ENTRY NO. FM-11

NAME OF MACHINE Leningrad Synchrocyclotron DATE May 1972

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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 316.5cm

R injection cm

GAP, min 39 cm, Field kG
min 50 cm, Field 19 kG at $1.2\ 10^6$ Ampere turns

AVERAGE FIELD at R ext 17.86 kG

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 1 180 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 POWEP 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 m²; movable m²

TARGET STATIONS 9 in

STATIONS served at same time, max 2

MAG SPECTROGRAPH, type

COMPUTER model

OTHER FACILITIES

CHARACTERISTIC BEAMS

PARTICLE	ENERGY (MeV) Goal	Achieved	CURRENT (pμA) Internal	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 pμ A of	1000 MeV	p	ions
PHASE EXC. max	90 RF deg	0.64 pμ A of	1000 MeV	p	ions
EXTRACT eff	25 %	0.64 pμ A of	1000 MeV	p	ions
RESOL ΔE/E	1 %	pμ A of	MeV		ions
EMITTANCE (π mm. mrad)	axial / rad	pμ A 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 proton beam 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.