

## Hard X-Ray Nanoprobe with Refractive X-Ray Lenses

Christian Schroer<sup>a</sup>, Olga Kurapova<sup>b</sup>, Jens Patommel<sup>b</sup>, Pit Boye<sup>b</sup>, Jan Feldkamp<sup>b</sup>, Bruno Lengeler<sup>b</sup>, Manfred Burghammer<sup>c</sup>, Christian Riekkel<sup>c</sup>, Laszlo Vincze<sup>d</sup>, <sup>a</sup>HASYLAB at DESY, Notkestr. 85, D-22607 Hamburg. <sup>b</sup>II. Physikalisches Institut, Aachen University, D-52056 Aachen, Germany. <sup>c</sup>European Synchrotron Radiation Facility ESRF, BP 220, F-38043 Grenoble, France. <sup>d</sup>Department of Analytical Chemistry, Ghent University, Krijgslaan 281 S12, B-9000 Ghent, Belgium. E-mail: christian.schroer@desy.de

A hard x-ray nanoprobe based on refractive x-ray lenses allows one to apply hard x-ray analytical techniques, such as diffraction or fluorescence analysis, with high spatial resolution. This is particularly useful to investigate heterogeneous samples in materials, environmental and life science.

Using nanofocusing lenses (NFLs) [1-2], a nanobeam with a lateral extension down to  $50 \times 50 \text{ nm}^2$  is currently feasible at third generation synchrotron radiation sources in the hard x-ray range. The beam divergence of about 1 mrad is sufficient for many diffraction experiments. The beam size can be expected to be reduced to below 10 nm in the future [3].

We report on nanodiffraction experiments in materials science performed at beamline ID-13 of the ESRF. The coherence properties of the nanobeam are discussed in view of diffraction from small objects with coherent radiation.

[1] Schroer C. G., et al., *Appl. Phys. Lett.*, 2003, **82**, 1485. [2] Schroer C. G., et al., *Proc. SPIE*, 2004, **5539**, 10. [3] Schroer C. G., Lengeler B., *Phys. Rev. Lett.*, 2005, **94**, 054802.

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