.psi.ch
E-mail: Stefan.Adan@psi.ch

HISTORY

Designed By: H.A.Willax with PSI(former SIN)-team
Construction Dates: 1968-1974
First Beam Date: 1974
CHARACTERISTIC BEAMS

ions	/ energy(MeV/N)	/current(pps)	/power(w)
p	590	< 2mA	1.2 e6

transmission efficiency(source to extract beam)

typical: inj 99.93, extr. 99.97% - **best:** 99.97%

transverse emittance

emittance definition: rms

vertical: 1.0π mm mrad

horizontal: 1.0π mm mrad

longitudinal: $0.1*4(\Delta) E/E$ %xdeg RF

USES

basic research: 70%

therapy: 5%

development: 3%

isotope production: %

other: 5%

maintenance: 11%

beam tuning: 5%

Total Time: 6500h/year

TECHNICAL DATA

a)magnet: type: separated sectors

Kb: 592MeV/A **Kf:** 592MeV/A

average field (min/max): 0.58-0.78 T

number of magnet sectors: 8

hill angular width: 18hill angular width

spiral (max): 35 deg deg

pole parameters

diameter: 9 m

injection radius: 2.1 m

extraction radius: 4.45 m

hill gap: 0.05-0.09m **valley gap:** m

trim coils

-number: 18x2

-current(max): 30/200 A A-turns

harmonic coils

-number: 5xNsectorsx2

-current(max): 200 A A-turns

main coils

number: 8x2

total ampere-turns: $1.5 e5$ A-turns

current: 930 A

stored energy: MJ

weight - iron: 1960t **coils:** 28t

power

main coils (total): 620 kW

trim coils (total max): 30 kW

refrigerator (cryogenic): kW

b)RF

acceleration

frequency range: 50.633MHz

harmonic modes: 6

number of dees:

number of cavities: 4 single gap + 1 flattop

dee angular width: degrees

voltage

at injection: 500kV(peak to ground, max)

at extraction: 630kV(peak to ground, max)

peak: 730kV(peak to ground, max)

line power(max): $4*520$ kW

stability

phase: 0.01 deg

voltage: 0.03%

injection

c)ion source:

external injection: inj at 72 MeV

components: magnetic channel (floating shim) and electrostatic inflector

source bias voltage: kV

injection energy: 72MeV/N

buncher:

injection efficiency: 99.93%

d)injector: PSI injector 2 Cyclotron

e)extraction

electrostatic extraction channel Panowsky type magnetic focussing channel septum magnet in vacuum

efficiency

typical: 99.94%

best: 99.97%

f)vacuum

pumps: 4 cryo pumps, 4 turbopumps, 1 booster pump, 2 large
achieved vacuum: $2.7 e-4$ Pa

REFERENCES

U.Schryber et al., Proc EPAC (1992)173 U.Schryber et al., Proc. 14th Int Cycl Conf, Cape Town (1995)

EXPERIMENTAL FACILITIES

pi-meson areas, mu-mesons areas, muSr Gantry for proton therapy Neutron Spallation Source SINQ

COMMENTS

