

ENTRY No. C42 Cyclotron (AIC-144)
 NAME OF MACHINE Automatic Isochronous DATE
 INSTITUTION Institute of Nuclear Physics
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 IN CHARGE J. Schwabe REPORTED BY J. Schwabe

HISTORY AND STATUS

DESIGN, date 1976-78 Model tests 1977-79
 ENG DESIGN, date 1979
 CONSTRUCTION, date 1980-85
 FIRST BEAM, date (or goal) 10.04.87
 MAJOR ALTERATIONS

COST, ACCELERATOR

COST, FACILITY, total
 FUNDED BY

ACCELERATOR STAFF, OPERATION AND DEVELOPMENT

SCIENTISTS 7 ENGINEERS 12
 TECHNICIANS 7 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) 144 cm, R extraction 63.5 cm

R injection 0.5-1 cm

GAP, min 11.2 cm, Field 20.5 kG

max 22 cm, Field 14.5 kG } at 710(A)x672(W)

AVERAGE FIELD at R ext 17.5 kG } Ampere turns

B max/ 1.17

NUMBER OF SECTORS { compact 4 } Spiral, max 54 deg

SECTOR ANGLE (SSC) 45 deg

TRIMMING COILS circular 15

valley 8

CONDUCTOR, material and type Cu

STORED ENERGY (cryogenic) MJ

POWER: main coils 240 max, kW; current stability 4×10^{-5}

trimming coils 120 max, kW; current stability 10^{-5}

WEIGHT: Fe 150 tons; coils 2 x 7.55 tons

COOLING system

ION ENERGY (bending limit) E/A = 60 (56) q^2/a^2 MeV/amu

(focusing limit) E/A = 60 (56) q^2/a^2 MeV/amu

ACCELERATION SYSTEM

DEES, number 1; angle 180 deg

BEAM APERTURE 16 cm; DC Bias kV

TUNED by, coarse panels fine trimmers, capac.

RF 8 to 26 MHz, stable $\pm 10^{-7}$

Orb F 8 to 26 MHz

HARMONICS, RF/Orb F, used 1

DEE - Gnd, max 50 kV, min gap 2.79 cm

STABILITY, (pk-pk noise)/(pk RF volt) 10^{-4}

ENERGY GAIN, max 100 kV/turn

RF PHASE, stable to $\pm 15 \div 45$ deg

RF POWER input, max 150 kW

FREQUENCY MODULATION, rate $10 \div 1000$ /s

modulator, type

beam pulse, width-structure; 15.6-4.8 ns; pulse; 1.25 μ s.

VACUUM SYSTEM

OPERATING PRESSURE $6 \cdot 10^{-6}$ Torr or mbar

PUMPS, No, Type, Size 2 diffusion oil pumps 4800 L/S

ION SOURCES

Penning Internal

INJECTION SYSTEM

Internal, or external, with electrostatic inflector

EXTRACTION SYSTEM

Electrostatic, deflector, 3 sector

FACILITIES FOR RESEARCH

SHIELDED AREA, fixed m^2 ; movable m^2

TARGET STATIONS in rooms

STATIONS served at same time, max

MAG SPECTROGRAPH, type

COMPUTER model

OTHER FACILITIES

CHARACTERISTIC BEAMS

PARTICLE	ENERGY (MeV)		CURRENT (μ A)	
	Goal	Achieved	Internal	External
p	60	-		
d	30	25	> 400	
α	60	52	50	

SECONDARY (part/s)

BEAM PROPERTIES

MEASURED CONDITIONS

PULSE WIDTH 35 RF deg μ A of 25 MeV d. ions

PHASE EXC, max RF deg μ A of MeV ions

EXTRACT eff % μ A of MeV ions

RESOL $\Delta E/E$ % μ A of MeV ions

EMITTANCE

(π mm. mrad) { 12 axial } μ A of MeV d. ions

{ 15 rad }

OPERATING PROGRAMS, time distribution

BASIC NUCLEAR PHYSICS SOLID STATES PHYSICS

BIOMEDICAL APPLICAT. ISOTOPE PRODUCTIONS

REFERENCES/NOTES

1) International seminar on isochronous

Cyclotron technique

Poland Krakow J.N.PH. 13-18 Nov. 1978

report JFJ No. 1069/PL

PLAN VIEW OF FACILITY, NOTEWORTHY FEATURES.

COMMENTS

AIC-144

