

ENTRY No. C17
NAME OF MACHINE ORLEANS ISOCHRONOUS CYCLOTRON **DATE** JUNE 1992
INSTITUTION CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE
ADDRESS C.E.R.I. 3A RUE DE LA FEROLLERIE 45071 ORLEANS CEDEX 2
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
 FIRST BEAM, date (or goal) 1974
 MAJOR ALTERATIONS

COST, ACCELERATOR 9.8.10⁶ FF (1970)
 COST, FACILITY, total 8.5x10⁶ FF (1974) + 8x10⁶ FF (1980)
 FUNDED BY C.N.R.S.

ACCELERATOR STAFF, OPERATION AND DEVELOPMENT
 SCIENTISTS ENGINEERS 3
 TECHNICIANS 4 CRAFTS
 GRAD STUDENTS involved during year

OPERATED BY Research staff or 6 Operators
 OPERATION 64 hr/wk, On target 46 hr/wk
 TIME DISTR. in house % Outside %

BUDGET, op & dev ≈ 10⁶ FF (1992)
 FUNDED BY CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE
 RESEARCH STAFF, not included above

USERS, in house 10 outside 6
 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 0.25.10⁶

AVERAGE FIELD at R ext 15 kG } Ampere turns
 B max/ 1,27

NUMBER OF SECTORS { compact 4 } Spiral, max 53 deg
 separated
 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 2.10⁻⁵
 trimming coils max, kW ; current stability 2.10⁻⁵

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 q²/a² MeV/amu

ACCELERATION SYSTEM

DEES, number 2 ; angle 60 deg
 BEAM APERTURE 3 cm ; DC Bias kV
 TUNED by, coarse M-PANEL fine A-PANEL

RF 20 to 40 MHz, stable ± 1.10⁻⁶
 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, 10⁻³
 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 10⁶ 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 NEUTRON THERAPY, BIOLOGY and ACTIVATION - SHORT LIVED GAS ISOTOPE PRODUCTION-ISOTOPE PRODUCTION - CHEMISTRY FACILITY

CHARACTERISTIC BEAMS WITH HOT CELLS

PARTICLE ENERGY (MeV) CURRENT (pA) Internal External

P 5-38 5-36 55

d 5-24 5-25 55

ALPHA 10-48 10-50 10

SECONDARY (part/s)

n, FROM P+Be FOR 10x10cm FIELD SIZE AT 135µSSD/

34 MeV DOSE RATE: 17 CGY/min

BEAM PROPERTIES

MEASURED CONDITIONS

PULSE WIDTH 25-30 RF deg 5 pA of 25 MeV d ions

PHASE EXC, max RF deg pA of MeV ions

EXTRACT eff 65 % 40 pA of 34 MeV p ions

RESOL ΔE/E % pA of MeV ions

EMITTANCE

(π mm, mrad) { axial } 3 pA of 45 MeV α ions

{ 40 rad }

OPERATING PROGRAMS, time distribution

BASIC NUCLEAR PHYSICS 0% SOLID STATES PHYSICS 69%

BIOMEDICAL APPLICAT. 31% ISOTOPE PRODUCTIONS 0%

REFERENCES/NOTES

PLAN VIEW OF FACILITY, NOTEWORTHY FEATURES, COMMENTS

