ENTRY NO. C7 **Date** June 20/92

Name of Machine HIRFL Sector Focusing Cyclotron (Injector)

Institution Institute of Modern Physics, Chinese Academy of Sciences (IMP)

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In Charge: B.W.Wei Reported by: F.Ye IHEP. CERN. CH

HISTORY

MILESTONE DATES:

Design ..... Model Tests .....

Construction ..... First Beam .....

DESIGN/CONSTRUCTION BY:

in house ..... other ....

COST: Accelerator ..... Facility .....

FUNDED BY: .....

STATUS

STAFF: Machine

Scientists 10 Engineers 10

Technicians 10 Students 3

Research (in house/external)

Scientists ..... / ..... Engineers ..... / .....

Technicians ..... / ..... Students ..... / .....

BUDGET: Machine ..... Funded by .....

Research ..... Funded by .....

TIME DISTRIBUTION:

Basic Research (in house/external) ..... % / ..... %

Applied Program (in house/external) ..... % / ..... %

Development ..... % Maintenance ..... %

MAGNET

POLE PARAMETERS:

Diameter 170 cm $R_{extract}$ 75 cm R_{inject} 4.5 cm

HILL PARAMETERS: Gap (min) 19 cm B_{max} 2.0 T

(@ ..... AT) Gap (max) ..... cm B_{min} ..... T

VALLEY PARAMETERS: Gap (min) ..... cm B_{max} ..... T

(@ ..... AT) Gap (max) 31.6 cm B_{min} 1.2 T

AVERAGE FIELD: $< B >_{min}$ 0.8 T $< B >_{max}$ 1.6 T

NUMBER OF SECTORS: compact/separated 3 / .....

sector angle ..... deg. spiral (max) 33° deg.

FIELD TRIMMING: Trim Coils 12

Harmonic Coils 4 X 3

Other .....

CURRENT: Main Coils 1300 Amps Stability $1 e^{-5}$

Trim Coils 500 Amps Stability $1 e^{-4}$

Stored Energy (cryogenic) ..... MJ

WEIGHT: Iron 220 tons Conductor 16 tons

ION ENERGY: Bending Limit E/A = 69 q^2/A^2 MeV/u

Focussing Limit E/A = ... q/A MeV/u

ACCELERATION SYSTEM

FUNDAMENTAL ACCELERATION:

Description: 1/2 lambda/ 1 resonator

No. of Gaps/turn 2 dE/dn(max) 0.2 MeV/q

Voltage(max) 100 MV Harmonic f_{rf}/f_{ion} 1, 3

Freq 6-18 MHz Power in(max) 0.2 MW

Stability: Phase 1° Voltage 10^{-3}

OTHER CAVITIES (Flattopping or otherwise):

Description: .....

Region of Influence: R_{min} ..... cm R_{max} ..... cm

No. of Gaps/turn ..... dE/dn(max) ..... MeV/q

Voltage(max) ..... MV Harmonic f_{rf}/f_{ion} .....

Freq ..... MHz Power in(max) ..... MW

Stability: Phase ..... Voltage .....

VACUUM SYSTEM

OPERATING PRESSURE: 5×10^{-5} Pa

PUMPS: No. and type 2 HIRFL 800 cryo-pumps,

2 turbo-pumps, rough pumping system

ION SOURCE(S)

	Type	Intensity (mA)	@	$\epsilon_n = \beta\gamma\epsilon$ (πmm mrad)	Ion Species
(a)	ECR	0.1-0.3		200	C - Ta
(b)					
(c)					
(d)					

INJECTION SYSTEM

spiral electrostatic inflector ..... Efficiency 30 %

EXTRACTION SYSTEM

electrostatic deflectors + magnetic channel Efficiency 70 %

CHARACTERISTIC BEAMS

	Accelerated Ions	E/A (MeV/u)	Current(part μA) Internal	External
(a)	C^{4+}	4.5		1
(b)	C^{4+}	6.6		1
(c)	O^{5+}	4.5		1
(d)	Ar^{8+}	2.3		0.8

	Secondary Particles	E (MeV)	part/sec
(a)			
(b)			
(c)			

EXTRACTED BEAM PROPERTIES:

For ..... μA of ..... MeV/u ..... ions

$\Delta E/E$ ..... % $\Delta\phi$ ..... °rf

$\epsilon_n = \beta\gamma\epsilon$ x ..... πmm mrad z ..... πmm mrad

FACILITIES FOR RESEARCH

SHIELDED AREA: Fixed ..... m^2 Moveable ..... m^2

Target Stations: ..... No. Served At Same Time: .....

MAGNETIC SPECTROMETERS: .....

OTHER FACILITIES: .....

.....

.....

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REFERENCES/NOTES

(a) .....

(b) .....

PLAN VIEW OF FACILITY, COMMENTS