ENTRY No. FM-9

NAME OF MACHINE 184-Inch Synchrocyclotron DATE July 24, 1981
INSTITUTION Lawrence Berkeley Laboratory
ADDRESS 1 Cyclotron Road, Berkeley, CA 94720, U.S.A.
TEL 415-486-5467 TELEX 910-366-2037
IN CHARGE H. A. Grunder REPORTED BY L. Kanstein

HISTORY AND STATUS

DESIGN, date ..... Model tests .....
ENG DESIGN, date .....
CONSTRUCTION, date .....
FIRST BEAM, date (or goal) 1946
MAJOR ALTERATIONS 1949, 1955-57
COST, ACCELERATOR .....
COST, FACILITY, total .....
FUNDED BY National Institute of Health

ACCELERATOR STAFF, OPERATION AND DEVELOPMENT

SCIENTISTS ..... ENGINEERS .....
TECHNICIANS 1 CRAFTS .5
GRAD STUDENTS involved during year .....
OPERATED BY ..... Research staff or 3. Operators
OPERATION 25 hr/wk, On target 24 hr/wk
TIME DISTR. in house 99 %, Outside 1 %
BUDGET, op & dev 315×10^3
FUNDED BY National Institute of Health

RESEARCH STAFF, not included above

USERS, in house 3 outside 2
GRAD STUDENTS involved during year .....
RESEARCH BUDGET, in house .....
FUNDED BY National Institute of Health

MAGNET

POLE FACE, diameter (compact) 470 cm, R extraction 208 cm
R injection ..... cm
GAP, min 28 cm, Field 23.4 kG
max ..... cm, Field ..... kG } at .....
AVERAGE FIELD at R ext 22.3 kG } Ampere turns
B max/ $<B>$ .....
NUMBER OF SECTORS { compact ..... / separated ..... } Spiral, max .. deg
SECTOR ANGLE (SSC) ..... deg
TRIMMING COILS .....
CONDUCTOR, material and type .....
STORED ENERGY (cryogenic) ..... MJ
POWER : main coils 850/1600 , kW ; current stability 10^{-5}
trimming coils ..... max, kW ; current stability .....
WEIGHT : Fe 4000 tons ; coils 340 tons
COOLING system oil/water
ION ENERGY (bending limit) E/A = 920 q^2/a^2 MeV/amu
(focusing limit) E/A = ... q /a MeV/amu

ACCELERATION SYSTEM

DEES, number 1 ; angle 180 deg
BEAM APERTURE 12.3 cm ; DC Bias 1.5 kV
TUNED by, coarse ..... fine .....
RF 36 to 18 mHz, stable ± .....
Orb F 36 to 18 mHz
HARMONICS, RF/Orb F, used 1
DEE - Gnd, max 11 kV, min gap 12 cm
STABILITY, (pk-pk noise)/(pk RF volt) .....
ENERGY GAIN, max ..... kV/turn
RF PHASE, stable to ± ..... deg
RF POWER input, max 72 kW
FREQUENCY MODULATION, rate 64 /s
modulator, type Vibrating blades
beam pulse, width .2-13 ms, stretching off/on

VACUUM SYSTEM

OPERATING PRESSURE 10^{-5} Torr or mbar
PUMPS, No, Type, Size Six 20 inch oil diffusion pumps

ION SOURCES

Hot filament open arc

INJECTION SYSTEM

EXTRACTION SYSTEM

Regenerator and magnetic channel

FACILITIES FOR RESEARCH

SHIELDED AREA, fixed ..... m² ; movable 55 m²
TARGET STATIONS 1 in 1 rooms
STATIONS served at same time, max 1
MAG SPECTROGRAPH, type .....
COMPUTER model .....
OTHER FACILITIES .....

CHARACTERISTIC BEAMS

PARTICLE	ENERGY (MeV) Goal	ENERGY (MeV) Achieved	CURRENT (pμA) Internal	CURRENT (pμA) External
p		740	1	.12
d		460	1	.12
α		920	.5	.06
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 .. 12 .. % .. 12 .. pμ A of 740 MeV p 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. 100 ISOTOPE PRODUCTIONS ....

REFERENCES/NOTES

PLAN VIEW OF FACILITY, NOTEWORTHY FEATURES, COMMENTS