ENTRY No. 68-

NAME OF MACHINE Brookhaven 60-inch Cyclotron DATE July 15, 1981
INSTITUTION Brookhaven National Laboratory
ADDRESS Upton, New York 11973 U.S.A.
TEL 516-282-4551, 4397 TELEX 96-7703
IN CHARGE Alfred P. Wolf REPORTED BY W. Barclay Jones & Alfred P. Wolf

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HISTORY AND STATUS
DESIGN, date October 1948 Model tests
ENG DESIGN, date
CONSTRUCTION, date
FIRST BEAM, date (or goal) April 1951
MAJOR ALTERATIONS Converted to isochronous 3-spiral sector operation 1965-1968
COST, ACCELERATOR —
COST, FACILITY, total —
FUNDED BY AEC

ACCELERATOR STAFF, OPERATION AND DEVELOPMENT
SCIENTISTS 1 ENGINEERS 0
TECHNICIANS 3 CRAFTS 0
GRAD STUDENTS involved during year 0
OPERATED BY Research staff or X Operators
OPERATION 45 hr/wk, On target ~35 hr/wk
TIME DISTR. in house 90 %, Outside %
BUDGET, op & dev
FUNDED BY US DOE & NIH

RESEARCH STAFF, not included above
USERS, in house 10 outside 2
GRAD STUDENTS involved during year ~2
RESEARCH BUDGET, in house
FUNDED BY DOE & NIH

MAGNET
POLE FACE, diameter (compact) 152 cm, R extraction 65 cm
R injection cm
GAP, min 19 cm, Field 18 kG
max 34.5 cm, Field 12 kG } at
AVERAGE FIELD at R ext 15.4 kG } Ampere turns
B max/ <B>
NUMBER OF SECTORS { compact 3 / separated } Spiral, max 50 deg
SECTOR ANGLE (SSC) deg
TRIMMING COILS 8
CONDUCTOR, material and type hollow copper (H_2O cooled)
STORED ENERGY (cryogenic) MJ
POWER : main coils 200 max, kW ; current stability
trimming coils 20 max, kW ; current stability
WEIGHT : Fe 240 tons ; coils tons
COOLING system 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 1 ; angle 180 deg
BEAM APERTURE 3.5 cm ; DC Bias kV
TUNED by, coarse moveable short fine panels
RF 10 to 20 mHz, stable ±
Orb F 3.3 to 20 mHz
HARMONICS, RF/Orb F, used
DEE - Gnd, max 70 kV, min gap 7 cm
STABILITY, (pk-pk noise)/(pk RF volt)
ENERGY GAIN, max 120 kV/turn
RF PHASE, stable to ± deg
RF POWER input, max 100 kW
FREQUENCY MODULATION, rate /s
modulator, type
beam pulse, width

VACUUM SYSTEM
OPERATING PRESSURE 10^{-5} Torr or mbar
PUMPS, No, Type, Size

ION SOURCES
Hooded Hot Filament

INJECTION SYSTEM

EXTRACTION SYSTEM
Electrostatic Deflector

FACILITIES FOR RESEARCH
SHIELDED AREA, fixed 100 m² ; movable m²
TARGET STATIONS 2 in 2 rooms
STATIONS served at same time, max
MAG SPECTROGRAPH, type
COMPUTER model
OTHER FACILITIES

CHARACTERISTIC BEAMS

PARTICLE	ENERGY (MeV) Goal	Achieved	CURRENT (pμA) Internal	External
Protons		10-36 MeV		~1 kW
Deuterons		17-23 MeV		~1 kW
Alphas		34-46 MeV		15 μa
^3He		30-64 MeV		10 μa
SECONDARY			(part/s)	

BEAM PROPERTIES

MEASURED	CONDITIONS
PULSE WIDTH 5 RF deg	pμ A of MeV ions
PHASE EXC, max RF deg	pμ A of MeV ions
EXTRACT eff 20 %	pμ A of MeV ions
RESOL ΔE/E 69 %	pμ A of MeV ions
EMITTANCE	
(π mm. mrad) { axial / rad }	pμA of MeV ions

OPERATING PROGRAMS, time distribution
BASIC NUCLEAR PHYSICS SOLID STATES PHYSICS
BIOMEDICAL APPLICAT. 50% ISOTOPE PRODUCTIONS 20%
CHEMISTRY RESEARCH 30%

REFERENCES/NOTES

PLAN VIEW OF FACILITY, NOTEWORTHY FEATURES, COMMENTS