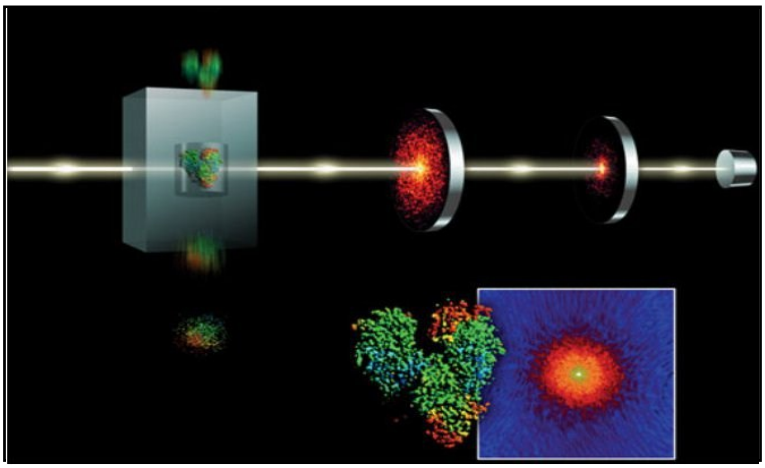
Applications of XFELs for crystallography and imaging in biology: current status and future perspectives

Joachim Schulz

European XFEL GmbH, Notkestr. 85, 22607 Hamburg, Germany
Joachim.Schulz@xfel.eu

Recent developments in free-electron lasers lead the way to new applications in biology. The ultimate goal is to image single molecules before destruction in a single flash of an FEL. This goal is currently being approached from two sides. Nano-crystallography shows a way to overcome the bottleneck of growing large crystals. Membrane protein complexes that are difficult to grow can be studied sequentially. The protein complexes can be reconstructed with resolutions of a few Angstroms [1]. The second approach is imaging before destruction of large biological samples, such as cell organelles and viruses [2]. These techniques allow to image non identical specimen in 2D. Advanced computational methods are developed to reproduce 3D images of reproducible samples like virus particles. In this talk I'll present the latest successful approaches to bio-imaging and crystallography on FELs and give an outlook into the future of such experiments at the European XFEL Facility.



Reference

[1] Henry N. Chapman et al., Nature, **470** (2011) 73.
[2] M. Marvin Seibert et al., Nature, **470** (2011) 78.