ENTRY No. 28

NAME OF MACHINE JULIC DATE September 1981
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HISTORY AND STATUS

DESIGN, date 1963 Model tests 1963-1965
ENG DESIGN, date 1964/1965
CONSTRUCTION, date 1966-1969
FIRST BEAM, date (or goal) int. 1968; ext. 1969
MAJOR ALTERATIONS none
COST, ACCELERATOR $14 \cdot 10^6$ DM
COST, FACILITY, total $24 \cdot 10^6$ DM (cycl. + bldg.)
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ACCELERATOR STAFF, OPERATION AND DEVELOPMENT

SCIENTISTS 4 ENGINEERS 2
TECHNICIANS 14 CRAFTS 5
GRAD STUDENTS involved during year -
OPERATED BY Research staff or 9 Operators
OPERATION 168 hr/wk, On target 135 hr/wk
TIME DISTR. in house 70 %, Outside 30 %
BUDGET, op & dev
FUNDED BY Kernforschungsanlage Jülich

RESEARCH STAFF, not included above

USERS, in house 30 outside 75
GRAD STUDENTS involved during year 5-10
RESEARCH BUDGET, in house
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MAGNET

POLE FACE, diameter (compact) 330 cm, R extraction 154 cm
R injection cm
GAP, min 8.4 cm, Field 19.2 kG
max 24 cm, Field 7 kG } at 150000 Ampere turns
AVERAGE FIELD at R ext 13.5 kG
B max/ <B> 1.42
NUMBER OF SECTORS { compact 3 / separated } Spiral, max 20 deg
SECTOR ANGLE (SSC) deg
TRIMMING COILS 12
CONDUCTOR, material and type copper, square hollow
STORED ENERGY (cryogenic) MJ
POWER : main coils 50 max, kW ; current stability $\pm 2 \cdot 10^{-6}$
trimming coils 12 max, kW ; current stability $\pm 5 \cdot 10^{-5}$
WEIGHT : Fe 700 tons ; coils 12 tons
COOLING system demineralized water
ION ENERGY (bending limit) E/A = 180 q^2/a^2 MeV/amu
(focusing limit) E/A = q /a MeV/amu

ACCELERATION SYSTEM

DEES, number 3 ; angle 40 deg
BEAM APERTURE 2.4 cm ; DC Bias 0 kV
TUNED by, coarse panels fine rotating loops
RF 21 to 30 mHz, stable $\pm$ $1.3 \cdot 10^{-5}$
Orb F 7 to 10 mHz
HARMONICS, RF/Orb F, used h=3
DEE - Gnd, max 45 kV, min gap 1 cm
STABILITY, (pk-pk noise)/(pk RF volt) $1 \cdot 10^{-3}$
ENERGY GAIN, max 240 kV/turn
RF PHASE, stable to $\pm$ deg
RF POWER input, max 60 kW
FREQUENCY MODULATION, rate /s
modulator, type
beam pulse, width

VACUUM SYSTEM

OPERATING PRESSURE $5 \cdot 10^{-6}$ Torr or mbar
PUMPS, No, Type, Size 2, oil diffusion
80 cm diameter, 30000 l/s

ION SOURCES

Livingston type

INJECTION SYSTEM

EXTRACTION SYSTEM

electrostatic defl., screening chann., focusing channel

FACILITIES FOR RESEARCH

SHIELDED AREA, fixed 210 m^2 ; movable 915 m^2
TARGET STATIONS 11 in 6 rooms
STATIONS served at same time, max 1
MAG SPECTROGRAPH, type QQDDQ (BIG KARL)
COMPUTER model PDP15, PDP11, VAX11/780
OTHER FACILITIES Scattering chambers; In-beam nucl. spectr. equipm.; Bent-crystal spectrom.; Orange type β-spectrom.; Facilities for isotope production and chemistry

CHARACTERISTIC BEAMS

PARTICLE	ENERGY (MeV) Goal	Achieved	CURRENT (pμA) Internal	External
p		22.5- 45	>100	>30
d		45 - 90	>100	>20
^{3}He		67.5-135	> 30	> 5
α		90 -180	> 40	> 8
SECONDARY			(part/s)	

BEAM PROPERTIES *

MEASURED		CONDITIONS				
PULSE WIDTH	15/6 RF deg	100/10	pμ A of	60	MeV	d ions
PHASE EXC, max	RF deg		pμ A of		MeV	ions
EXTRACT eff	50/75 %	10/4	pμ A of	60	MeV	d ions
RESOL ΔE/E	0.3/0.15%	10/4	pμ A of	60	MeV	d ions
EMITTANCE (π mm. mrad) { 6 axial / 6/3 rad }		10/4	pμA of	60	MeV	d ions

OPERATING PROGRAMS, time distribution

BASIC NUCLEAR PHYSICS 84 SOLID STATES PHYSICS -
BIOMEDICAL APPLICAT. - ISOTOPE PRODUCTIONS 10 %
Beam and apparatus development 6 %

REFERENCES/NOTES

* second number refers to insert axial phase slits.

Complete reference list: L. Aldea, W. Bräutigam, R. Brings, C. Mayer-Böricke, J. Reich, P. Wucherer: Status of JULIC, Proc. 9th Int.Conf. on Cycl. and their Appl. (Caen, 1981)

PLAN VIEW OF FACILITY, NOTEWORTHY FEATURES, COMMENTS