ENTRY NO. 16

NAME OF MACHINE GANIL

INSTITUTION Grand Accélérateur National d'Ions Lourds

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IN CHARGE JOUBERT REPORTED BY GOUTTEFANGEAS - JOUBERT

HISTORY AND STATUS

DESIGN, date 1973 Model tests 1976

ENG DESIGN, date 1975 - 1976

CONSTRUCTION, date 1976 - 1982

FIRST BEAM, date (~~or goal~~) November 1982

MAJOR ALTERATIONS A second injector cyclotron with an E.C.R. source is in construction

COST, ACCELERATOR

COST, FACILITY, total 500 MFF 1984 (salaries excluded)

FUNDED BY French AEC and IN2P3 (CNRS)

ACCELERATOR STAFF, OPERATION AND DEVELOPMENT

SCIENTISTS and ENGINEERS 34

TECHNICIANS 29 CRAFTS 5

GRAD STUDENTS involved during year 5

OPERATED BY 23 Research staff or 24 Operators

OPERATION 400 hr/wk On target 250 hr/wk
months months

TIME DISTR. in house 5 % Outside 95 %

BUDGET, op & dev 45 MFF (salaries excluded)

FUNDED BY French AEC and IN2P3 (CNRS)

RESEARCH STAFF, not included above

USERS, in house 12 outside 250

GRAD STUDENTS involved during year 25

RESEARCH BUDGET, in house 12 MFF

FUNDED BY French AEC and IN2P3

MAGNET (SCC1 or SCC2)

POLE FACE, diameter (compact) cm, R extraction 300 cm

R injection 257 cm

GAP, min 1.6 cm, Field 16,5 kG
min 10 cm, Field 16,5 kG } at 173000 Ampere turns

AVERAGE FIELD at R ext 9,5 kG

B max/ < B > 1.73

NUMBER OF SECTORS { compact ; separated 4 } Spiral, max deg

SECTOR ANGLE (SSC) 52 deg

TRIMMING COILS 12 isochronous coils in series in the 4 quadrants, 28 harmonic and compensation coils

CONDUCTOR, material and type copper + MgO

STORED ENERGY (cryogenic) MJ

POWER: main coils 950 max, kW; current stability 10^{-5}
trimming coils 140 max, kW; current stability 10^{-4}

WEIGHT: Fe 1700 tons; coils 14 tons

COOLING system demineralized water

ION ENERGY (bending limit) E/A = 400 q^2/a^2 MEV/amu
(focusing limit) E/A = " q/a MeV/amu

ACCELERATION SYSTEM (SCC1 or SCC2)

DEES, number 2 34 deg

BEAM APERTURE 5 cm; DC Bias kV

TUNED by, coarse movable panel fine rotating loop

RF 6.5 to 14 mHz, stable ± 10^{-8}

Orb F 1,6 to 7 mHz

HARMONICS, RF/Orb F, used 7,14 (SSC1) ; 2,4 (SSC2)

DEE—Gnd, max 200 kV kV, min gap 10^{-4} 6 cm

STABILITY, (pk-pk noise)/(pk RF volt) 10

ENERGY GAIN, max 4 x 200 kV/turn

RF PHASE, stable to ± 0,1 deg

RF POWEP input, max 80/cavity kW

FREQUENCY MODULATION, rate /s

modulator, type

beam pulse, width

VACUUM SYSTEM (SCC1 and SCC2)

OPERATING PRESSURE 5.10 Torr or mbar

PUMPS, No, Type, Size 8 cryogenics unit 60 cm nominal diameter

ION SOURCES

~~Pig internal (radially inserted)~~

ECR external (axial injection system)
in construction

INJECTION SYSTEM (SCC1 and SCC2)

magnetic channel + electrostatic inflector

EXTRACTION SYSTEM (SCC1 and SCC2)

electrostatic deflector + magnetic channel

FACILITIES FOR RESEARCH

SHIELDED AREA, fixed m²; movable 4000 m²

TARGET STATIONS 10 in 8 rooms

STATIONS served at same time, max 2

MAG SPECTROGRAPH, type Energy loss spectrometer

COMPUTER model Modcomp

OTHER FACILITIES 3 large scattering chambers ; super stripped high energy ions line ; on line mass separator ; He jet facility ; low temperature irradiation facility

CHARACTERISTIC BEAMS

PARTICLE	ENERGY (MeV amu) Goal	Achieved	CURRENT (pμA) Internal	External
O	94	94		0,15
Ar		60		0,03
Ar		44		0,06
Kr		35		0,004
SECONDARY		(part/s)		

BEAM PROPERTIES

MEASURED		CONDITIONS			
PULSE WIDTH 6,5 RF deg	0,05 pμ A of 44	MeV/amu	ions	argon	
PHASE EXC. max RF deg	pμ A of	MeV	ions		
EXTRACT eff 95 %	" pμ A of	" MeV	" ions	"	
RESOL ΔE/E 0,05%	" pμ A of	" MeV	" ions	"	
EMITTANCE (π mm. mrad) { 6 π axial ; 3 π rad }	0,05 pμ A of 44	MeV/amu	argon		

OPERATING PROGRAMS, time distribution

BASIC NUCLEAR PHYSICS 90% SOLID STATES PHYSICS and ATOMIC BIOMEDICAL APPLICAT ISOTOPE PRODUCTIONS PHYSICS 10%

REFERENCES/NOTES

1) L'accélérateur GANIL (Avril 1975)

2)

PLAN VIEW OF FACILITY, COMMENTS, ETC.