Instrument Data (E 2)

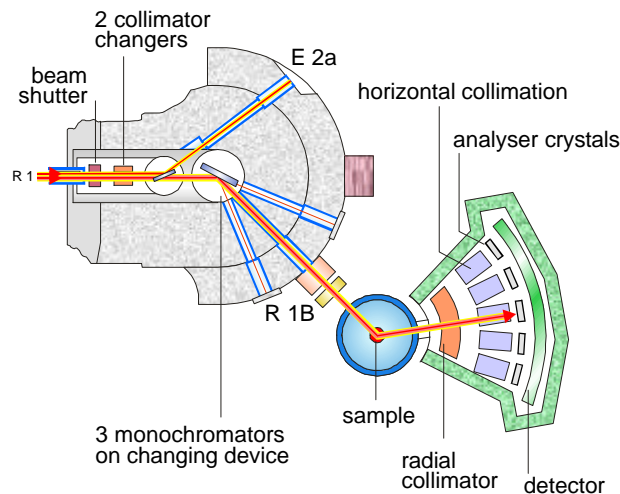|	
Beam tube:	R 1B
Collimators:	15', 30', 60' (open)
Monochromator crystals:	Cu 220 (Lambda=0,091 nm) Ge 311 (Lambda=0,121 nm) PG 002 (Lambda=0,241 nm)
Range of scattering angle:	-10°< 2Theta < 107°
2 Theta-resolution:	0.3°-0.1°
Tilting angle:	0°< My < 18°
Multidetector - Radius: - Angular range: - Distance between wires: - Effective height: - Pressure: - Efficiency at:	 1500 mm 80° (400 wires, or data points) 5.3 mm (0.2°) 90 mm 1 bar 0,12 nm 30 % 0,18 nm 40 % 0,24 nm 55 %
Analyzer crystals: - Energy resolution: - Energy tranfer:	5 crystals, PG 002, covering a 2Theta-sample range of 40° simultaneously 1 meV (E_i=14.1 meV) -13 meV to +4 meV (E_i-E_f)
Flux at sample position:	$2 \cdot 10^6$ n/cm^{2}s (flat PG monochromator without collimation)
Sample environment	T = 20 mK – 1700 K H (vertical) = 0 T – 6.5 T H (horizontal) = 0 T – 1 T
Data analysing	TVtueb (Freeware / Win32) Bean (UNIX)

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2 collimator changers

beam shutter

E 2a

horizontal collimation

analyser crystals

R 1

R 1B

3 monochromators on changing device

sample

radial collimator

detector

Verbundforschung

Hahn-Meitner Institut Berlin
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Flat-Cone single crystal diffractometer E2
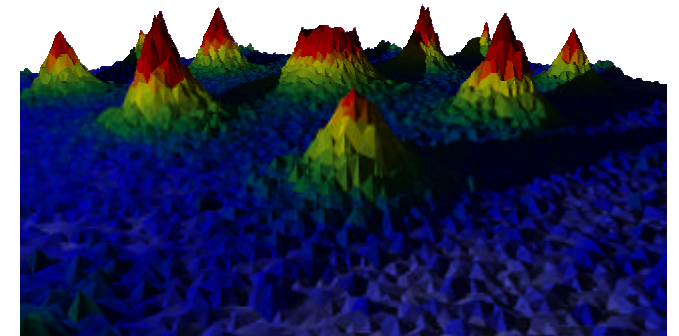
Single Crystal Applications

As single crystal diffractometer with high intensity and a low background, the instrument can be used for the study of:

- *complicated distributions of Bragg and superstructure reflections in three dimensions of reciprocal space (Flat-Cone).*

- *diffuse scattering arising from structural and magnetic disorder.*

Single crystal

Energy analysis of neutron scattering can also be done to some extent, especially to record the elastic contribution.

Powder Applications

As powder diffractometer with medium resolution and high intensity, the instrument can be used for the study of:

- *magnetic and crystal structures*

- *phase transitions*

- *in-situ kinetic of phase transitions and chemical reactions*

Sample changer

Optional: Measure a lot of powder samples inline by using the sample change.

Data analysing with TV*tueb*

TV*tueb* is develloped for WinNT/2000. This software is able to visualize and analyse one and two-dimensional intensity distributions. The program is designed especially for data determined by neutron experiments using diffractometer equipped with linear multidetector and can be used for single crystal and for powder experiments aswell.
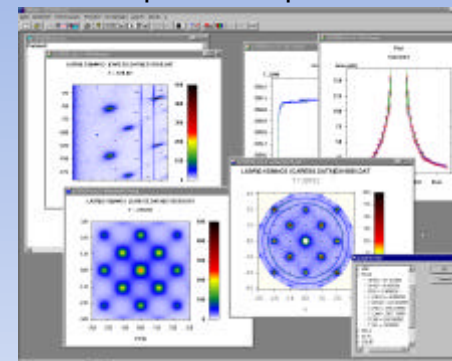
The newest version of the program can be downloaded: www.hmi.de/bensc/flat-cone.html
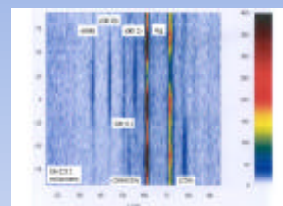
Flat-Cone

The Flat-Cone method is a special Weissenberg-Technique by which three-dimensional diffraction data are measured layer by layer in reciprocal space. One specific layer or plane can be adjusted by tilting the multidetector and the sample table by an angle µ. All scattering events of this layer can then be obtained by rotating around the axis of the sample table.
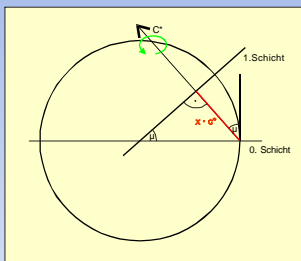
In-Situ-Measurements
Example: HTC-Superconductor

The aim with an in-situ neutron diffraction experiments in the investigation of multi filamentary Bi-2223/Ag tape superconductors was to characterise the formation reaction of the Bi-2223 phase and the changes in the secondary phases assemblage under real reaction conditions without removing of the silver sheath of the composite.

Area of Expertise

The Flat-Cone single crystal diffractometer is well suited for investigation of diffuse scattering. With extensions of the software package TV*tueb* can be fit models of structural and magnetical disorder and there diffuse scattering distribution.

Experiment
Theory
MnO - Magnetic Disorder