ENTRY No. 2

NAME OF MACHINE CYCLONE DATE August 1981
INSTITUTION Université Catholique de Louvain
ADDRESS Chemin du Cyclotron, 2 - B - 1348 LOUVAIN-LA-NEUVE, Belgium
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IN CHARGE Y. JONGEN REPORTED BY C. PIRART

HISTORY AND STATUS

DESIGN, date 1969 Model tests 1969
ENG DESIGN, date 1968-1969
CONSTRUCTION, date 1969-1971
FIRST BEAM, date (or goal) 1972
MAJOR ALTERATIONS
COST, ACCELERATOR 3.10^6 $ U.S.
COST, FACILITY, total $6.5\ 10^6$ $ U.S.
FUNDED BY University of Louvain, IISN (State)

ACCELERATOR STAFF, OPERATION AND DEVELOPMENT

SCIENTISTS - ENGINEERS 3
TECHNICIANS 9 CRAFTS 3
GRAD STUDENTS involved during year 1
OPERATED BY Research staff or 4 Operators
OPERATION 168 hr/wk, On target 140 hr/wk
TIME DISTR. in house %, Outside %
BUDGET, op & dev 900.000 $ (incl. salaries)
FUNDED BY IISN - UCL

RESEARCH STAFF, not included above

USERS, in house 38 outside 45
GRAD STUDENTS involved during year 10
RESEARCH BUDGET, in house 450.000 $ without salaries
FUNDED BY IISN - UCL

MAGNET

POLE FACE, diameter (compact) 215.6cm, R extraction 93 cm
R injection - cm
GAP, min 16.6 cm, Field 21.5 kG
max 40.5 cm, Field 11.5 kG
at $4\ 10^6$ Ampere turns
AVERAGE FIELD at R ext 16 kG
B max/ <B>
NUMBER OF SECTORS compact 4 / separated - Spiral, max 53 deg
SECTOR ANGLE (SSC) deg
TRIMMING COILS 12 pairs
CONDUCTOR, material and type Cu (20 x 20 ø 13 mm)
STORED ENERGY (cryogenic) MJ
POWER : main coils 400 max, kW ; current stability 10^{-5}
trimming coils 100 max, kW ; current stability 10^{-3}
WEIGHT : Fe 200 tons ; coils 6 tons
COOLING system desionized water
ION ENERGY (bending limit) E/A = 130 q^2/a^2 MeV/amu
(focusing limit) E/A = 95 q /a MeV/amu

ACCELERATION SYSTEM

DEES, number 2 ; angle 86 deg
BEAM APERTURE 3.8 cm ; DC Bias 0 kV
TUNED by, coarse MP fine MP auto
RF 10.6 to 23 mHz, stable ± $0.1\ 10^{-6}$
Orb F 3.6 to 23 mHz
HARMONICS, RF/Orb F, used 1, 2, 3
DEE - Gnd, max 50 kV, min gap cm
STABILITY, (pk-pk noise)/(pk RF volt) 10^{-4}
ENERGY GAIN, max kV/turn
RF PHASE, stable to ± 0.1 deg
RF POWER input, max 240 kW
FREQUENCY MODULATION, rate - /s
modulator, type -
beam pulse, width -

VACUUM SYSTEM

OPERATING PRESSURE 2.10^{-6} mbar
PUMPS, No, Type, Size 2 x (OIL DIF. 12.000 l/s)
1 cryopanel 10.000 l/s 15° K

ION SOURCES

Internal : Livingston-Jones, Hot cathode Pig
External : ECR

INJECTION SYSTEM

Axial injection

EXTRACTION SYSTEM

DC electrostatic + weak magn. channel

FACILITIES FOR RESEARCH

SHIELDED AREA, fixed 390 m² ; movable 1300 m²
TARGET STATIONS 12 in 8 rooms
STATIONS served at same time, max 1
MAG SPECTROGRAPH, type -
COMPUTER model -
OTHER FACILITIES Remote target handling-hot cell - neutron beam (radiotherapy-biology) - neutron beam (physics) - on line mass separator (LISOL)

CHARACTERISTIC BEAMS

PARTICLE	ENERGY (MeV) Goal	ENERGY (MeV) Achieved	CURRENT (pμA) Internal	CURRENT (pμA) External
p	80	95	2000	50
α	80	130	200	45
Heavy ions		130 Q^2/A		
Ar^{8+}				0.012
SECONDARY n from (d + Be 50 MeV)			10^{14} (part/s)	

BEAM PROPERTIES

MEASURED	CONDITIONS
PULSE WIDTH 10-30 RF deg	20 pμ A of 33 MeV D ions
PHASE EXC, max 30 RF deg	5 pμ A of 65 MeV P ions
EXTRACT eff 90 %	20 pμ A of 65 MeV P ions
RESOL ΔE/E 0.3 %	1 pμ A of 40 MeV α ions
EMITTANCE	
(π mm. mrad) 40 axial / 60 rad	1 pμA of 65 MeV P ions

OPERATING PROGRAMS, time distribution

BASIC NUCLEAR PHYSICS 51 SOLID STATES PHYSICS -
BIOMEDICAL APPLICAT. 20 ISOTOPE PRODUCTIONS 10

REFERENCES/NOTES

PLAN VIEW OF FACILITY, NOTEWORTHY FEATURES, COMMENTS