



Experiment title: Russian grant: Development and testing of prototype of ultracompact x-ray transfocator based on refractive optics	Experiment number: MI-1250
Beamline: ID06	Date of experiment: from:10.12.2015 to: 13.12.2015
Shifts: 9	Local contact(s): Irina Snigirev (email: irina@esrf.fr)
Date of report: 16.11.2018 <i>Received at ESRF:</i>	

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Report:

We assembled the setup for testing a new type of CRL-based Transfocator (Fig. 1) developed in the X-ray optics laboratory of the Immanuel Kant Baltic Federal University.



Fig. 1 Photo of Compact Transfocator

The Experiment on was occurred at Micro Optics Test Bench (MOTB) ID06 @ ESRF 17-18.11.2014. An X-ray microscopy scheme was applied at 17 keV, as shown in the figure 2. The Siemens Star was magnified by using from 10 to 18 Aluminum CRLs, with R=50 um radius of curvature, placed at the variable imaging distance from 1471 to 783 mm from the

sample respectively. The high-resolution CCD detector Photonic Science with the field of 13mm and pixel size of 6.5 μm was placed a 13.8 m downstream.

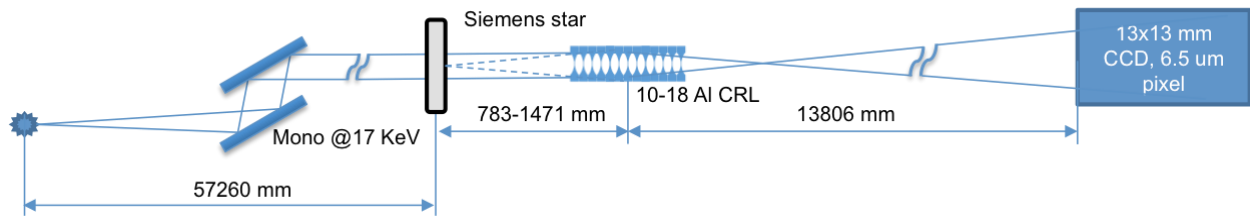


Fig. 2. Scheme of setup for testing of Compact X-ray Transfocator

A stack of images with magnification $\times 9.37$ to 17.61 was obtained by one-by-one independently lenses insertion into the beam from 10 to 18 lenses (fig. 3). Proportional sequential movement object closer to the Compact Transfocator (changing L_2 distance), while Lens-Detector distance was constant ($L_1=13.8$ m)

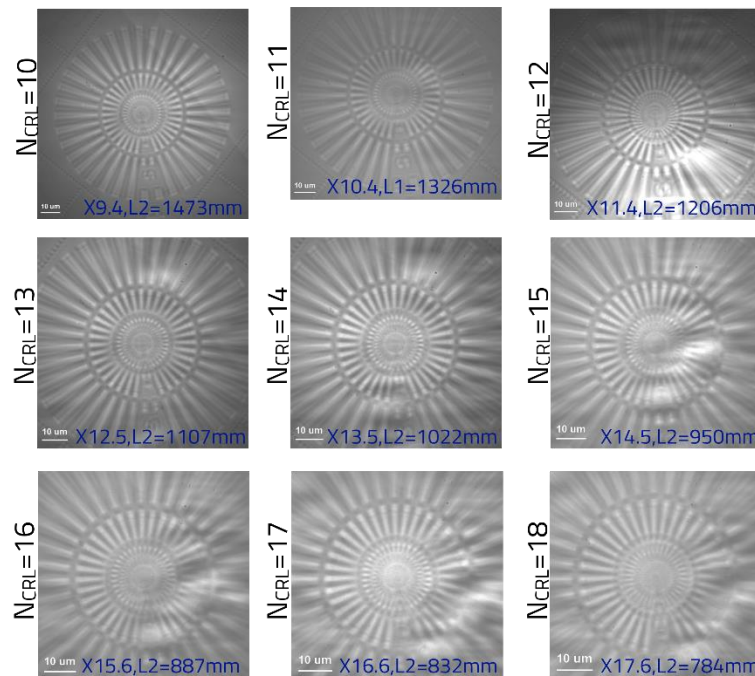


Fig. 3. Images stack of the Siemens Star with magnification from $9.37\times$ to $17.61\times$

Using high precision mechanics, Compact Transfocator shows the 1-micron accuracy of lens positioning for each axis with the high reproducibility. The advantage of smoothly moving the focus has been demonstrated by the ability of the device to insert lenses into the beam one by one, which leads to a change in the magnification of High Resolution X-ray Transmission Microscopy setup.