ENTRY NO. C60 **Date** June 26, 1992

Name of Machine 88-Inch Cyclotron

Institution Lawrence Berkeley Laboratory

Address 1 Cyclotron Road, Berkeley, CA 94720 U.S.A.

Tel 510/486-5088 **Telex** 910-366-2037 **Fax** 510/486-7983 **EMAIL** CMLYNEIS@LBL.GOV

In Charge: C. M. Lyneis **Reported by:** D. J. Clark

HISTORY

MILESTONE DATES:
Design ...1958... Model Tests ...1958-59...
Construction ..1959-62... First Beam external 1962...
DESIGN/CONSTRUCTION BY:
in house ..Yes.... other .outside contracts.. . ....
COST: Accelerator 3.5 M$... Facility .5.1 M$...
FUNDED BY: ..U.S. D.O.E.

STATUS

STAFF: Machine
Scientists ....3..... Engineers .....3.....
Technicians ..12..... Students ....
Research (in house/external)
Scientists ...20.... / ..50..... Engineers ....1..... / .....
Technicians ..4..... / ..... Students .....14 / 15.....
BUDGET: Machine ..... Funded by ..D.O.E.....
Research ..... Funded by ..D.O.E.....
TIME DISTRIBUTION:
Basic Research (in house/external) .....24.. % / ...36..... %
Applied Program (in house/external) .....-- % / ...20..... %
Development .....2 % Maintenance .....18..... %

MAGNET

POLE PARAMETERS:
Diameter....224. cm $R_{extract}$ ....99... cm R_{inject} .....0. cm
HILL PARAMETERS: Gap (min) .....19... cm B_{max} ....2.1.. T
(@ .6x10⁶.. AT) Gap (max) ..... cm B_{min} ..... T
VALLEY PARAMETERS: Gap (min) .30.... cm B_{max} ...1.5.. T
(@ ..6x10⁶.. AT) Gap (max) ..... cm B_{min} ..... T
AVERAGE FIELD: $< B >_{min}$ ..... T $< B >_{max}$ ....1.8.. T
NUMBER OF SECTORS: (compact)/separated ...3..... / .....
sector angle (hill) 60..... deg. spiral (max) .....55..... deg.
FIELD TRIMMING: Trim Coils .....17 Circular.....
Harmonic Coils .....5 valley.....
Other .....
CURRENT: Main Coils .3000..... Amps Stability ...10^{-5}.....
Trim Coils .750-2500..... Amps Stability .....10^{-3}.....
Stored Energy (cryogenic) ..... MJ
WEIGHT: Iron .....290. tons..... Conductor ....10. tons.....
ION ENERGY: Bending Limit E/A = ..160..... q^2/A^2 MeV/u
Focussing Limit E/A = .65..... q/A MeV/u

ACCELERATION SYSTEM

FUNDAMENTAL ACCELERATION:
Description: .....180 degree dee.....
No. of Gaps/turn .....2... dE/dn(max) ....1..... MeV/q
Voltage(max) .....05... MV Harmonic f_{rf}/f_{ion} 1,3,5,7.....
Freq 5.5 - 16.2.... MHz Power in(max) .....3..... MW
Stability: Phase ..... Voltage .....10^{-3}.....
OTHER CAVITIES (Flattopping or otherwise):
Description: .....
Region of Influence: R_{min} ..... cm R_{max} ..... cm
No. of Gaps/turn ..... dE/dn(max) ..... MeV/q
Voltage(max) ..... MV Harmonic f_{rf}/f_{ion} .....
Freq ..... MHz Power in(max) ..... MW
Stability: Phase ..... Voltage .....

VACUUM SYSTEM

OPERATING PRESSURE: ..$1x10^{-6}$.. torr.....
PUMPS: No. and type .....2 - 81 cm diff. pumps,.....
....2-25 cm diff. pumps, 20° K cryopanel.....

ION SOURCE(S)

	Type	Intensity @ (mA)	$\epsilon_n = \beta\gamma\epsilon$ (πmm mrad)	Ion Species
(a)	ECR, AECR	10^{-3} - 1	--	All ions
(b)	Atomic Beam	3×10^{-3}	--	Pol. H, D
(c)				
(d)				

INJECTION SYSTEM

Axial injection, 90° mirror ..... Efficiency ...-- %

EXTRACTION SYSTEM

Electrostatic, 3 section. ..... Efficiency ...50... %

CHARACTERISTIC BEAMS

Accelerated Ions	E/A (MeV/u)	Current(part μA) Internal	External
(a) p	2-55	50	25-2
(b) p(pol.)	6-50	1	.5
(c) $^{16}O^{5+}$	9	4	2
(d) $^{86}Kr^{29+}$	10	.004	.002

Secondary Particles	E (MeV)	part/sec
(a)		
(b)		
(c)		

EXTRACTED BEAM PROPERTIES:
For .....5..... μA of .....16..... MeV/u ...$^{4}He^{2+}$..... ions
$\Delta E/E$ .....3..... % $\Delta\phi$ ..... °rf
$\epsilon_n = \beta\gamma\epsilon$ x .....3.. πmm mrad z .....4... πmm mrad

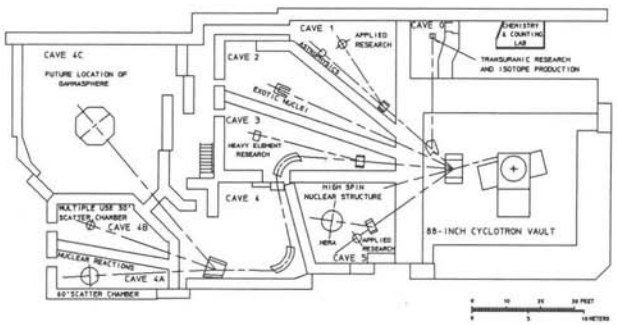
FACILITIES FOR RESEARCH

SHIELDED AREA: Fixed ...-- m² Moveable ...800.... m²
Target Stations: ....12.. No. Served At Same Time: 1.....
MAGNETIC SPECTROMETERS: .....
OTHER FACILITIES: .on-line mass separator, Transuranic chemistry, gamma ray ball, atomic physics facility.....
.....
.....

REFERENCES/NOTES

(a) .R.S.I. 62 (3) Mar. 1991 - (AECR) p. 775.....
(b) .I.E.E.E. Part. Accel. Conf. May. 1991. P. 2796.....

PLAN VIEW OF FACILITY, COMMENTS



88-INCH CYCLOTRON FACILITY