

Nanoimaging using soft X-ray and EUV sources

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Visualizing small objects in the nano-meter scale with high spatial resolution is very important from the point of view of modern science and technology. To extend the diffraction limit associated with the wavelength of radiation, one way is to reduce the wavelength, allowing smaller features to be resolved.

This requires short wavelength sources, capable of delivering sufficient flux to achieve high signal-to-noise ratio images. Those sources are synchrotrons, free electron lasers, but also compact sources, such as laser-plasma, discharge-pumped, or high harmonic generation sources plasma, among others.

The goal of achieving nanometre spatial resolution cannot be accomplished without specialized optics, often dedicated for specific spectral range, mostly reflective and diffractive, sometimes refractive optics for keV-range photon energies. Moreover, many unique imaging techniques were also developed and will be mentioned in the presentation, including: holography, Talbot imaging, diffraction (lensless) imaging, zone plate based imaging, scanning microscopy, contact microscopy and tomography.

Of course this brief lecture cannot address all available possibilities to achieve nanoscale imaging, however, it might be a good introduction to this interesting and novel topic.

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