

ENTRY NO. **C69** Date

Name of Machine University of California Davis 76" Cyclotron

Institution Crocker Nuclear Laboratory (CNL)

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In Charge: Dr. Robert G. Flocchini, Director Reported by: CNL Personnel

HISTORY

MILESTONE DATES:

Design ORIC Copy Model Tests

Construction 1964-1966 First Beam 1966

DESIGN/CONSTRUCTION BY:

in house other W.M. Brobeck & Associates

COST: Accelerator \$1,400,000 Facility \$4,500,000

FUNDED BY: AEC

STATUS

STAFF: Machine

Scientists 1 Engineers None

Technicians 8 Students 2

Research (in house/external)

Scientists / Engineers /

Technicians / Students /

BUDGET: Machine Recharge

Research Funded by Recharge to Grant of User

TIME DISTRIBUTION:

Basic Research (in house/external) 5 % / %

Applied Program (in house/external) 35 % / 30 %

Development % Maintenance 15 %

MAGNET

POLE PARAMETERS:

Diameter 193 cm R_{extract} 80 cm R_{inject} cm

HILL PARAMETERS: Gap (min) 19 cm B_{max} 2.27 T

(0 AT) Gap (max) cm B_{min} T

VALLEY PARAMETERS: Gap (min) 71 cm B_{max} T

(0 AT) Gap (max) cm B_{min} 1.27 T

AVERAGE FIELD: < B >_{min} T < B >_{max} 1.75 T

NUMBER OF SECTORS: compact/separated 3 /

sector angle deg. spiral (max) 30 deg.

FIELD TRIMMING: Trim Coils 10

Harmonic Coils 3

Other 3 Valley Coils

CURRENT: Main Coils 4,000 Amps Stability 5 x 10⁻⁴

Trim Coils 800 Amps Stability 5 x 10⁻⁴

Stored Energy (cryogenic) MJ

WEIGHT: Iron 268 Conductor 42

ION ENERGY: Bending Limit E/A = 90 q²/A² MeV/u

Focussing Limit E/A = q/A MeV/u

ACCELERATION SYSTEM

FUNDAMENTAL ACCELERATION:

Description: Dep. 1

No. of Gaps/turn 2 dE/dn(max) 0.14 MeV/q

Voltage(max) 0.07 MV Harmonic f_{rf}/f_{ion} 3:1

Freq 7.3 to 22.5 MHz Power in(max) 0.15 MW

Stability: Phase ± 1.0 Deg. Voltage 0.005

OTHER CAVITIES (Flattopping or otherwise):

Description: None

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: 10⁻⁷ Torr

PUMPS: No. and type 32 in., 35 in. Diffusion Pumps

Two 300 CFM Mechanical Pumps

ION SOURCE(S)

Type	Intensity (mA)	ε _n = βγc (πmm mrad)	Ion Species
(a) P.I.G. Hot Fil.	2.0		Positive Ion
(b)			
(c)			
(d)			

INJECTION SYSTEM

None Efficiency %

EXTRACTION SYSTEM

Electrostatic + 2 Magnetic Efficiency 30-90 %

CHARACTERISTIC BEAMS

Accelerated Ions	E/A (MeV/u)	Current (part μA)	
		Internal	External
(a) Protons	4 - 68	60	30
(b) Deuterons	15 - 45	60	30
(c) Alphas	16 - 90	60	30
(d)			

Secondary Particles	E (MeV)	part/sec
(a) Neutron		15 - 65 x 10 ⁶
(b)		
(c)		

EXTRACTED BEAM PROPERTIES:

For 1.0 μA of 67.5 MeV/u Proton ions

ΔE/E 0.4 % Δφ °rf

ε_n = βγc x πmm mrad z πmm mrad

FACILITIES FOR RESEARCH

SHIELDED AREA: Fixed 360 m² Moveable None m²

Target Stations: 9 No. Served At Same Time: 1

MAGNETIC SPECTROMETERS:

OTHER FACILITIES:

REFERENCES/NOTES

(a)

(b)

PLAN VIEW OF FACILITY, COMMENTS

