ENTRY No. 38

NAME OF MACHINE Zyklotron U-120 DATE March 1989
INSTITUTION Zentralinstitut für Kernforschung Rossendorf
ADDRESS DDR - 8051 Dresden, PF 19
TEL 5910 TELEX
IN CHARGE E. Richter REPORTED BY E. Richter, H. Guratzsch

HISTORY AND STATUS

DESIGN, date Model tests
ENG DESIGN, date
CONSTRUCTION, date 1957-1958
FIRST BEAM, date (or goal) August 1958
MAJOR ALTERATIONS see below x)

COST, ACCELERATOR
COST, FACILITY, total
FUNDED BY government

ACCELERATOR STAFF, OPERATION AND DEVELOPMENT

SCIENTISTS 4 ENGINEERS 4
TECHNICIANS 10 CRAFTS -
GRAD STUDENTS involved during year -
OPERATED BY - Research staff or 2 Operators
OPERATION 120 hr/wk, On target 110 hr/wk
TIME DISTR. in house 75 %, Outside 25 %
BUDGET, op & dev
FUNDED BY government

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) 120 cm, R extraction 52.5 cm
R injection cm
GAP, min 17 cm, Field 14.5 kG
max cm, Field kG
at 0.29×10^6 Ampere turns
AVERAGE FIELD at R ext 14.1 kG
B max/ <B>
NUMBER OF SECTORS compact / separated Spiral, max deg
SECTOR ANGLE (SSC) deg
TRIMMING COILS
CONDUCTOR, material and type hollow copper
STORED ENERGY (cryogenic) MJ
POWER : main coils 70 max, kW ; current stability 5×10^{-5}
trimming coils max, kW ; current stability
WEIGHT : Fe 105 tons ; coils 15 tons
COOLING system H_2O
ION ENERGY (bending limit) E/A = 27 q^2/a^2 MeV/amu
(focusing limit) E/A = q^2/a^2 MeV/amu

ACCELERATION SYSTEM

DEES, number 2 ; angle 180 deg
BEAM APERTURE 4.5 cm ; DC Bias kV
TUNED by, coarse mov. short fine trim cap.
RF 8.2 to 16.8 mHz, stable ±
Orb F 8.2 to 16.8 mHz
HARMONICS, RF/Orb F, used 1
DEE - Gnd, max 60 kV, min gap 5 cm
STABILITY, (pk-pk noise)/(pk RF volt)
ENERGY GAIN, max 240 kV/turn
RF PHASE, stable to ± deg
RF POWER input, max 120 kW
FREQUENCY MODULATION, rate /s
modulator, type
beam pulse, width

VACUUM SYSTEM

OPERATING PRESSURE 10^{-5} Torr or ~~mbar~~
PUMPS, No, Type, Size 5 oil diffusion pumps
2 2500 l/s, 3 500 l/s

ION SOURCES PIG internal

INJECTION SYSTEM

EXTRACTION SYSTEM

electrostatic deflector 110 degr.

FACILITIES FOR RESEARCH

SHIELDED AREA, fixed 200 m² ; movable - m²
TARGET STATIONS 6 in 2 rooms
STATIONS served at same time, max 1
MAG SPECTROGRAPH, type
COMPUTER model K 1630 + PCs
OTHER FACILITIES Isotope production fac.
Neutron therapy fac.
Irradiation fac.

CHARACTERISTIC BEAMS

PARTICLE	ENERGY (MeV) Goal	Achieved	CURRENT (pμA) Internal	External
d, H_2^+		13.5		50
α		27		10
$^3He^{2+}$		31		2
$^6Li^{3+}$		42		0.05
SECONDARY			(part/s)	
n			1.3×10^{12}	

BEAM PROPERTIES

	MEASURED		CONDITIONS		
PULSE WIDTH	16 RF deg	50	pμ A of 13.5	MeV	d ions
PHASE EXC, max	RF deg		pμ A of	MeV	ions
EXTRACT eff	60 %		pμ A of	MeV	ions
RESOL ΔE/E	0.6 %		pμ A of	MeV	ions

EMITTANCE
(π mm. mrad) axial / rad pμA of MeV ions

OPERATING PROGRAMS, time distribution

BASIC NUCLEAR PHYSICS 25 % SOLID STATES PHYSICS
BIOMEDICAL APPLICAT. ISOTOPE PRODUCTIONS 40 %
Medicine 25 % Thin Layer Activation 10 %

REFERENCES/NOTES

1) Alekseew A.G. et. al. Kernenergie 3 (1960)456
2) 20 Jahre Rossendorfer Zyklotron, ZfK-363 (1978)

PLAN VIEW OF FACILITY, NOTEWORTHY FEATURES, COMMENTS

x) Extensions: switching magnet 1963, computer 1970, fast neutron facility 1972, ^3He 1975, ^6Li 1978, isotope production facility 1977, circ. coils 1989 (p 12 MeV).