

Atomic A beamline for extremely high resolution coherent imaging of atomistic structures

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Abstract

In recent years coherent imaging has begun to reach down to length scales where atomic phenomena are ultimately responsible for the structural characteristics being seen. In fact, the very strength of Bragg coherent imaging is in its sensitivity to distortions of the crystalline lattice, which is inherently an atomistic feature. Here we intend to exploit the tremendous increase in coherent flux of the Advanced Photon Source Upgrade to push coherent imaging toward atomic resolution in both crystalline and amorphous materials[1]. The instrumentation will also enable ultra high resolution imaging of evolving structures both in-situ and operando.

With a technical focus on extremely high resolution imaging of operando samples and structural evolution, the scientific fields impacted most will be energy transport and storage materials, structural materials, advanced electronics and magnetic material, and materials involved in catalytic and photocatalytic processes.