ENTRY NO. 31

NAME OF MACHINE AEG Compact Cyclotron Munich DATE 8/15/78
INSTITUTION Fachbereich Physik Technical University Munich BRD
ADDRESS D 8046 Garching James Franckstr.

IN CHARGE H. Morinaga REPORTED by E. Huenges

HISTORY AND STATUS

DESIGN, date 1968 MODEL tests 1970
ENG. DESIGN, date 1970
CONSTRUCTION, date 1972
FIRST BEAM date (or goal) 1973
MAJOR ALTERATIONS Tritium ion source system
OPERATION, 100 hr/wk; On Target 80 hr/wk
TIME DIST., in house 80 %, outside 20 %
USERS' SCHEDULING CYCLE / weeks
COST, ACCELERATOR 1.5×10^6 DM
COST, FACILITY, total 3×10^6 DM
FUNDED BY Bavarian Government

ACCELERATOR STAFF, OPERATION and DEVELOPMENT

SCIENTISTS 1 ENGINEERS 1
TECHNICIANS 2 CRAFTS 1
GRAD STUDENTS involved during year
OPERATED BY Res staff or Operators
BUDGET, op & dev
FUNDED BY Bavarian Government

RESEARCH STAFF, not included above

USERS, in house 5 outside 8
GRAD STUDENTS involved during year 3
RES. BUDGET, in house 150.000 DM
FUNDED BY Bavarian Government

FACILITIES FOR RESEARCH

SHIELDED AREA, fixed 100 m^2
movable m^2
TARGET STATIONS 1 in 1 rooms
STATIONS served at same time, max –
MAG SPECTROGRAPH, type –
COMPUTER, model –
OTHER FACILITIES Rotating internal target for beam intensities up to 1mA for 22MeV protons

REFERENCES/NOTES

MAGNET

POLE FACE diameter 109 cm; R extraction 48 cm
GAP, min 5.4 cm; Field 19 kG } at X 10^6
max 17.5 cm; Field 8 kG } ampere turns
AVERAGE FIELD at R ext 14 kG
CURRENT STABILITY 50 parts/10^6; $B_{max}/\langle B \rangle$ 1.35
NUMBER OF SECTORS 4 ; SPIRAL, max – deg
POLE FACE COIL PAIRS: AVF 1 /sec;
Harmonic correction 4 per sector
Rad grad /sec or Circ coils
WEIGHT: Fe 25 tons; Coils 5 tons
CONDUCTOR, Material and type Copper
STORED ENERGY MJ
COOLING SYSTEM Demineralized water
POWER: Main coils 40 max, kW
Trimming coils 2 max, kW
YOKE/POLE AREA 100 %
SECTOR ANGLE (Sep Sec) deg
ION ENERGY (Bending limit) E/A = 25 q^2/A^2 MeV
(Focusing limit) E/A = 22 q/A MeV

ACCELERATION SYSTEM

DEES, number 2 angle 63 deg
BEAM APERTURE 2.3 cm; DC BIAS 0 kV
TUNED by, coarse Short st. fine Trim. cap.
RF 28 to 42.5 mHz, stable ± 1 part /10^6
Orb F 7 to 21.3 mHz; GAIN, max 130 kV/turn
HARMONICS, RF/Orb F, used 2, 4
DEE-Gnd, max 50 kV, min gap 2.3 cm
STABILITY, (pk-pk noise)/(pk RF volt) 0.0007
RF PHASE stable to ± deg
RF POWER input, max 40 kW
RF PROTECT circuit, speed – μsec
Type
FREQUENCY MODULATION, rate 0 /sec
MODULATOR, type –
BEAM PULSE, width –

VACUUM SYSTEM

PUMPS, No., Type, Size 2 diffusion oil pumps or 1 ion getter p. 2000
OPERATING PRESSURE 7 μTorr,
PUMPDOWN TIME 10 hrs

ION SOURCES/INJECTION SYSTEM

Internal Livingstone type

EXTRACTION SYSTEM

Electrost. deflector + mag.ch.

CONTROL SYSTEM

Conventional system

ENTRY NO. 31 (cont.)

CHARACTERISTIC BEAMS

	Particle	Goal (MeV)	Achieved (MeV)
ENERGY	p, ^{4}He		22
	d		11
	^{3}He		29
	t		7.3
		(μA)	(μA)
CURRENT Internal	p, d	1000	400
	t		45
	He	80	40
External			
		(part/s)	(part/s)
Secondary			

BEAM PROPERTIES

	Measured	Conditions
Pulse Width	____ RF deg	____ μA of ____ MeV ____
Phase Exc, max	____ RF deg	____ μA of ____ MeV ____
Extract Eff	____ %	____ μA of ____ MeV ____
Res, ΔE/E	____ %	____ μA of ____ MeV ____
Emittance (mm-mrad)	____ axial ____ radial	____ μA of ____ MeV ____

OPERATING PROGRAMS, time dist

Basic Nuclear Physics	%
Solid State Physics	5 %
Bio-Medical Applications	%
Isotope Production	85 %
Development	10 %
	%
	%

PLAN VIEW OF FACILITY, NOTEWORTHY FEATURES, OPERATION SUMMARY, ADDITIONAL REFERENCES

The AEG isochronous compact cyclotron is an energy fixed machine for light particles with rather high beam intensities. It is used nearly exclusively for isotope production. The main purpuse is the production of strong 57Co - sources for Mößbauer experiments and the production of various short-lived isotopes usefull in biological research by means of the the tritium beam.