

ENTRY No. FM-8

NAME OF MACHINE JINR PHASOTRON DATE  
INSTITUTION Joint Institute for Nuclear Research, Lab. of Nucl. Problems  
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IN CHARGE Ts. Vylov REPORTED BY L. Onischenko

**HISTORY AND STATUS**

DESIGN, date 1967 Model tests 1968-71  
ENG DESIGN, date 1968-71  
CONSTRUCTION, date 1971-78  
FIRST BEAM, date (or goal) March 1984  
MAJOR ALTERATIONS

COST, ACCELERATOR  
COST, FACILITY, total 18 · 10<sup>6</sup> roubles  
FUNDED BY JINR

**ACCELERATOR STAFF, OPERATION AND DEVELOPMENT**  
SCIENTISTS ENGINEERS  
TECHNICIANS CRAFTS  
GRAD STUDENTS involved during year  
OPERATED BY Research staff or Operators  
OPERATION hr/wk, On target hr/wk  
TIME DISTR. in house %, 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) 600 cm, R extraction 270 cm  
R injection 15 cm  
GAP, min 30 cm, Field 12 kG }  
max 80 cm, Field 18 kG } at 1.35 · 10<sup>6</sup>  
AVERAGE FIELD at R ext 16.3 kG } Ampere turns  
B max/ <B>

NUMBER OF SECTORS { compact 1 } Spiral, max 77 deg  
SECTOR ANGLE (SSC) { separated } deg  
TRIMMING COILS 3

CONDUCTOR, material and type Al  
STORED ENERGY (cryogenic)  
POWER: main coils 1100 max, kW; current stability 5 · 10<sup>-5</sup>  
trimming coils max, kW; current stability  
WEIGHT: Fe 7000 tons; coils 165 tons  
COOLING system demineralized water  
ION ENERGY (bending limit) E/A = q<sup>2</sup>/a<sup>2</sup> MeV/amu  
(focusing limit) E/A = q<sup>2</sup>/a<sup>2</sup> MeV/amu

**ACCELERATION SYSTEM**  
DEES, number 1; angle 180 deg  
BEAM APERTURE 1.6 · 10 cm; DC Bias -2 kV  
TUNED by, coarse fine  
RF 10.6 to 11.4 MHz, stable ±  
Orb F 10.2 to 11.4 MHz  
HARMONICS, RF/Orb F, used 1  
DEE - Gnd, max 40 kV, min gap 3.5 cm  
STABILITY, (pk-pk noise)/(pk RF volt)  
ENERGY GAIN, max 21 kV/turn  
RF PHASE, stable to ± deg  
RF POWER input, max 200 kW  
FREQUENCY MODULATION, rate 200-500 /s  
modulator, type rotating capacitor  
beam pulse, width 85% of modulation period

**VACUUM SYSTEM**  
OPERATING PRESSURE 2 · 10<sup>-6</sup> Torr or mbar  
PUMPS, No, Type, Size 5 diffusion pumps with nitrogen baffles

**ION SOURCES**  
Pig type

**INJECTION SYSTEM**

**EXTRACTION SYSTEM** Regenerative extraction  
Iron-current channel

**FACILITIES FOR RESEARCH**  
SHIELDED AREA, fixed 1500 m<sup>2</sup>; movable m<sup>2</sup>  
TARGET STATIONS 4-7 in 3-5 rooms  
STATIONS served at same time, max 3-5  
MAG SPECTROGRAPH, type  
COMPUTER model ISOT 1055, SM 1700  
OTHER FACILITIES Medico-Biological complex,  
YASNAPP (ISOL)

**CHARACTERISTIC BEAMS**

| PARTICLE | ENERGY (MeV) |          | CURRENT (pμA) |          |
|----------|--------------|----------|---------------|----------|
|          | Goal         | Achieved | Internal      | External |
| p        | 680          | 680      | 7             | 3.5      |

SECONDARY 3 · 10<sup>5</sup>/A s (part/s)  
3 · 10<sup>5</sup>/A s

**BEAM PROPERTIES**

| MEASURED       | CONDITIONS                   |                              |
|----------------|------------------------------|------------------------------|
|                | RF deg                       | μA of MeV ions               |
| PULSE WIDTH    |                              |                              |
| PHASE EXC, max | RF deg                       | μA of MeV ions               |
| EXTRACT eff    | 50 %                         | μA of MeV ions               |
| RESOL ΔE/E     | 1.5 %                        | μA of MeV ions               |
| EMITTANCE      |                              |                              |
| (π mm. mrad)   | { 3,4 axial }<br>{ 5,1 rad } | ... 2... μA of .660 MeV ions |

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

**REFERENCES/NOTES**

**PLAN VIEW OF FACILITY, NOTEWORTHY FEATURES, COMMENTS**