ENTRY NO. 72

NAME OF MACHINE ANL 60-inch Cyclotron DATE August 14, 1981

INSTITUTION Argonne National Laboratory, Chemistry Division

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IN CHARGE J. Aron REPORTED BY M. Oselka

HISTORY AND STATUS

DESIGN, date 1949 Model tests 1951-1952

ENG DESIGN, date 1949-1951

CONSTRUCTION, date 1949-1952

FIRST BEAM, date (or goal) 1952

MAJOR ALTERATIONS Manget trim coils added 1964

New Dees - 1974

COST, ACCELERATOR $950,000

COST, FACILITY, total $2,200,000

FUNDED BY AEC, ERDA

ACCELERATOR STAFF, OPERATION AND DEVELOPMENT

SCIENTISTS ENGINEERS 1

TECHNICIANS 1 CRAFTS

GRAD STUDENTS involved during year

OPERATED BY Research staff or X Operators

OPERATION hr/wk. On target hr./wk

TIME DISTR. in house 30 % Outside 70 %

BUDGET, op & dev

FUNDED BY DOE

RESEARCH STAFF, not included above

USERS, in house 3 outside 4

GRAD STUDENTS involved during year

RESEARCH BUDGET, in house

FUNDED BY DOE

MAGNET

POLE FACE, diameter (compact) 152 cm, R extraction 68 cm

R injection 0 cm

GAP, min 30.5 cm, Field kG } at 440,000

min cm, Field kG } Ampere turns

AVERAGE FIELD at R ext 15 kG }

B max/ < B >

NUMBER OF SECTORS { compact } Spiral, max deg

{ separated }

SECTOR ANGLE (SSC) deg

TRIMMING COILS

CONDUCTOR, material and type Aluminum

STORED ENERGY (cryogenic) MJ

POWER: main coils 200 max, kW; current stability 16 parts/10^6

trimming coils max, kW; current stability

WEIGHT: Fe 265 tons; coils 26 tons

COOLING system Demineralized water

ION ENERGY (bending limit) E/A = q^2/a^2 MEV/amu

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

ACCELERATION SYSTEM

DEES, number 2 ; angle 180 deg

BEAM APERTURE cm; DC Bias 0 kV

TUNED by, coarse fine Trim Cap.

RF 11.2 to 11.5 mHz, stable ± 5 parts/10^6

Orb F 11.2 to 11.5 mHz

HARMONICS, RF/Orb F, used 1

DEE—Gnd, max kV, min gap cm

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

ENERGY GAIN, max 240 kV/turn

RF PHASE, stable to ± deg

RF POWEP input, max 150 kW

FREQUENCY MODULATION, rate 0 /s

modulator, type

beam pulse, width

VACUUM SYSTEM

OPERATING PRESSURE 5×10^{-6} Torr or mbar

PUMPS, No, Type, Size 2 Diffusion Pumps, 16 inch

ION SOURCES

DC-type hooded arc

INJECTION SYSTEM

EXTRACTION SYSTEM

Electrostatic Deflector

FACILITIES FOR RESEARCH

SHIELDED AREA, fixed 350 m^2; movable m^2

TARGET STATIONS 7 in 3

STATIONS served at same time, max 1

MAG SPECTROGRAPH, type

COMPUTER model

OTHER FACILITIES Hot Lab, with caves

CHARACTERISTIC BEAMS

PARTICLE	ENERGY (MeV) Goal	Achieved	CURRENT (pμA) Internal	External
H_2^+		10.7		100
D^+		21.4		150
$^3He^{++}$		33.0		100
α^{++}		43.0		90
SECONDARY (part/s)				

BEAM PROPERTIES

MEASURED		CONDITIONS
PULSE WIDTH	RF deg	pμ A of MeV ions
PHASE EXC. max	RF deg	pμ A of MeV ions
EXTRACT eff	%	pμ A of MeV ions
RESOL ΔE/E	%	pμ A of MeV ions
EMITTANCE (π mm. mrad)	axial	pμ A of MeV
	rad	

OPERATING PROGRAMS, time distribution

BASIC NUCLEAR PHYSICS 10% SOLID STATES PHYSICS

BIOMEDICAL APPLICAT 40% ISOTOPE PRODUCTIONS 50%

REFERENCES/NOTES W.J. Ramler & G.W. Parker, THE ARGONNE 60-INCH CYCLOTRON, ANL-5907; W.J. Ramler, et al., ARGONNE CYCLOTRON-HELIUM 3 CONVERSION, ANL-7171; W.J. Ramler, et al., ENERGY-ANALYZING SYSTEM FOR THE ARGONNE 60-INCH CYCLOTRON, ANL-7251.

PLAN VIEW OF FACILITY, COMMENTS, ETC.