

THE MATERIALS SCIENCE AND ENGINEERING DEPARTMENT COLLOQUIUM SERIES PRESENTS:

# Stephan Hruszkewycz

Assistant Physicist, Argonne National Laboratory



## *Opportunities for materials science with coherent x-ray diffraction imaging*

Recent progress in 3D coherent x-ray diffraction imaging methods can enable high resolution structural imaging of nano-structured crystalline materials under operating conditions. In this talk, I discuss developments in Bragg coherent diffraction imaging (BCDI) that aim to broaden the envelope of materials science problems that can be addressed with the technique. Following an introduction of the basic principles of the method, two specific topics will be discussed: 1) BCDI at high x-ray energies that provide dramatic penetrating ability, 2) Bragg ptychography that enable imaging of targeted sub-volumes of a crystal. Both approaches will be discussed in the context of materials science problems that can be addressed in-situ at next-generation synchrotron storage rings including the Upgraded Advanced Photon Source project now underway at Argonne National Laboratory.

Stephan Hruszkewycz is a staff scientist in the Materials Science Division at Argonne National Laboratory. His research focuses on developing and using coherent x-ray scattering techniques to interrogate nanoscale materials structure and dynamics under working conditions to reveal structure-property relationships. Currently he is using strain-sensitive coherent Bragg diffraction to image subtle strain fields in nanoscale crystals for photonic and quantum information applications. These research thrusts are pursued at high-brightness synchrotron sources with state-of-the-art coherence-preserving beamlines, including those at the Advanced Photon Source, NSLS-II, and LCLS, and aim to broaden the applicability of coherent diffraction imaging within both the broader materials science community.

**Tuesday, September 25 • 4 pm •**

**Tech L211**