

ENTRY NO. 95

NAME OF MACHINE Kiev Isochronous Cyclotron DATE April, 1978  
INSTITUTION Institute Nuclear Research, Academy of Science UkSSR  
ADDRESS USSR Kiev 252028, Prospect Nauky, 119.

IN CHARGE O.F.Nemets REPORTED BY A.F.Linev

**HISTORY AND STATUS**

DESIGN, date 1965-70 MODEL tests 1963-66  
ENG. DESIGN, date 1966-1972  
CONSTRUCTION, date 1966-1973  
FIRST BEAM date (or goal) March 1976  
MAJOR ALTERATIONS \_\_\_\_\_

OPERATION, 120 hr/wk; On Target 100 hr/wk  
TIME DIST., in house \_\_\_\_\_ %, outside \_\_\_\_\_ %  
USERS' SCHEDULING CYCLE \_\_\_\_\_ weeks  
COST, ACCELERATOR \_\_\_\_\_  
COST, FACILITY, total \_\_\_\_\_  
FUNDED BY \_\_\_\_\_

**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 \_\_\_\_\_ outside \_\_\_\_\_  
GRAD STUDENTS involved during year \_\_\_\_\_  
RES. BUDGET, in house \_\_\_\_\_  
FUNDED BY \_\_\_\_\_

**FACILITIES FOR RESEARCH**

SHIELDED AREA, fixed 1000 m<sup>2</sup>  
movable 1200 m<sup>2</sup>  
TARGET STATIONS 16 in 6 rooms  
STATIONS served at same time, max \_\_\_\_\_  
MAG SPECTROGRAPH, type \_\_\_\_\_  
COMPUTER, model \_\_\_\_\_  
OTHER FACILITIES \_\_\_\_\_

**REFERENCES/NOTES**

Proceedings of International  
Cyclotron Conference, Vancouver,  
Canada, 87(1972).

Proceedings 5th All-Union Conf.  
Charged-Particle Accelerators,  
"Nauka", Moscow, v.11, 338(1977).

**MAGNET**

POLE FACE diameter 240 cm; R extraction 103 cm  
GAP, min 232 cm; Field 23.0 kG } at 0.83 × 10<sup>6</sup>  
max 532 cm; Field 11.2 kG } ampere turns  
AVERAGE FIELD at R ext 17.0 kG }  
CURRENT STABILITY 30 parts/10<sup>6</sup>; B<sub>max</sub>/(B) 1.35  
NUMBER OF SECTORS 3; SPIRAL, max 45 deg  
POLE FACE COIL PAIRS: AVF 1 /sec;  
Harmonic correction 3 per sector  
Rad grad \_\_\_\_\_ /sec or Circ coils 15  
WEIGHT: Fe 650 tons; Coils 83.5 Cu tons  
CONDUCTOR, Material and type Cupruous  
STORED ENERGY \_\_\_\_\_ MJ  
COOLING SYSTEM Demineralized water  
POWER: Main coils 200 max, kW  
Trimming coils 800 max, kW  
YOKE/POLE AREA \_\_\_\_\_ %  
SECTOR ANGLE (Sep Sec) \_\_\_\_\_ deg  
ION ENERGY (Bending limit) E/A = 140 q<sup>2</sup>/A<sup>2</sup> MeV  
(Focusing limit) E/A = 100 q/A MeV

**ACCELERATION SYSTEM**

DEES, number 1 angle 180 deg  
BEAM APERTURE 5 cm; DC BIAS 0 kV  
TUNED by, coarse MS fine VC, auto  
RF 7.5 to 22.5 MHz, stable ± 0.01 /10<sup>6</sup>  
Orb F 2.5 to 22.5 MHz; GAIN, max 250 kV/turn  
HARMONICS, RF/Orb F, used 1, 3  
DEE-Gnd, max 125 kV, min gap 5 cm  
STABILITY, (pk-pk noise)/(pk RF volt) 0.0001  
RF PHASE stable to ± \_\_\_\_\_ deg  
RF POWER input, max 450 kW  
RF PROTECT circuit, speed \_\_\_\_\_ μsec  
Type \_\_\_\_\_  
FREQUENCY MODULATION, rate \_\_\_\_\_ /sec  
MODULATOR, type \_\_\_\_\_  
BEAM PULSE, width \_\_\_\_\_

**VACUUM SYSTEM**

PUMPS, No., Type, Size 3 Diffusion pumps  
(50 cm)  
OPERATING PRESSURE 5 μTorr,  
PUMPDOWN TIME 2 hrs

**ION SOURCES/INJECTION SYSTEM**

Heated Cathode

EXTRACTION SYSTEM dc electrostatic with  
compensated magnetic channel and  
CONTROL SYSTEM iron channel

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CHARACTERISTIC BEAMS

	Particle	Goal (MeV)	Achieved (MeV)
ENERGY	P	100	72
	d	70	64
		140	128
CURRENT			
		( $\mu$ A)	( $\mu$ A)
Internal	P	100	100
External	P	50	10
Secondary		(part/s)	(part/s)

BEAM PROPERTIES

	Measured	Conditions
Pulse Width	15 RF deg	5 $\mu$ A of 50 MeV
Phase Exc, max	RF deg	$\mu$ A of MeV
Extract Eff	60 %	5 $\mu$ A of 50 MeV
Res, $\Delta E/E$	0.3 %	5 $\mu$ A of 50 MeV
Emittance	(mm-mrad) { $\frac{10}{12}$ axial } 2 $\mu$ A of 50 MeV	

OPERATING PROGRAMS, time dist

Basic Nuclear Physics	100	%
Solid State Physics		%
Bio-Medical Applications		%
Isotope Production		%
Development		%

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

1. The valley coil will operate at  $E_p > 80$  MeV.
2. The cyclotron is intended to be as a pulsed neutron generator.
3. It is supposed to accelerate heavy ions (up to Xe) after the pre-acceleration in the tandem-generator.
4. The source of polarized and deuterons will be designed and installed.

