ENTRY No. FM-11

NAME OF MACHINE LENINGRAD SYNCHROCYCLOTRON ... Date : May 1972
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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 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 ... ; 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
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 ... rooms
STATIONS served at same time, max . 2 ...
MAG SPECTROGRAPH, type ...
COMPUTER model ...
OTHER FACILITIES ...

CHARACTERISTIC BEAMS

PARTICLE	ENERGY (MeV) Goal	Achieved	CURRENT (μA) 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	μ A of 1000 MeV	p ions
PHASE EXC, max 90 RF deg	0.64	μ A of 1000 MeV	p ions
EXTRACT eff .... 25. %	0.64	μ A of 1000 MeV	p ions
RESOL ΔE/E ..... 1. %	.....	μ A of .... MeV	... ions

EMITTANCE
(π mm. mrad) { ... axial / .... rad } ..... pμA of ..... MeV ... ions

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, NOTEWORTHY FEATURES, COMMENTS

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 2 kW.