



PHYSICS AND ASTRONOMY COLLOQUIUM

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“The Rise of Ptychography and Machine Learning in Electron Microscopy”

Abstract

Electron microscopy (EM) gives atomic resolution images and insights into a vast range of materials and is an essential nanotechnology tool. However, the images are limited by lens imperfections and in current scanning EM, significant scattering angle information is currently being discarded. Ptychography, however, uses beam position and diffraction data to computationally reconstruct images that need not be limited by lens imperfections. This technique has recently become practical in EM due to major developments in the processing algorithms, detector technology, and computational hardware, as shown with my ptychography implementation on the advanced transmission electron microscope at UVic. I will show example images and collected data, highlighting that quantitative phase information is gained without holographic hardware, and that the richness, complexity, and vastness of the collected data, lends itself well to machine learning to provide analysis and insights. This new paradigm for EM leads to exciting prospects and opportunities for new and enhanced understanding in materials and surface science.

Wednesday, May 30, 2018
3:30 p.m.
ECS Building - Room 124