

**Title Electron Holography of Nanoscale Electric and Magnetic Fields**

**Speaker** Prof. Molly McCartney  
Professor  
Department of Physics, Arizona State University  
USA



**Date & Time** Friday, March 6, 2015 4:00 p.m.

**Place** I<sup>2</sup>CNER Hall, Ito campus, Kyushu University

**Abstract**

Off-axis electron holography in the transmission electron microscope provides a unique and powerful approach to visualizing electric and magnetic fields within materials with resolutions approaching the nanometer scale. The ability to image phase shifts at medium resolution opens up a wide field of interesting and important materials problems. In this work, the technique has been successfully used to quantify electrostatic and magnetic fields in and around deep-submicron devices and patterned nanomagnets. An important extension of this work has involved *in situ* application of magnetic fields to image local magnetic response during hysteresis loops. Applications include asymmetric pinning of domain walls at notches in nanowires. Electrostatic field examples include, imaging of electrostatic phase shift at quantum dots to allow for quantification of charge capture and measurement of piezoelectric fields and 2-dimensional electron gas densities. In situ biasing of doped Ge-Si nanowires allows for analysis of activation of dopants.

**About the Speaker**

Professor Martha (Molly) McCartney received her Ph.D. in Physics from Arizona State University and is currently a Professor in the Physics Department. She is a fellow of the American Physical Society and the Microscopy Society of America and is the recipient of the Ernst Ruska prize for her work on electron holography of magnetic materials at the nanometer scale.

**Host:** Professor Zenji Horita

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