

ENTRY No. C25
 NAME OF MACHINE: Zyklotron U-120 DATE: March 1989
 INSTITUTION: Zentralinstitut für Kernforschung, Rossendorf
 ADDRESS: DDR - B51 D r e s d e n, PF 19
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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 ENGINEERS
 TECHNICIANS 10 CRAFTS
 GRAD STUDENTS involved during year
 OPERATED BY Research staff or 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 } at 0.29×10^6
 max cm, Field kG } Ampere turns
 AVERAGE FIELD at R ext 14.1 kG }
 B max/ < B >
 NUMBER OF SECTORS { compact } Spiral, max .. deg
 separated }
 SECTOR ANGLE (SSC) deg
 TRIMMING COILS
 CONDUCTOR, material and type hollow copper
 STORED ENERGY (cryogenic) M\$
 POWER: main coils 70 max, kW ; current stability 5×10^{-4}
 trimming coils max, kW ; current stability
 WEIGHT: Fe 105 tons ; coils 15 tons
 COOLING system H₂O
 ION ENERGY (bending limit) E/A = 27 q²/a² MeV/amu
 (focusing limit) E/A = q²/a² MeV/amu
ACCELERATION SYSTEM
 DEES, number 2 ; angle 180 deg
 BEAM APERTURE 4.5 cm ; DC Bias kV
 TUNED by, coarse mov. short line trim cap.
 RF 8.2 to 16.8 MHz, stable \pm
 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 \pm 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 deg.
FACILITIES FOR RESEARCH
 SHIELDED AREA, fixed 200 m² ; movable m²
 TARGET STATIONS 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)		CURRENT (pA)	
	Goal	Achieved	Internal	External
d, H ₂ ⁺		13.5		50
³ He ²⁺		21		10
⁶ Li ³⁺		31		2
L ⁺		42		0.05

SECONDARY

0 (part/g)
 1.3x10¹⁰

BEAM PROPERTIES

MEASURED CONDITIONS
 PULSE WIDTH 16 RF deg 50 pA of 12 MeV d ions
 PHASE EXC, max RF deg pA of MeV ions
 EXTRACT eff 60 % pA of MeV ions
 RESOL $\Delta E/E$ 0.6 % pA of MeV ions
EMITTANCE
 (x mm. mrad) { axial } pA of MeV ions
 { rad }

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

