ROBL-CRG	**Experiment title:** Micro focusing with capillary optics and/or KB Mirror systems at ROBL	**Experiment number**: **20_02_653**
Beamline: BM 20	**Date of experiment**: from: 10.10.2007 to: 17.10.2007	**Date of report**: 5.11.2007
Shifts: 21	**Local contact(s)**: Dr. Carsten Baehtz (baehtz@esrf.fr)	*Received at ROBL:*

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Report:

Microfocussing is one of the great challenge for future investigations using Xray techniques. Therefore a monocapillary was tested for diffraction experiments on BM20. A new motorized and in the control software integrated alignment stage was also tested. The beam entrance of this capillary is 4.25 mm whereby the centred beamstop is around 2.6 mm, so only approx. 1.65 mm^2 beam area was accepted by this device. To test the performance reciprocal space maps (RSM) of (400) were also recorded.

Results

The device works at 8 kev with a gain of 445 and at 17 kev the gain decreases down to 110. At higher energies this device is not applicable. The smalles spot size was approx. 30*50 µm at 8 keV.

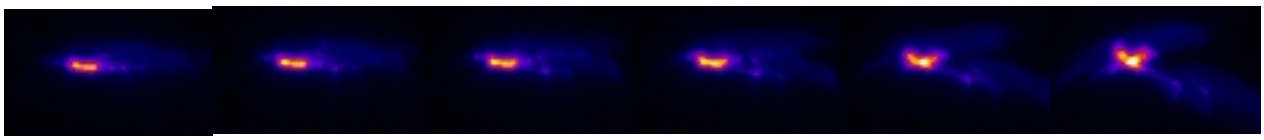

Fig1: Focus at 8 keV by different bending (30, 20, 17, 14.5, 12 respectively 9,5km) of mirror 2, recorded with an Photonics FDII.

The focus spot was recorded using a CCD camera with 12 µm pixel size. Additionally the focus size was mapped by the use of an 10 µm pin hole and a scintillation counter. In both cases side maximas were observed. To demonstrate the loss of resolution in an diffraction experiment, the RMS of Si (004) with and without capillary was recorded (Fig.3).

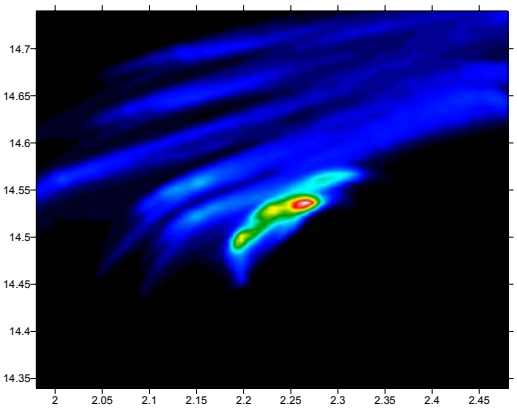

Fig 2: Focus mapped by the use of a pin hole, scaling in mm, intensity in logarithm scale.

Results

The intensity gain especially at 8keV is satisfactory, the energie range is competetive with other systems. Due to the fact, that incoming beam is divided into two parts by the central beam stop of the capillary and then reflected, leads to two itself at the focus crossing separate beams. Therefore the use of this device should only be recomanded in vertical scattering geometrie, where this effect can be neglected.

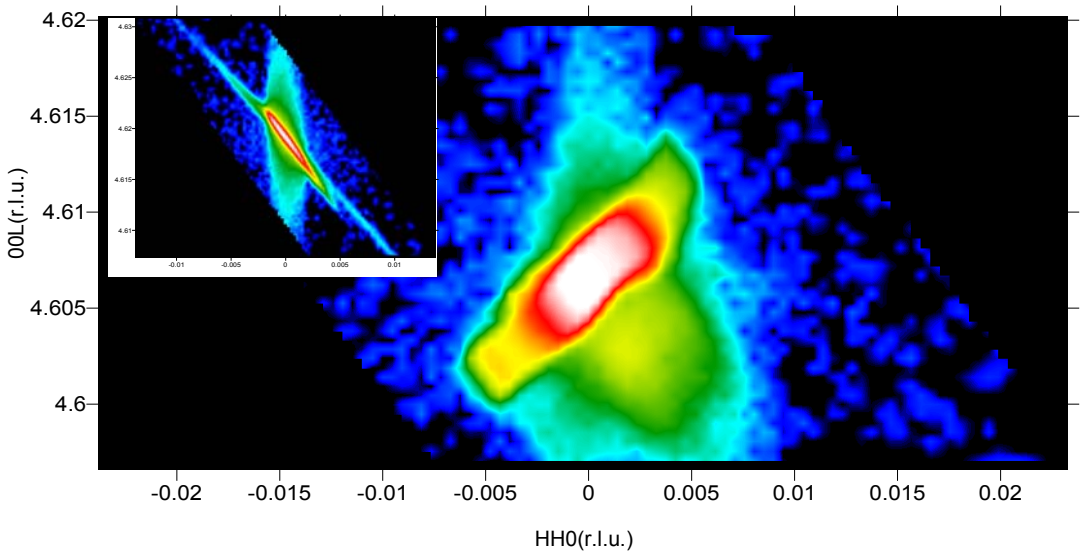

Fig.3: RSM of Si (004) reflection at 8keV, measured with capillary and without (inlay).