

ENTRY NO. **FM2** Date **1 Sept. 1995**
 Name of Machine **JINR PHASOTRON**
 Institution **Joint Institute for Nuclear Research, Laboratory of Nuclear Problems**
 Address **141980 Dubna Moscow Region, Russia**
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 In Charge: **N. Russakovich** Reported by: **L. Onischenko**

HISTORY
MILESTONE DATES:
 Design 1967 Model Tests 1968-1974
 Construction 1979-1984 First Beam 1984
DESIGN/CONSTRUCTION BY:
 in house JINR other **EFREMOV INSTITUTE**
COST: Accelerator Facility **18·10⁶ roubles**
FUNDED BY: JINR

STATUS
STAFF: Machine
 Scientists 15 Engineers 24
 Technicians 41 Students
 Research (in house/external)
 Scientists / Engineers /
 Technicians / Students /
BUDGET: Machine Funded by
 Research Funded by
TIME DISTRIBUTION:
 Basic Research (in house/external) 40 % / 20 %
 Applied Program (in house/external) 15 % / %
 Maintenance 19 % Development 6 %

MAGNET
POLE PARAMETERS:
 Diameter 600 cm R_{extract} 270 cm R_{inject} cm
HILL PARAMETERS: Gap (min) 15 cm B_{max} 1.8 T
 (@ AT) Gap (max) 30 cm B_{min} T
VALLEY PARAMETERS: Gap (min) cm B_{max} 1.2 T
 (@ AT) Gap (max) cm B_{min} T
AVERAGE FIELD: _{min} 1.2 T _{max} 1.63 T
NUMBER OF SECTORS: compact/separated /
 sector angle deg. spiral (max) 77 deg.
FIELD TRIMMING: Trim Coils
 Harmonic Coils
 Other
CURRENT: Main Coils 4000 Amps Stability 2·10⁻⁴
 Trim Coils Amps Stability
 Stored Energy (cryogenic) MJ
WEIGHT: Iron 7000 tons Conductor 165 tons
ION ENERGY: Bending Limit E/A = q²/A² MeV/u
 Focusing Limit E/A = q/A MeV/u

ACCELERATION SYSTEM
FUNDAMENTAL ACCELERATION:
 Description: 180°DEE
 No. of Gaps/turn 2 dE/dn(max) MeV/q
 Voltage (max) 0.04 MV Harmonic f_r/f_{ion}
 Freq. 18.6±14.4 MHz Power in(max) 0.3 MW
 Stability: Phase Voltage
OTHER CAVITIES (Flattopping or otherwise):
 Description: C-electrode 60°
 Region of Influence: R_{min} 259 cm R_{max} 274 cm
 No. of Gaps/turn 2 dE/dn(max) 0.02 MeV/q
 Voltage (max) 0.02 MV Harmonic f_r/f_{ion}
 Freq. 14.56±14.52 MHz Power in(max) 0.01 MW
 Stability: Phase Voltage

VACUUM SYSTEM
OPERATING PRESSURE: 2·10⁻⁶ Torr
PUMPS: (No. and type) 5 diffusion pumps
 with nitrogen baffles

ION SOURCE(S)
 Type Intensity @ ε_n = βγε Ion Species
 (mA) (π mm mrad)
 (a) internal
 (b) pig type
 (c)
 (d)

INJECTION SYSTEM
 Efficiency %

EXTRACTION SYSTEM
 regenerative extraction Efficiency 50 %
 Iron-current channel

CHARACTERISTIC BEAMS
 Accelerated Ions E/A (MeV/u) Current (part μA)
 Internal External
 (a) p 680 7 3.5
 (b)
 (c)
 (d)
 Secondary Particles E (MeV) part/sec
 (a) π 40 3·10⁶/μA
 (b) μ 60 3·10⁵/μA
 (c) μ⁺ 4 5·10⁵

EXTRACTED BEAM PROPERTIES:
 For 2 μA of .665 MeV/u p ions
 ΔE/E 1.5 % Δφ °rf
 ε_n = βγε x 5.1 π mm mrad z 3.4 π mm mrad

FACILITIES FOR RESEARCH
 SHIELDED AREA: Fixed: 1500 m² Moveable m²
 Target Stations: 4*7 No. Served At Same Time: 2*3
MAGNETIC SPECTROMETERS:
OTHER FACILITIES: 1. Medico-Biological Complex
 2. Proton therapy
 3. YASNAPP (ISOL)

REFERENCES/NOTES
 (a) PHASOTRON and Its Beams, JINR, E9-92-232
 (b)

PLAN VIEW OF FACILITY, COMMENTS

