

Soft X-ray Macromolecular Crystallography: An Overview

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There is a growing interest in using x-rays with wavelengths greater than 1.5Å for the *de novo* determination of macromolecular crystal structures by single wavelength anomalous diffraction (SAD) using crystals of unlabeled native protein. This approach has great potential for cases where proteins resist selenomethionine incorporation (for example some eukaryotic proteins) and proteins isolated directly from native sources or environmental samples related to metaproteomics studies.

Major synchrotron facilities worldwide, including the Photon Factory (Japan), Diamond Light Source (UK), ESRF (France), and BESSY (Germany) have recently made considerable investments in long wavelength beamline development to enable macromolecular structure determination using unlabeled native crystals.

Home x-ray sources also have the capability of providing long wavelength x-rays (using copper, cobalt, iron and chromium anodes) and considerable advances have been made in recent years to exploit these softer x-rays for SAD applications.

The Advanced Photon Source (USA) is also interested in planning for a future soft x-ray beamline to complement its already strong suite of macromolecular crystallographic instruments. An overview on the benefits and advances in soft x-ray macromolecular crystallography will be presented.