

ENTRY No. 72

NAME OF MACHINE IUCF Main Stage DATE August 1981
 INSTITUTION Indiana University
 ADDRESS Milo B. Sampson Lane, Bloomington, IN 47405, USA
 TEL 812-337-9365 TELEX
 IN CHARGE D.W. Miller, P.P. Singh REPORTED BY R.E. Pollock

HISTORY AND STATUS

DESIGN, date 1966 Model tests 1967-1972
 ENG DESIGN, date 1968-1973
 CONSTRUCTION, date 1968-1974
 FIRST BEAM, date (or goal) August 1975
 MAJOR ALTERATIONS

COST, ACCELERATOR \$6.10⁶
 COST, FACILITY, total \$14.10⁶
 FUNDED BY National Science Foundation and IU

ACCELERATOR STAFF, OPERATION AND DEVELOPMENT

SCIENTISTS 5 ENGINEERS 5
 TECHNICIANS 15 CRAFTS 15
 GRAD STUDENTS involved during year 0
 OPERATED BY Research staff or Operators
 OPERATION 135 hr/wk, On target 90 hr/wk
 TIME DISTR. in house 45 % Outside 55 %
 BUDGET, op & dev \$3.10⁶
 FUNDED BY National Science Foundation

RESEARCH STAFF, not included above

USERS, in house 25 outside >120
 GRAD STUDENTS involved during year 18
 RESEARCH BUDGET, in house \$1.10⁶
 FUNDED BY NSF

MAGNET

POLE FACE, diameter (compact) cm, R extraction 330 cm
 R injection 101 cm
 GAP, min 7.6 cm, Field 16 kG }
 max ∞ cm, Field <0.2 kG } at 150000
 AVERAGE FIELD at R ext 6.4 kG } Ampere turns
 B max/ 2.50

NUMBER OF SECTORS { compact } Spiral, max 0 deg
 { separated 4 }
 SECTOR ANGLE (SSC) 36° deg

TRIMMING COILS 21 Gradient, 4 Harmonic

CONDUCTOR, material and type Hollow Copper

STORED ENERGY (cryogenic) MJ

POWER: main coils 400 max, kW; current stability ±10.10⁶
 trimming coils 100 max, kW; current stability

WEIGHT: Fe 2000 tons; coils 10 tons

COOLING system Deionized Water

ION ENERGY (bending limit) E/A = 215 q²/a² MeV/amu
 (focusing limit) E/A = >215 q/a MeV/amu

ACCELERATION SYSTEM

DEES, number 2; angle 38 deg

BEAM APERTURE 4 cm; DC Bias 0 kV

TUNED by, coarse Panels fine

RF 25 to 35 MHz, stable ±
 Orb F 1.6 to 9.0 MHz

HARMONICS, RF/Orb F, used 3-8, 11-16

DEE - Gnd, max 200 kV, min gap 3 cm

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

ENERGY GAIN, max 800 kV/turn

RF PHASE, stable to ± deg

RF POWER input, max 150 kW

FREQUENCY MODULATION, rate /s
 modulator, type
 beam pulse, width

VACUUM SYSTEM

OPERATING PRESSURE 10⁻⁵ Torr

PUMPS, No, Type, Size
 2 Diffusion + 6 Cryopanel

ION SOURCES

Duoplasmatron (H⁺, He⁺)
 Beta-Euchryptite (Li⁺)
 Hot Filament P.I.G. (He⁺⁺)
 Atomic Beam (p, d)

INJECTION SYSTEM

DC Terminal plus 1/3 Scale Injector Cyclotron

EXTRACTION SYSTEM

Non Resonant, Electric/Magnetic

FACILITIES FOR RESEARCH

SHIELDED AREA, fixed 300 m²; movable 800 m²
 TARGET STATIONS 7 in 5 rooms

STATIONS served at same time, max 1
 MAG SPECTROGRAPH, type QDDM QDD (30 msr)

COMPUTER model 3 Harris Slash 4
 OTHER FACILITIES Long Path Neutron Swinger

CHARACTERISTIC BEAMS

PARTICLE	ENERGY (MeV)		CURRENT (pA)	
	Goal	Achieved	Internal	External
p	200	215	7	6.0
d	104	98		1.5
³⁴ He	300/200	230/196		0.3
^{6,7} Li	300/260	154/100		0.1

SECONDARY (part/s)
 200 (2.10⁶)

BEAM PROPERTIES

MEASURED		CONDITIONS	
PULSE WIDTH	4 RF deg	pA of	MeV ions
PHASE EXC, max	7 RF deg	pA of	MeV ions
EXTRACT eff	95 %	pA of	MeV ions
RESOL ΔE/E	0.05 %	pA of	MeV ions

EMITTANCE
 (π mm. mrad) { 1.5 axial } pA of MeV ions
 { 1.5 rad }

OPERATING PROGRAMS, time distribution

BASIC NUCLEAR PHYSICS 95% SOLID STATES PHYSICS
 BIOMEDICAL APPLICAT. ISOTOPE PRODUCTIONS

REFERENCES/NOTES**PLAN VIEW OF FACILITY, NOTEWORTHY FEATURES, COMMENTS**