ENTRY NO. 97

NAME OF MACHINE Davis 76" Cyclotron

INSTITUTION Crocker Nuclear Laboratory, University of California, Davis

ADDRESS Davis, California USA

TEL (916) 752-1460 TELEX

IN CHARGE Tom Cahill REPORTED BY Carlos Castaneda/Tom Cahill

HISTORY AND STATUS

DESIGN, date Model tests

ENG DESIGN, date ORIC copy

CONSTRUCTION, date 1964-1966

FIRST BEAM, date (or goal) 1966

MAJOR ALTERATIONS none

COST, ACCELERATOR 1.4×10^6

COST, FACILITY, total 4.5×10^6

FUNDED BY recharges for beams and services

ACCELERATOR STAFF, OPERATION AND DEVELOPMENT

SCIENTISTS 1.5 ENGINEERS 1

TECHNICIANS 6.0 CRAFTS 2.0

GRAD STUDENTS involved during year 5

OPERATED BY Research staff or 4 Operators

OPERATION 140 hr/wk. On target 50 hr./wk

TIME DISTR. in house 95 % Outside 5 %

BUDGET, op & dev 450 K$

FUNDED BY recharges for beams and shops

RESEARCH STAFF, not included above

USERS, in house 12 outside 24

GRAD STUDENTS involved during year 40

RESEARCH BUDGET, in house 1.0 M$

FUNDED BY Radiopharm. Co., NPS, EPA, DOE, NSF

MAGNET

POLE FACE, diameter (compact) 193 cm, R extraction 80 cm

R injection — cm

GAP, min 19 cm, Field 22.7 kG
min 71 cm, Field 12.7 kG
AVERAGE FIELD at R ext 17.5 kG
at 0.8×10^6 Ampere turns

B max/ < B > 13

NUMBER OF SECTORS compact 3, separated — Spiral, max 30 deg

SECTOR ANGLE (SSC) deg

TRIMMING COILS 10

CONDUCTOR, material and type hollow copper

STORED ENERGY (cryogenic) MJ

POWER: main coils 800 max, kW; current stability $\pm 10^{-5}$
trimming coils 800 max, kW; current stability $\pm 10^{-5}$

WEIGHT: Fe 2.68 tons; coils 42 tons

COOLING system deionized water

ION ENERGY (bending limit) E/A = 90 q^2/a^2 MEV/amu
(focusing limit) E/A = q/a MeV/amu

ACCELERATION SYSTEM

DEES, number 1 180 deg

BEAM APERTURE 4.5 cm; DC Bias 0 kV

TUNED by, coarse MS fine VC auto

RF 7.3 to 22 mHz, stable ± $1/10^6$

Orb F 1.5 to 22 mHz

HARMONICS, RF/Orb F, used 1,3

DEE—Gnd, max 120 kV, min gap 1 cm

STABILITY, (pk-pk noise)/(pk RF volt) 0.005

ENERGY GAIN, max 240 kV/turn

RF PHASE, stable to ± 10 deg

RF POWEP input, max 150 kW

FREQUENCY MODULATION, rate /s

modulator, type

beam pulse, width

VACUUM SYSTEM

OPERATING PRESSURE 4×10^{-7} Torr or mbar

PUMPS, No, Type, Size 2 diffusion, 2m

ION SOURCES hot filament, modified LBL 88" source

INJECTION SYSTEM

none

EXTRACTION SYSTEM

Electrostatic + 2 magnetic

FACILITIES FOR RESEARCH

SHIELDED AREA, fixed 360 m²; movable — m²

TARGET STATIONS 10 in 4 rooms

STATIONS served at same time, max 1

MAG SPECTROGRAPH, type none

COMPUTER model PDP 15/40; 2 PDP 11/44; PDP 11/23

OTHER FACILITIES XRF, PIXE Systems; Co-60 Irradiation source; hot radiochemical labs; isotope production; large area irradiation station; 0°-(n,p) facility; off-line counting station(ND65 & ND66 multichannel analyzer)

CHARACTERISTIC BEAMS

PARTICLE	ENERGY (MeV) Goal	ENERGY (MeV) Achieved	CURRENT (pμA) Internal	CURRENT (pμA) External
p		4 to 68		30μA
d		15 to 45		40μA
α		16 to 90		40μA
^{3}He		20 to 90		1μA
SECONDARY (part/s)				
n	15 to 65		10^6	

BEAM PROPERTIES

MEASURED		CONDITIONS			
PULSE WIDTH	10 RF deg	20	pμ A of 65	MeV p	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		pμ A of	MeV	
	rad				

OPERATING PROGRAMS, time distribution

BASIC NUCLEAR PHYSICS 10% SOLID STATES PHYSICS 5%

BIOMEDICAL APPLICAT 15% ISOTOPE PRODUCTIONS 40%

Atomic 5%, Analytical Services (PIXE) 20%

Biological (N-13) 5%

REFERENCES/NOTES

1) Accelerator supported on beam and services
2) recharged since 1971.

PLAN VIEW OF FACILITY, COMMENTS, ETC.