

**ENTRY No. 104**

NAME OF MACHINE U-300 DATE 1972, same for 1975\*\*  
INSTITUTION Joint Institute for Nuclear Research  
ADDRESS DUBNA - USSR  
TEL TELEX  
IN CHARGE G.N. FLERQV\* REPORTED BY same

**HISTORY AND STATUS**

DESIGN, date 1955 Model tests  
ENG DESIGN, date 1956-58  
CONSTRUCTION, date 1956-59  
FIRST BEAM, date (or goal) Int. 1960, ext. 1965  
MAJOR ALTERATIONS None

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 150 hr/wk, On target 120 hr/wk

TIME DISTR. in house 95 %, Outside 5 %

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) 31.0 cm, R extraction 138 cm

R injection cm

GAP, min cm, Field kG } at 0.910<sup>6</sup>

max 54 cm, Field kG } Ampere turns

AVERAGE FIELD at R ext 16.7 kG

B max/ <B> 1

NUMBER OF SECTORS { compact } Spiral, max deg

SECTOR ANGLE (SSC) separated deg

TRIMMING COILS Harmonic 4/sect

CONDUCTOR, material and type

STORED ENERGY (cryogenic) MJ

POWER: main coils 510 max, kW ; current stability 10<sup>-4</sup>

trimming coils max, kW ; current stability

WEIGHT : Fe 2090 tons ; coils 101 tons

COOLING system water

ION ENERGY (bending limit) E/A = 250 q<sup>2</sup>/a<sup>2</sup> MeV/amu

(focusing limit) E/A = q/a MeV/amu

**ACCELERATION SYSTEM**

DEES, number 2 ; angle 180 deg

BEAM APERTURE 4-14 cm ; DC Bias 0 kV

TUNED by, coarse MS fine 4

RF 3 to 6 mHz, stable ± 10<sup>-4</sup>

Orb F 1, 5 to 5, 6 mHz

HARMONICS, RF/Orb F, used 1, 3

DEE - Gnd, max 150 kV, min gap cm

STABILITY, (pk-pk noise)/(pk RF volt)

ENERGY GAIN, max 600 kV/turn

RF PHASE, stable to ± deg

RF POWER input, max 250 kW

FREQUENCY MODULATION, rate /s

modulator, type

beam pulse, width

**VACUUM SYSTEM**

OPERATING PRESSURE 2 μ Torr

PUMPS, No, Type, Size

**ION SOURCES**

Arc type with heated cathode

**INJECTION SYSTEM**

**EXTRACTION SYSTEM**

dc electrostatic with magnetic channel

**FACILITIES FOR RESEARCH**

SHIELDED AREA, fixed 1500 m<sup>2</sup> ; movable m<sup>2</sup>

TARGET STATIONS 10 in 7 rooms

STATIONS served at same time, max 1

MAG SPECTROGRAPH, type

COMPUTER model

OTHER FACILITIES

**CHARACTERISTIC BEAMS**

PARTICLE ENERGY (MeV) CURRENT (μA)

Goal Achieved Internal External

<sup>12</sup>C <sup>2+</sup> 83 200

<sup>22</sup>Ne <sup>4+</sup> 182 50

<sup>40</sup>Ar <sup>7+</sup> 305 3

SECONDARY (part/s)<sub>12</sub>

<sup>136</sup>Xe <sup>9+</sup> 3.10

<sup>184</sup>W <sup>12+</sup> 1.0

**BEAM PROPERTIES**

MEASURED CONDITIONS

PULSE WIDTH RF deg μA of MeV ions

PHASE EXC, max RF deg μA of MeV ions

EXTRACT eff 25-35 % 50 μA of 182 MeV <sup>22</sup>Ne<sup>4+</sup> ions

RESOL ΔE/E 04-05 % μA of MeV ions

EMITTANCE

(π mm. mrad) { 1.0 axial } 10 μA of 83 MeV <sup>12</sup>C<sup>2+</sup> ions

{ 1.26 rad }

**OPERATING PROGRAMS, time distribution**

BASIC NUCLEAR PHYSICS SOLID STATES PHYSICS

BIOMEDICAL APPLICAT. ISOTOPE PRODUCTIONS