ENTRY No. 7 TASCC (Tandem Accelerator

NAME OF MACHINE SuperConducting Cyclotron) ... DATE .....
INSTITUTION ..Atomic Energy of Canada Limited.....
ADDRESS .....Chalk River Nuclear Laboratories, Chalk River, Ontario, Canada K0J 1J0.....
TEL ....613-584-3311..... TELEX .053-34555.....
IN CHARGE .....J.C. Hardy..... REPORTED BY ...J.A. Hulbert.....

HISTORY AND STATUS

DESIGN, date ..1973..... Model tests . 1974-1978.....
ENG DESIGN, date ...1974-1982.....
CONSTRUCTION, date ...1978-1984.....
FIRST BEAM, date (or goal) ..... September 1985 .....
MAJOR ALTERATIONS .....
.....
COST, ACCELERATOR ...$..2.4 M Canadian.....
COST, FACILITY, total ....$.12... M Canadian.....
FUNDED BY .... Atomic Energy of Canada Limited.....

ACCELERATOR STAFF, OPERATION AND DEVELOPMENT

SCIENTISTS .....3..... ENGINEERS .....8.....
TECHNICIANS .....8..... CRAFTS/OPS.....15.....
GRAD STUDENTS involved during year .....
OPERATED BY ..... Research staff or ..... Operators
OPERATION .....80... hr/wk, On target ...50-75.... hr/wk
TIME DISTR. in house ..... %, Outside ..... %
BUDGET, op & dev .....
FUNDED BY .....

RESEARCH STAFF, not included above

USERS, in house ....14..... outside 6-16 at a time...
GRAD STUDENTS involved during year .....
RESEARCH BUDGET, in house .....
FUNDED BY .....

MAGNET

POLE FACE, diameter (compact) 138.6cm, R extraction ..65 cm
R injection .14.5... cm - 22 cm
GAP, min ...3.7... cm, Field .....60... kG } at .5.4. x. 10^6
max .64..... cm, Field .....43... kG } Ampere turns
AVERAGE FIELD at R ext .....50... kG
B max/ <B> ...1.2 - 1.7.....
NUMBER OF SECTORS { compact ...4.. / separated ..... } Spiral, max 50 deg
SECTOR ANGLE (SSC) ..... deg
TRIMMING COILS ..13 saturated iron trim rods.....
.....in each flutter pole.....
CONDUCTOR, material and type .....Nb-Ti.....
STORED ENERGY (cryogenic) ..... 22 ..... MJ
POWER : main coils ..... max, kW ; current stability .....
trimming coils ..... max, kW ; current stability .....
WEIGHT : Fe ...170 ..... tons ; coils ....10..... tons
COOLING system .....Liquid helium bath.....
ION ENERGY (bending limit) E/A = ...520.. q^2/a^2 MeV/amu
(focusing limit) E/A = ...100.. q^2/a^2 MeV/amu

ACCELERATION SYSTEM

DEES, number .....4..... ; angle .....40..... deg
BEAM APERTURE .....2.... cm ; DC Bias ....0..... kV
TUNED by, coarse sliding short fine variable capacitors.
RF .....31... to ...62..... mHz, stable ± .1 in 106.....
Orb F .....5.9.. to ...23.4... mHz
HARMONICS, RF/Orb F, used ...2, 4, 6.....
DEE - Gnd, max .100.. kV, min gap ....3..... cm
STABILITY, (pk-pk noise)/(pk RF volt) ..1/104.....
ENERGY GAIN, max .....800 q keV..... kV/turn
RF PHASE, stable to ± ..... deg
RF POWER input, max .....100..... kW
FREQUENCY MODULATION, rate ..... /s
modulator, type .....
beam pulse, width .....

VACUUM SYSTEM

OPERATING PRESSURE ..... Torr or mbar
PUMPS, No, Type, Size ..two cryopanels.....
.....1500 l/s each.....
.....

ION SOURCES

.....13 MeV Van de Graaff.....

INJECTION SYSTEM

Carbon stripper after radial injection.....

EXTRACTION SYSTEM

electrostatic deflector, superconducting magnetic.....

FACILITIES FOR RESEARCH

channel
SHIELDED AREA, fixed ..... m^2 ; movable ..... m^2
TARGET STATIONS ...4..... in ....1.... rooms
STATIONS served at same time, max ....1.....
MAG SPECTROGRAPH, type ..Q3D (accessible after Phase II
COMPUTER model ..Perkin Elmer.....construction)
OTHER FACILITIES ..8. π. spectrometer.....
.....
Research facilities funded for Phase II upgrade.....

CHARACTERISTIC BEAMS

PARTICLE	ENERGY (MeV) Goal	Achieved	CURRENT (pμA) Internal	External
C^{12}	600			
U^{238}	2370			
I^{127}		1270	3.5 pnA	2. pnA
I^{127}		710	5. pnA	3.5. pnA
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 ..58...	%	0.0035 pμ A of 1270 MeV ^{127}I ions
RESOL ΔE/E .0.05..	%	0.002 . pμ A of 710 MeV ^{127}I ions
EMITTANCE		
(π mm. mrad) {0.7 axial / 0.6 rad}		0.003 . pμA of 1270 MeV ^{127}I ions

OPERATING PROGRAMS, time distribution

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

1) J.A. Hulbert, et al., Proc. 11th Int. Conf. on Cycl. and their Applications, Tokio 1986

PLAN VIEW OF FACILITY, NOTEWORTHY FEATURES, COMMENTS