ENTRY No. 69

NAME OF MACHINE Japan Steel Works Model JSW BC 168 A (Baby Cyclotron) DATE July 17, 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 1977 - 1980 Model tests 1981
ENG DESIGN, date 1980
CONSTRUCTION, date goal - October 1981
FIRST BEAM, date (or goal) August 1981
MAJOR ALTERATIONS none
COST, ACCELERATOR ——
COST, FACILITY, total ——
FUNDED BY DOE

ACCELERATOR STAFF, OPERATION AND DEVELOPMENT
SCIENTISTS 1 ENGINEERS —
TECHNICIANS 1 CRAFTS —
GRAD STUDENTS involved during year —
OPERATED BY Research staff and Operators
OPERATION 45 hr/wk, On target 40 hr/wk
TIME DISTR. in house 100 %, Outside 0 %
BUDGET, op & dev —
FUNDED BY DOE & NIH

RESEARCH STAFF, not included above
USERS, in house 6 outside
GRAD STUDENTS involved during year —
RESEARCH BUDGET, in house —
FUNDED BY DOE & NIH

MAGNET
POLE FACE, diameter (compact) 105 cm, R extraction 42 cm
R injection cm
GAP, min 7 cm, Field 18.4 kG
max 13 cm, Field 12.4 kG } at 1.3×10^5
AVERAGE FIELD at R ext 15.5 kG } Ampere turns
B max/ <B> 1.2
NUMBER OF SECTORS { compact 4 / separated } Spiral, max 0 deg
SECTOR ANGLE (SSC) deg
TRIMMING COILS
CONDUCTOR, material and type hollow core
STORED ENERGY (cryogenic) MJ
POWER : main coils 60 max, kW ; current stability 20×10^6
trimming coils 3 max, kW ; current stability
WEIGHT : Fe 30 tons ; coils 1 tons Cu
COOLING system deionized H_2O
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 45° deg
BEAM APERTURE cm ; DC Bias kV
TUNED by, coarse MS fine MP
RF 43.7 to 47 mHz, stable ± 5/10⁶
Orb F 21.85 to 11.75 mHz
HARMONICS, RF/Orb F, used 2nd and 4th
DEE - Gnd, max 35 kV, min gap cm
STABILITY, (pk-pk noise)/(pk RF volt)
ENERGY GAIN, max 140 kV/turn
RF PHASE, stable to ± deg
RF POWER input, max 23 kW
FREQUENCY MODULATION, rate /s
modulator, type
beam pulse, width

VACUUM SYSTEM
OPERATING PRESSURE 1×10^{-5} Torr or mbar
PUMPS, No, Type, Size 450 l/sec

ION SOURCES
Hot Cathode Penning Type - Axial

INJECTION SYSTEM

EXTRACTION SYSTEM
Electrostatic & Magnetic Channel

FACILITIES FOR RESEARCH
SHIELDED AREA, fixed 60 m² ; movable m²
TARGET STATIONS 1 in 1 rooms
STATIONS served at same time, max 1
MAG SPECTROGRAPH, type
COMPUTER model
OTHER FACILITIES automated target changing

CHARACTERISTIC BEAMS

PARTICLE	ENERGY (MeV) Goal	Achieved	CURRENT (pμA) Internal	External
H^+	17			50
D^+	10			65
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 SOLID STATES PHYSICS
BIOMEDICAL APPLICAT. 70% ISOTOPE PRODUCTIONS 10%
CHEMISTRY RESEARCH 20%

REFERENCES/NOTES

Delivery Date, BNL, December 1981

PLAN VIEW OF FACILITY, NOTEWORTHY FEATURES, COMMENTS

Simplified operation, designed for reliable beam on target in production mode.