ENTRY NO. FM-12
NAME OF MACHINE ...... Leningrad Synchrocyclotron .... DATE May 1972
INSTITUTION .... Leningrad Nuclear Physics Institute, ACAD. OF SC. USSR
ADDRESS .... Gatchina, Leningrad District, 188350 USSR
TEL .... TELEX
IN CHARGE . N.K. Abrosimon .... REPORTED BY . . N.K. Abrosimov

HISTORY AND STATUS
DESIGN, date .... Model tests
ENG DESIGN, date
CONSTRUCTION, date 1967
FIRST BEAM, date (or goal) .... Nov. 1967
MAJOR ALTERATIONS
COST, ACCELERATOR
COST, FACILITY, total
FUNDED BY

ACCELERATOR STAFF, OPERATION AND DEVELOPMENT
SCIENTISTS .... ENGINEERS
TECHNICIANS .... CRAFTS
GRAD STUDENTS involved during year
OPERATED BY .... Research staff or .... Operators
OPERATION ... 130 .... hr/wk. On target .... hr/wk
TIME DISTR. in house .... 100 %, 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) . 685 .... cm, R-extraction . 316.5 cm
R injection ..... cm
GAP, min .. 39 cm, Field .... kG
max .. 50 cm, Field .... 19 kG } at ... $1.2 \cdot 10^6$ .....
AVERAGE FIELD at R ext .... 17.86 kG ... Ampere turns
B max/< B > 1
NUMBER OF SECTORS {compact ...... / separated ......} Spiral, max ... deg
SECTOR ANGLE (SSC) .... deg
TRIMMING COILS
CONDUCTOR, material and type
STORED ENERGY (cryogenic) .... MJ
POWER: main coils . 1000 max kW: current stability 10^{-4} ...
trimming coils ..... max kW: current stability ....
WEIGHT: Fe .. 7800 .... tons: coils ..... 174 .... tons
COOLING system
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 .. 10 .... cm; DC Bias .... 3 .... kV
TUNED by, coarse .... fine
RF ..... 13.2 .. to .. 30.5 .... MHz, stable ±
Orb F ... 13.2 ..... to 28.9 .... MHz
HARMONICS, RF/Orb F, used .. 1
DEE–Gnd, max .... 10 .... kV, min gap .... cm
STABILITY, (pk-pk noise)/(pk RF volt)
ENERGY GAIN, max ... 10 .... kV/turn
RF PHASE, stable to ± .... deg
RF POWER input, max. 240 (per pulse) .... kW
FREQUENCY MODULATION, rate ..... 50 .... /s
modulator, type .. rotating capacitor
beam pulse, width . micro 20 ns, macro 0.3 ms

VACUUM SYSTEM
OPERATING PRESSURE ...... 2 µ .... Torr or mbar
PUMPS, No, Type, Size

ION SOURCES
.... Cold cathode

INJECTION SYSTEM

EXTRACTION SYSTEM
Non, linear regenerative system

FACILITIES FOR RESEARCH
SHIELDED AREA, fixed .. 2500 . m^2; movable .... m^2
TARGET STATIONS .... 9 .... in .... rooms
STATIONS served at same time, max ... 2
MAG SPECTROGRAPH, type
COMPUTER model
OTHER FACILITIES

CHARACTERISTIC BEAMS

PARTICLE	ENERGY (MeV) Goal	ENERGY (MeV) Achieved	CURRENT (pµA) Internal	CURRENT (pµA) External
p	1000	1000	0.64	0.16

SECONDARY			(part/s)
π^-			10^5
π^+			10^6

BEAM PROPERTIES

MEASURED	CONDITIONS
PULSE WIDTH . 90 RF deg	0.64 pµA of 1000 MeV . p . . . ions
PHASE EXC. max 90 RF deg	0.64 pµA of 1000 MeV . p . . . ions
EXTRACT eff . . 25 %	0.64 pµA of 1000 MeV . p . . . ions
RESOL ΔE/E . . . 1 %	.... pµA of ..... MeV ...... ions

EMITTANCE
(π mm-mrad) .... axial / .... rad .... pµA of ..... MeV ......

OPERATING PROGRAMS, time distribution
BASIC NUCLEAR PHYSICS .... SOLID STATES PHYSICS ....
BIOMEDICAL APPLICAT...... ISOTOPE PRODUCTIONS ....

REFERENCES/NOTES

1. Proc. of the Intern conf. on High Energy Acc., Yerevan 1969, V.1, p. 317, 349
2. Sov. Jour. of Tech. Phys., V. 40, p.2593; V.41,p.1222 and 1769 (1971)

PLAN VIEW OF FACILITY, COMMENTS, ETC.

1. The protonbeam is extracted by means of a wide aperture non linear regenerative system. when the extraction system was designed, the betatron oscillation spectrum present in the machine was taken into account.

2. The proton beam may be stretched by means of a cee-electrod system with a macro duty cycle 50-80%and efficiency 80-50%. Cee 60° azimuthally, frequency range 13.4 to 13.2 MHz, 2.5 kV peak, one long wave type resonance system with a ferrite modulation, DC power 2kW.