# Grating interferometry on a 160 kV lab source

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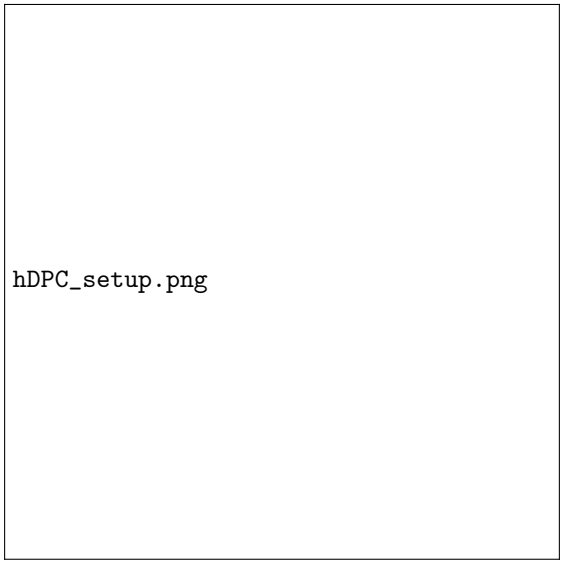
Grating interferometry is an imaging technique that allows the simultaneous retrieval of attenuation, phase and small angle scattering of X-rays. It was first demonstrated on synchrotron sources [1], then applied to conventional sources with a wide Bremsstrahlung spectrum and low spatial coherence [2].

Experiments on lab sources have been performed only for energies below 60 keV, while most applications in medicine and nondestructive testing require higher penetration power, with voltages above 100 kV. Absorption gratings suitable for high-energy interferometers would then need to be fabricated with a large thickness and a small pitch, in order to provide both enough blocking power and sensitivity. The necessary aspect ratios are thus outside of the reach of the most advanced microfabrication techniques.

In this presentation, an *edge-on* arrangement of the gratings is shown [3], where the gratings are not illuminated on the face but lay down in the beam plane, so that arbitrarily high aspect ratios can be achieved at the cost of one spatial dimension. With such an alignment, it is also easy to build curved structures that match the beam divergence on short setups.

The design of this kind of setup is shown, as well as the first images taken with two prototypes with a design energy of 100 and 120 keV realized at PSI [4]. The short length of the interferometer, under 60 cm, makes it also efficient from the point of view of the flux. The retrieval and meaning of the attenuation, differential phase and scattering signals is discussed, together with the possible applications available in this new energy range.




Edge-on arrangement for a high-energy interferometer.

References

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