

ENTRY NO. FM6 Date June 25/92  
 Name of Machine Synchrocyclotron on I GeV  
 Institution PNPI, Russian academy of Sciences  
 Address Gatchina, Petersburg District, 188350, Russia  
 Tel Telex Fax EMAIL  
 In Charge: N.K. Abrosimov Reported by:

**HISTORY**

MILESTONE DATES:  
 Design Model Tests  
 Construction 1967 First Beam Nov. 1967  
 DESIGN/CONSTRUCTION BY:  
 in house other  
 COST: Accelerator Facility  
 FUNDED BY:

**STATUS**

STAFF: Machine  
 Scientists Engineers  
 Technicians Students  
 Research (in house/external)  
 Scientists / Engineers /  
 Technicians / Students /  
 BUDGET: Machine Funded by  
 Research Funded by  
 TIME DISTRIBUTION:  
 Basic Research (in house/external) % / %  
 Applied Program (in house/external) % / %  
 Development % Maintenance %

**MAGNET**

POLE PARAMETERS:  
 Diameter 685 cm  $R_{extract}$  315 cm  $R_{inject}$  cm  
 HILL PARAMETERS: Gap (min) 30 cm  $B_{max}$  1.93 T  
 ( $\theta$  AT) Gap (max) 50 cm  $B_{min}$  T  
 VALLEY PARAMETERS: Gap (min) cm  $B_{max}$  T  
 ( $\theta$  AT) Gap (max) cm  $B_{min}$  T  
 AVERAGE FIELD:  $\langle B \rangle_{min}$  T  $\langle B \rangle_{max}$  1.9 T  
 NUMBER OF SECTORS: compact/separated /  
 sector angle deg. spiral (max) deg.  
 FIELD TRIMMING: Trim Coils  
 Harmonic Coils  
 Other  $10^{-5}$   
 CURRENT: Main Coils 4800 Amps Stability  $2 \cdot 10^{-5}$   
 Trim Coils Amps Stability  
 Stored Energy (cryogenic) MJ  
 WEIGHT: Iron 7800 t. Conductor 174 (Al)  
 ION ENERGY: Bending Limit  $E/A = 1000$   $q^2/A^2$  MeV/u  
 Focussing Limit  $E/A = q/A$  MeV/u

**ACCELERATION SYSTEM**

FUNDAMENTAL ACCELERATION:  
 Description: Lambda/2 one dee with rotating capacitor  
 No. of Gaps/turn 2  $dE/dn(max)$  MeV/q  
 Voltage(max) 0.010 MV Harmonic  $f_{rf}/f_{ion}$  1  
 Freq 29.13.3 MHz Power in(max) 0.2 MW  
 Stability: Phase Voltage  
 OTHER CAVITIES (Flattopping or otherwise):  
 Description: C-electrode for slow extraction  
 Region of Influence:  $R_{min}$  295 cm  $R_{max}$  320 cm  
 No. of Gaps/turn 2  $dE/dn(max)$  MeV/q  
 Voltage(max) 0.003 MV Harmonic  $f_{rf}/f_{ion}$  1  
 Freq ~13.3 MHz Power in(max) 0.002 MW  
 Stability: Phase Voltage

**VACUUM SYSTEM**

OPERATING PRESSURE:  $2 \cdot 10^{-6}$   
 PUMPS: No. and type 2 diffusion pumps on  
40000.1/s

**ION SOURCE(S)**

Type	Intensity (mA)	$\epsilon_n = \beta\gamma\epsilon$ ( $\pi$ mm mrad)	Ion Species
(a) open with cold cathod			
(b)			
(c)			
(d)			

**INJECTION SYSTEM**

Efficiency %

**EXTRACTION SYSTEM**

non-linear regenerative system Efficiency 30 %

**CHARACTERISTIC BEAMS**

Accelerated Ions	E/A (MeV/u)	Current (part $\mu$ A)	
		Internal	External
(a) P	1000	3	1
(b)			
(c)			
(d)			
Secondary Particles		E (MeV)	part/sec
(a)	+	150	$1.6 \cdot 10^7$
(b)	-	150	$5 \cdot 10^4$
(c)	+	4	$3 \cdot 10^4$

**EXTRACTED BEAM PROPERTIES:**

For  $\mu$ A of MeV/u ions  
 $\Delta E/E$  %  $\Delta\phi$  of  
 $\epsilon_n = \beta\gamma\epsilon$  x  $\pi$ mm mrad z  $\pi$ mm mrad

**FACILITIES FOR RESEARCH**

SHIELDED AREA: Fixed m<sup>2</sup> Moveable m<sup>2</sup>  
 Target Stations: No. Served At Same Time:  
 MAGNETIC SPECTROMETERS:  
 OTHER FACILITIES: Protontherapy, Isotope Production, Pi-Mu channel, SR, Time of Flight, Neutron Spectrometer, IRIS-facility for investigation isotops far from stability region

**REFERENCES/NOTES**

(a) Proc. of the VII All-Union Conference on  
 (b) Charged Particle Accel., v2, p75 (1980)

**PLAN VIEW OF FACILITY, COMMENTS**