W0059

Coherent Electron Nanodiffraction and the Solution of Phase Problem. J.M. Zuo, Dept. of Materials Science and Engineering, Univ. of Illinois, Urbana-Champaign, 1304 W Green St., Urbana, IL 61801 USA.

This talk will introduce a new electron diffraction technique using a coherent nanometer-sized parallel electron beam and how the missing phase in the diffraction pattern can be retrieved to reconstruct the image using carbon nanotubes as application examples. We show that electron nanodiffraction is a sensitive technique for nanostructure characterization. The phase problem is solved for nonperiodic objects using oversampling and coherent electron diffraction. The principles of phase retrieval is applied to carbon nanotubes. The challenge of applying this technique to other materials will be discussed*.

*J.M. Zuo, I. Vartanyants, M. Gao, R. Zhang and L.A. Nagahara, Atomic Resolution Imaging of A Single Double-Wall Carbon Nanotube From Diffraction Intensities, Science, 300, 1419-1421 (2003)