

Entry: **C26**
 Machine Name: Karlsruhe Isochronous Zyklotron (KIZ)
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HISTORY

Design by: AEG in 1958
 Construction time: 1960-1962
 First beam: 1963

CHARACTERISTIC BEAMS

ions / energy (MeV/n) / current (pps) / power (W) :
 - H_2^+ 26 / 15 μ A (ext) 780
 - d 26 / 20 μ A (ext) 1040
 - He^{2+} 26 / 10 μ A (ext) 1040

transmission efficiency (total)
 - typical: 95 % - best: 95 - 100 %
 transverse emittance (rms)
 - vertical: 8 π mmmrad
 - horizontal: 4 π mmmrad
 longitudinal emittance (rms) 5 - 10 $\Delta E/E$.deg RF

USES

basic research: 10 % therapy: %
 development: 5 % isotope production: 10 %
 other applications: 70 % maintenance: \approx 3 %
 beam tuning: %
 total time: \approx 800 h/year

TECHNICAL DATA

a) magnet
 type: normal conductor (copper)
 Kb: MeV/A Kf: MeV/A
 average field (min-max): 1.43/0.95/1.95 T
 number of magnet sectors: 3
 - angle: 60 deg
 - spiral (max): deg
 pole parameters
 - diameter: 2.25 m
 - injection radius: m
 - extraction radius: 1.05 m
 hill gap: 0.08 m valley gap: 0.16 m
 field trimming
 - trim coils
 - number: 6
 - current (max): 6 A
 - harmonic coils
 - number: 6
 - current (max): 15 A
 - others
 - number:
 - current (max): A
 main coils:
 - number: 2
 - Ampere-turns: 164 000 A.T.
 - current: 360 A
 stored energy: MJ
 weight : - iron: 280 t - coils: \approx 3 t
 power
 - main coils (total): 35 kW

- trim coils (total max): 5 kW
 - refrigerator (cryogenic): kW

b) RF

- acceleration
 - frequency range: 33 MHz
 - harmonic modes: 3
 - number of dees: 3
 - angular aperture: 60 deg
 - voltage:- average (min-max): 50 kV
 - variation with radius:
 - power in (max): 50 kW
 - stability:- phase: ± 1 deg - voltage: 0.1 %

- other cavities

- purpose:
 - frequency range: MHz
 - region of influence: m
 - voltage (max): kV
 - power in (max): kW
 - stability:- phase: deg - voltage: %

c) injection

- internal source: Hot cathode penning
 - external (radial/axial):
 - elements:
 - source voltage: 0 - 0.3 kV
 - injection energy: MeV/n
 - buncher:

- injection efficiency: %
d) ion sources/injector

e) extraction

- elements, characteristics:
 - 2 electrostatic deflector
 - efficiency
 - typical: 50 % - best: 60 %

f) vacuum

- pumps: 2 oil diffusion pumps
 - achieved vacuum: 2×10^{-6} Pa

REFERENCES

a) Proc. 7th Int. Conf. on cyclotrons, p. 496
 b) Proc. 12th Int. Conf. on cyclotrons, p. 194
 c) Proc. 13th Int. Conf. on cyclotrons, p. 801

EXPERIMENTAL FACILITIES

Experimental Hall
 Dual Beam Facility

PLAN VIEW OF FACILITY

