

**ENTRY NO:**C15**Date:** 3 Feb 2005 15:31:56**Machine Name:** ISL Berlin (former: VICKSI)**Institution:** Hahn-Meitner-Institut Berlin**Address:** Glienicke Str. 100 D 14109 Berlin, Germany**Telephone:** ++49-30-8062-2415**Fax:** ++49-30-8062-2097**Web Address:** www.hmi.de/isl/**Person in Charge of Cyclotron:** W. Pelzer**Person Reporting Information:** A. Denker**E-mail Address:** denker@hmi.de**History****Designed by:** in house, Scanditronix, Danfysik and other**Construction Dates:** cyclotron design 1973-74

cyclotron construction 1974-76

**First Beam Date:** June 1977**Characteristic Beams**

p	72MeV	6e11 pps	6W;
12C	30MeV/u	6e9 pps	0.4W
86Kr	1-5 MeV/u	>7e10pps	(typical: 20W)
129Xe	1.8-5 MeV/u	>2e10pps	(typical: 5W)
197Au	1.5-3.5 MeV/u	>3e10pps	(typical: 3W)

**Transmission Efficiency (source to extracted beam)****Typical (%)**: 10%**Best (%)**: 30%**Emittance****Emittance Definition:** normalized**Vertical (pi mm mrad)**: 0.4 pi mmm mrad**Horizontal (pi mm mrad)**: 0.4 pi mmm mrad**Longitudinal (dE/E[%] x RF[deg.])**: 0.1 X 6 (dE/E (%) x RF-deg.)**USES****Basic Research (%)**: materials modification + ion-solid-interaction:33% analytic: 13%, others: 14%**Development (%)**: 10%**Therapy (%)**: 10%**Isotope Production (%)**: -**Other Application (%)**: 5%**Maintenance (%)**: is done outside total time**Beam Tuning (%)**: 15%**Total Time (h/year)**: 4500**TECHNICAL DATA****(a)Magnet****Type:** separated sectors**Kb (MeV)**: 132**Kf (MeV)**:**Average Field (min./max. T)**: 0.89 T max.**Number of Sectors**: 4**Hill Angular Width (deg.)**: 50**Spiral (deg.)**: -**Pole Diameter (m)**: -**Injection Radius (m)**: 0.43**Extraction Radius (m)**: 1.71**Hill Gap (m)**: 0.06**Valley Gap (m)**: open**Trim Coils****Number**: 9\*2**Maximum Current (A-turns)**: 100 A-turns**Harmonic Coils****Number**: 3\*N\_sector\*2**Maximum Current (A-turns)**: 150 A-turns**Main Coils****Number**: 1\*2**Total Ampere Turns**: 2000\*30 A-turns**Maximum Current (A)**: 2000 A**Stored Energy (MJ)**: -**Total Iron Weight (tons)**: 360 t**Total Coil Weight (tons)**: 6 t**Power****Main Coils (total KW)**: 400 kW**Trim Coils (total, maximum, KW)**: 60 kW**Refrigerator (cryogenic, KW)**: -**(b)RF****Acceleration****Frequency Range (MHz)**: 10-20 MHz**Harmonic Modes**: 2-8 MHz**Number of Dees**: 2**Number of Cavities**: 2**Dee Angular Width (deg.)**: 26 deg.**Voltage****At Injection (peak to ground, KV)**: 140 kV**At Extraction (peak to ground, KV)**: 100 kV**Peak (peak to ground, KV)**: 140 kV**Line Power (max, KW)**: 200 kW**Phase Stability (deg.)**: < 0.1 deg**Voltage Stability (%)**: < 0.05 %**(c)Injection****Ion Source**: 2 external injectors: Van-de-Graaff and 2 stage RFQ with ECR sources**Source Bias Voltage (kV)**:**External Injection**: radial**Buncher Type**: external, 60 % in 6 deg.**Injection Energy (MeV/n)**: 0.09 - 4 MeV/u**Component**: 2 magnetic, 1 electrostatic**Injection Efficiency (%)**: > 70 %**Injector**: either 5.5 MV Van-de-Graaff or 2 stage RFQ**(d)Extraction****Elements, Characteristic**: 3 radial deflectors: 2 magnetic, 1 electrostatic**Typical Efficiency (%)**: 95 %**Best Efficiency (%)**: 100 %**(e)Vacuum****Pumps**: 2 cryogenic, 2 turbomolecular**Achieved Vacuum (Pa)**: 1e5Pa**REFERENCES** IEEE Vol.NS-26/2 1979, p 1872, 2300, 2344, 2202

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**EXPERIMENTAL FACILITIES**

Analysis: HE PIXE, HE ERDA,

Mat.mod: dual beam line BIBER, on-line XRD, Laser post ionisation, e-spectroscopy  
tumour therapy**COMMENTS** see figure