ENTRY No. 67

NAME OF MACHINE ANL 60-inch Cyclotron DATE August 14, 1981
INSTITUTION Argonne National Laboratory, Chemistry Division
ADDRESS 9700 South Cass Avenue, Argonne, Illinois 60439 USA
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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 Magnet 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
max cm, Field kG } at 440,000 Ampere turns
AVERAGE FIELD at R ext 15 kG
B max/ <B>
NUMBER OF SECTORS { compact / separated } Spiral, max deg
SECTOR ANGLE (SSC) deg
TRIMMING COILS
CONDUCTOR, material and type Aluminum
STORED ENERGY (cryogenic) MJ
POWER : main coils 200 max, kW ; current stability 16parts/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 POWER input, max 150 kW
FREQUENCY MODULATION, rate 0 /s
modulator, type
beam pulse, width

VACUUM SYSTEM

OPERATING PRESSURE 5 x 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 rooms
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 / rad } pμA of MeV ions

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, NOTEWORTHY FEATURES, COMMENTS