

Science opportunities with an MBA lattice at the APS: 3D Micro & Nano Diffraction

Jon Tischler (Team co-leader)	<i>Argonne National Laboratory</i>
Wenjun Liu (Team co-leader)	<i>Argonne National Laboratory</i>
Zhonghou Cai	<i>Argonne National Laboratory</i>
Ruqing Xu	<i>Argonne National Laboratory</i>
Lyle Levine	<i>National Institute of Standards and Technology</i>
John Budai	<i>Oak Ridge National Laboratory</i>

Contact info:

Jon Tischler	tischler@aps.anl.gov	(630-252-0861)
Wenjun Liu	wjliu@anl.gov	(630-252-0890)

Abstract

The 3D Micro & Nano Diffraction beamline is designed to directly attack a wide range of spatially inhomogeneous materials problems at the mesoscopic length scale. These are problems in materials science, physics, geoscience, and most other fields of science where previous x-ray diffraction techniques are insufficient due to the short length scale of the inhomogeneities in the materials. This inhomogeneity is an important or intrinsic part of the material's properties, and so must be studied on its length scale; large perfect samples are either impossible to make or do not represent the real material. Due to the current extreme difficulty or impossibility of making these measurement we propose to use the bright MBA source to provide small intense x-ray spots (50 – 200 nm) to investigate the important spatial variations of strain and structure that define this wide range of scientifically and technologically important materials.