“Looking Inside Real Materials using 3-D Submicron Laue X-ray Diffraction”

APS User Science Seminar

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New x-ray techniques for mapping the microstructure (orientation and strain) of materials with submicron spatial resolution in both 2- and 3-dimensions will be described. This approach uses intense, focused white synchrotron x-ray microbeams at UNICAT sector 34-ID. In 2-D, this technique is demonstrated by a study of the epitaxial growth of oxide films on rolling-assisted biaxially textured metal substrates (RABiTS). In 3-D, the evolution of the grain microstructure has been directly observed for polycrystalline aluminum by obtaining orientation maps before and after in-situ annealing. These studies represent the first nondestructive, micron-resolution studies of bulk grain growth.