ENTRY No. 19

NAME OF MACHINE ORLEANS ISOCHRONOUS CYCLOTRON Date : JULY 1981
INSTITUTION ... CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE
ADDRESS ..... SERVICE DU CYCLOTRON - 3A RUE DE LA FEROLLERIE 45045 ORLEANS CEDEX (France)
TEL ..... TELEX .....
IN CHARGE ..... G.GOIN ..... REPORTED BY .. G.GOIN .....

HISTORY AND STATUS

DESIGN, date .... 1971 ..... Model tests ... 1971 .....
ENG DESIGN, date ..... 1971 .....
CONSTRUCTION, date .... 1972-1973 (CGR-MeV 680 type) ...
FIRST BEAM, date (or goal) ..... 1974 .....
MAJOR ALTERATIONS .....
..... 6 .....
COST, ACCELERATOR .... 9 x 10 FF (1970) .....
COST, FACILITY, total 8.5x10 FF (1974) + 8x10 FF (1980) ....
FUNDED BY . C.N.R.S .....

ACCELERATOR STAFF, OPERATION AND DEVELOPMENT

SCIENTISTS ..... ENGINEERS ... 2 .....
TECHNICIANS ..... 5 ..... CRAFTS .....
GRAD STUDENTS involved during year .....
OPERATED BY ..... Research staff or ... 5 ..... Operators
OPERATION .. 54 ..... hr/wk, On target .. 31 ..... hr/wk
TIME DISTR. in house ... 86 ..... %, Outside .... 14 ..... %
BUDGET, op & dev 1.35 x 10 FF (1981) .....
FUNDED BY CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE

RESEARCH STAFF, not included above

USERS, in house .... 8 ..... outside ... 16 .....
GRAD STUDENTS involved during year .....
RESEARCH BUDGET, in house .....
FUNDED BY .....

MAGNET

POLE FACE, diameter (compact) 160. cm, R extraction 67.5. cm
R injection ..... cm
GAP, min .. 13 ..... cm, Field .19 ..... kG
max . 27 ..... cm, Field .11 ..... kG } at .0,25.10 Ampere turns
AVERAGE FIELD at R ext ..... 15 ..... kG
B max/ <B> ..... 1,27 .....
NUMBER OF SECTORS { compact .4 ... / separated ..... } Spiral, max 53 deg
SECTOR ANGLE (SSC) ..... deg
TRIMMING COILS HARMONIC COILS . 4 .....
..... CIRC.. COILS .... 8 .....
CONDUCTOR, material and type .....
STORED ENERGY (cryogenic) ..... MJ
POWER : main coils 110 ... max, kW ; current stability 2. 10
trimming coils ..... max, kW ; current stability 2. 10
WEIGHT : Fe ..... 100 ..... tons ; coils ..... tons
COOLING system DEMINERALISED WATER .....
ION ENERGY (bending limit) E/A = .50 ..... q²/a² MeV/amu
(focusing limit) E/A = .50 ..... q /a MeV/amu

ACCELERATION SYSTEM

DEES, number ... 2 ..... ; angle ..... 60 ..... deg
BEAM APERTURE ... 3 ..... cm ; DC Bias ..... kV
TUNED by, coarse . M-PANEL ..... fine .. M-PANEL .....
RF .... 20 ..... to .. 40 ..... mHz, stable ± .... 1 ..... /10
Orb F . 5 ..... to .. 20 ..... mHz
HARMONICS, RF/Orb F, used .....
DEE - Gnd, max . 40 ... kV, min gap ..... cm
STABILITY, (pk-pk noise)/(pk RF volt) ... 5,.10 .....
ENERGY GAIN, max ..... 132 ..... kV/turn
RF PHASE, stable to ± ..... 0.2 ..... deg
RF POWER input, max ..... 110 ..... kW
FREQUENCY MODULATION, rate ..... /s
modulator, type .....
beam pulse, width .....

VACUUM SYSTEM

OPERATING PRESSURE ..... 2 x 10 ..... Torr or mbar
PUMPS, No, Type, Size . DIFFUSION PUMPS .....
..... 2 x 6000 L / s .....
.....

ION SOURCES

..... INTERNAL LIVINGSTONE TYPE .....

INJECTION SYSTEM

.....

EXTRACTION SYSTEM

ELECTROSTATIC DEFLECTOR+FOCUSING MAGNET .....

FACILITIES FOR RESEARCH

SHIELDED AREA, fixed ... 25 ..... m² ; movable .≃ 225 ..... m²
TARGET STATIONS .. 4 ..... in ... 4 ..... rooms
STATIONS served at same time, max ... 1 .....
MAG SPECTROGRAPH, type .....
COMPUTER model .....
OTHER FACILITIES-FAST NEUTRON PRODUCTION FOR NEUTRONTHERAPY, BIOLOGY and ACTIVATION - SHORT LIVED GAZ ISOTOPE PRODUCTION-ISOTOPE PRODUCTION(123, I)-CHEMISTRY FACILITY WITH HOT CELLS

CHARACTERISTIC BEAMS

PARTICLE	ENERGY (MeV) Goal	Achieved	CURRENT (pμA) Internal	External
P	.5-38	.5-38	200	100
d	.5-24	.5-25	200	90
ALPHA	10-48	10-50	100	50

SECONDARY (part/s)
n, FROM P+Be ... FOR 10x10cm FIELD SIZE AT 135cmSSD/
34 Mev ..... DOSE RATE: 17 CGy min ⁻¹

BEAM PROPERTIES

	MEASURED	CONDITIONS
PULSE WIDTH	25-30 RF deg	5 ..... pμ A of 25 . MeV d . ions
PHASE EXC, max	... RF deg	..... pμ A of .... MeV ... ions
EXTRACT eff	.65 .... %	40 .... pμ A of 34 . MeV p . ions
RESOL ΔE/E	..... %	..... pμ A of .... MeV ... ions
EMITTANCE		
(π mm. mrad)	{ ... axial / 40 .. rad }	3 ..... pμA of 45 .. MeV ∝ ions

OPERATING PROGRAMS, time distribution

BASIC NUCLEAR PHYSICS 0% SOLID STATES PHYSICS 24% .
BIOMEDICAL APPLICAT. .... ISOTOPE PRODUCTIONS ....
..... 69% ..... 7% .....
.....

REFERENCES/NOTES

PLAN VIEW OF FACILITY, NOTEWORTHY FEATURES, COMMENTS Machine being constructed by CGR-Mev FRANCE

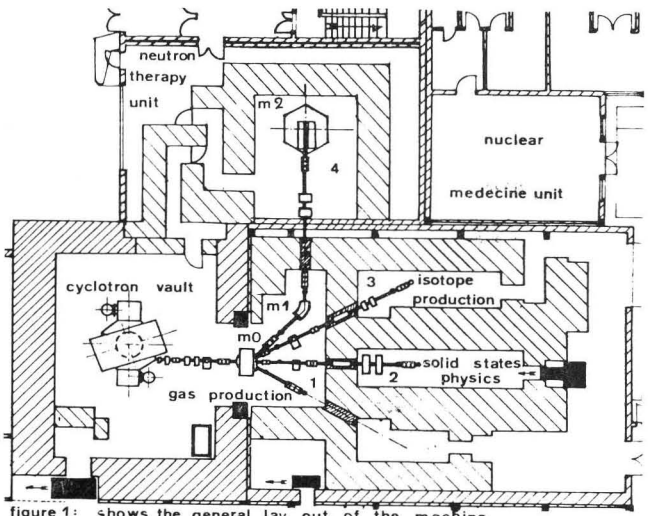

figure 1: shows the general lay out of the machine the experimental area and beam transport lines