ENTRY No. 52

NAME OF MACHINE . NAC Light-ion Injector . . . . . DATE . . July 1981
INSTITUTION . . . . . National Accelerator Centre
ADDRESS . . . . . P.O Box 72, Faure, 7131, Republic of South Africa.
TEL . . . . . 43620 . . . . . TELEX . . 57-22202 S.A.
IN CHARGE . . D. . Reitmann . . . . . REPORTED BY . . A.H. . Botha

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HISTORY AND STATUS

DESIGN, date . . . 1978 . . . . . Model tests . 1979-1980 . . . . .
ENG DESIGN, date . . . . . 1978- . . . . . .
CONSTRUCTION, date . 1980-1983 . . . . . .
FIRST BEAM, date (or goal) . Goal - April 1983 . . . . . .
MAJOR ALTERATIONS . . . . . -
COST, ACCELERATOR
COST, FACILITY, total . . . . . -
FUNDED BY . . . . . CSIR

ACCELERATOR STAFF, OPERATION AND DEVELOPMENT

SCIENTISTS . . . . . 4 . . . . ENGINEERS . . . 1 . . . . . .
TECHNICIANS . . . . . 4 . . . . CRAFTS . . . . . 2 . . . . . .
GRAD STUDENTS involved during year . . . . . 0 . . . . . .
OPERATED BY . . . - . . . . . Research staff or . . . . . - . . Operators
OPERATION . . . . . - . . . . . hr/wk, On target . . . . . - . . . . . hr/wk
TIME DISTR. in house . . - . . . . . %, Outside . . - . . . . . %
BUDGET, op & dev . . . . . -
FUNDED BY . . . . . CSIR

RESEARCH STAFF, not included above

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

MAGNET

POLE FACE, diameter (compact) . . 116cm, R extraction 47.6cm
R injection . . . . . - . . . cm
GAP, min . . . 15.6 . . cm, Field . . . . 7.5 . . . . kG
max . . . 25.0 . . cm, Field . . . 12.3 . . . . kG
at 2.15 x 10^5 Ampere turns
AVERAGE FIELD at R ext . . . . . 9.8 . . . . kG
B max/ <B> 1.25
NUMBER OF SECTORS { compact . . 4 . . . / separated . . - . . . } Spiral, max 0. deg
SECTOR ANGLE (SSC) . . . . . - deg
TRIMMING COILS . . . . 5 pairs of circular coils
CONDUCTOR, material and type . . . Copper
STORED ENERGY (cryogenic) . . . . . - . . . . . MJ
POWER : main coils . . . 90 max, kW ; current stability . 10^{-5}.
trimming coils . . . . 2 max, kW ; current stability . 10^{-4}.
WEIGHT : Fe . . . . . 54.5 . . . . tons ; coils . . . . . 1.85 . . . . . tons
COOLING system . . . . Demineralized water
ION ENERGY (bending limit) E/A = . . 8 . . . . . q^2/a^2 MeV/amu
(focusing limit) E/A = . . 8 . . . . . q /a MeV/amu

ACCELERATION SYSTEM

DEES, number . . . . . 2 . . . . . ; angle . . . . . 90 . . . . . deg
BEAM APERTURE . . . . 4 . . . . . cm ; DC Bias . . . . . 0 . . . . . kV
TUNED by, coarse . . . . MS . . . . . fine . VC, AUTO . . . . . .
RF . . . . . 8.6 . . . to . . 26 . . . . . mHz, stable ± . . . . . .
Orb F . . . . 1.43 . . to . . 13 . . . . . mHz
HARMONICS, RF/Orb F, used . . . . . 2 and 6 . . . . . .
DEE - Gnd, max . . . 60 . kV, min gap . . . . . 4 . . . . . cm
STABILITY, (pk-pk noise)/(pk RF volt) . . . . . .
ENERGY GAIN, max . . . 240 . . . . . kV/turn
RF PHASE, stable to ± . . . . . deg
RF POWER input, max . . . . . 2 x 25 . . . . . kW
FREQUENCY MODULATION, rate . . . - . . . . . /s
modulator, type . . . . . -
beam pulse, width . . . . . -

VACUUM SYSTEM

OPERATING PRESSURE . . . . . 1 x 10^{-6} . . . . . Torr
PUMPS, No, Type, Size . . 1 Turbo 4.8 $m^3 s^{-1}$ . . 1 Roots . . . . . .
. 350 $m^3 h^{-1}$ . . 1 Rotary Vane 60 $m^3 h^{-1}$ . . 2 Cryo-pumps 5 $m^3 s^{-1}$
. . . . . .

ION SOURCES

. . . . . Internal hot cathode source . . . . . .

INJECTION SYSTEM

. . . . . .

EXTRACTION SYSTEM

1 Electrostatic deflector and two magnetic channels . . . .

FACILITIES FOR RESEARCH

SHIELDED AREA, fixed . . . . . m^2 ; movable . . . . . m^2
TARGET STATIONS . . . . . in . . . . . rooms
STATIONS served at same time, max . . . . . .
MAG SPECTROGRAPH, type . - . . . . . .
COMPUTER model . . . . . .
OTHER FACILITIES . . . . . .
. . . . . .
. . . . . .

CHARACTERISTIC BEAMS

PARTICLE	ENERGY (MeV) Goal	Achieved	CURRENT (pμA) Internal	External
p	0.8 - 8			
d	0.4 - 4			
^{3}He	1 - 10.7			
^{4}He	0.8 - 8			
SECONDARY			(part/s)	
-				
-				

BEAM PROPERTIES

MEASURED		CONDITIONS		
PULSE WIDTH	RF deg	pμ A of	MeV . . .	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 / . . . . rad }		. . . . . pμA of	MeV . . .	ions

OPERATING PROGRAMS, time distribution

BASIC NUCLEAR PHYSICS . . SOLID STATES PHYSICS . . . .
BIOMEDICAL APPLICAT. . . . ISOTOPE PRODUCTIONS . . . .
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REFERENCES/NOTES

PLAN VIEW OF FACILITY, NOTEWORTHY FEATURES, COMMENTS