ENTRY NO. FM-13

NAME OF MACHINE Dubna 700 MeV High Intensity Phasotron DATE August, 1978
INSTITUTION Joint Institute for Nuclear Research., Lab. of Nucl. Pr.
ADDRESS JINR, Head Post Office, POB 79, Moscow, USSR

IN CHARGE Prof. V. P. DZHELEPOV REPORTED by Prof. V. P. DZHELEPOV

**HISTORY AND STATUS**

DESIGN, date 1967 MODEL tests 1968-1974
ENG. DESIGN, date 1968-1974
CONSTRUCTION, date 1971-1978
FIRST BEAM date (or goal) 1980
MAJOR ALTERATIONS

OPERATION, 156 hr/wk; On Target _____ hr/wk
TIME DIST., in house 80 %, outside 20 %
USERS' SCHEDULING CYCLE _____ weeks
COST, ACCELERATOR _____
COST, FACILITY, total $18 \times 10^6$ rubles
FUNDED BY JINR

**ACCELERATOR STAFF, OPERATION and DEVELOPMENT**

SCIENTISTS _____ ENGINEERS _____
TECHNICIANS _____ CRAFTS _____
GRAD STUDENTS involved during year _____
OPERATED BY _____ Res staff or _____ Operators
BUDGET, op & dev _____
FUNDED BY _____

**RESEARCH STAFF, not included above**

USERS, in house 200 outside 80
GRAD STUDENTS involved during year _____
RES. BUDGET, in house _____
FUNDED BY _____

**FACILITIES FOR RESEARCH**

SHIELDED AREA, fixed 1500 $m^2$ $m^2$
movable _____ $m^2$
TARGET STATIONS 4-7 in 2 rooms
STATIONS served at same time, max 2-3
MAG SPECTROGRAPH, type _____
COMPUTER, model EC-1040, EC-1010, H.P.
OTHER FACILITIES Isotope production M-5, M-6, MU
Medico-Biological Complex,
YASNAPP.

**REFERENCES/NOTES**

**MAGNET**

POLE FACE diameter 600 cm; R extraction 270 cm
GAP, min 15-30 cm; Field 18 kG
max 120 cm; Field 12 kG
AVERAGE FIELD at R ext 16.3 kG
} at 1.7 X $10^6$ ampere turns
CURRENT STABILITY 50 parts/$10^6$; $B_{max}/\langle B \rangle$ 1.1
NUMBER OF SECTORS 4 ; SPIRAL, max 77 deg
POLE FACE COIL PAIRS: AVF 0 /sec;
Harmonic correction 3 per sector
Rad grad _____ /sec or Circ coils _____
WEIGHT: Fe 7000 tons; Coils 165 tons
CONDUCTOR, Material and type Al
STORED ENERGY about 10 MJ
COOLING SYSTEM Demineralized water
POWER: Main coils 1100 max, kW
Trimming coils _____ max, kW
YOKE/POLE AREA 58.5 %
SECTOR ANGLE (Sep Sec) - deg
ION ENERGY (Bending limit) E/A = _____ $q^2/A^2$ MeV
(Focusing limit) E/A = _____ q/A MeV

**ACCELERATION SYSTEM**

DEES, number 1 angle 180 deg
BEAM APERTURE 7-10 cm; DC BIAS 2 kV
TUNED by, coarse VC fine _____
RF 18.4 to 14.4 mHz, stable ± _____ /$10^6$
Orb F 18 to 14 mHz; GAIN, max 80 kV/turn
HARMONICS, RF/Orb F, used 1
DEE-Gnd, max 50 kV, min gap _____ cm
STABILITY, (pk-pk noise)/(pk RF volt) _____
RF PHASE stable to ± 200 deg
RF POWER input, max _____ kW
RF PROTECT circuit, speed _____ μsec
Type _____
FREQUENCY MODULATION, rate 600 /sec
MODULATOR, type _____
BEAM PULSE, width _____

**VACUUM SYSTEM**

PUMPS, No., Type, Size 3 Diffusion Pumps
OPERATING PRESSURE 8-10 μTorr,
PUMPDOWN TIME about 8 hrs

**ION SOURCES/INJECTION SYSTEM**

P.I.G. type
Axial injector & Polarized ion source

**EXTRACTION SYSTEM**

Iron-Current Channel, 70%

**CONTROL SYSTEM**

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**CHARACTERISTIC BEAMS**

| | Particle | Goal (MeV) | Achieved (MeV) |
|---|---|---|---|
| ENERGY | p | 700 | |
| | | | |
| | | | |
| | | | |
| CURRENT | | (μA) | (μA) |
| Internal | p | 50 | |
| | | | |
| | | | |
| External | p | 35 | |
| | | | |
| | | | |
| | | (part/s) | (part/s) |
| Secondary | $\pi^-$ | $66\times10^6$ | |
| | $\pi^+$ | $8\times10^8$ | |
| | n | $7\times10^7$ | |

**BEAM PROPERTIES**

| | Measured | Conditions | |
|---|---|---|---|
| Pulse Width | ____ RF deg | ____ μA of ____ MeV | ____ |
| Phase Exc, max | ____ RF deg | ____ μA of ____ MeV | ____ |
| Extract Eff | ____ % | ____ μA of ____ MeV | ____ |
| Res, ΔE/E | ____ % | ____ μA of ____ MeV | ____ |
| Emittance | | | |
| (mm-mrad) { ____ axial, ____ radial } | | ____ μA of ____ MeV | ____ |

**OPERATING PROGRAMS, time dist**

Basic Nuclear Physics ____ %
Solid State Physics ____ %
Bio-Medical Applications ____ %
Isotope Production ____ %
Development ____ %
____ %
____ %

**PLAN VIEW OF FACILITY, NOTEWORTHY FEATURES, OPERATION SUMMARY, ADDITIONAL REFERENCES**