ENTRY NO. 28

NAME OF MACHINE JULIC

INSTITUTION Institut für Kernphysik der Kernforschungsanlage Jülich (KFA)

ADDRESS D-5170 Jülich

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IN CHARGE Managing director REPORTED BY W. Bräutigam, J. Reich
of IKP, 1984: O. Schult

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 5 ENGINEERS 2

TECHNICIANS 6 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 75 % Outside 25 %

BUDGET, op & dev

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RESEARCH STAFF, not included above

USERS, in house 20 outside 50

GRAD STUDENTS involved during year

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 40 deg

BEAM APERTURE 2.4 cm; DC Bias 0 kV

TUNED by coarse panels fine rotating loops

RF 21 to 30 mHz, stable ± $1.3 \cdot 10^{-5}$

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 ± ... deg

RF POWEP 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 m²; movable 915 m²

TARGET STATIONS 11 in 6 rooms

STATIONS served at same time, max 1

MAG SPECTROGRAPH, type QQDDQ (BIG KARL)

COMPUTER model 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	> 50
d		45 - 90	> 100	> 20
^{3}He		67.5 - 135	> 30	> 15
α		90 - 180	> 40	> 20
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	5 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 pμ A of	60 MeV	d

OPERATING PROGRAMS, time distribution

BASIC NUCLEAR PHYSICS 80 SOLID STATES PHYSICS -

BIOMEDICAL APPLICAT - ISOTOPE PRODUCTIONS 10 %

Beam and apparatus development 10 %

REFERENCES/NOTES * second number refers to 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, COMMENTS, ETC.