

WEEKLY CALENDAR

August 27-31, 2012

DEPARTMENTAL COLLOQUIUM

"Dynamic Electron Scattering: An emerging technique to measure material transport properties"

3:40 PM, August 30, 2012
109 Nicholson Hall

Patrick Garrity
Loyola University

Host: Juana Moreno

• *Refreshments served at 3:15 PM in 232 (Library) Nicholson Hall* •

Elementary fluctuations of fundamental particles such as electrons, photons or phonons offer the deepest insight into the nature of the phase state of the particle ensemble. This presentation focuses on the continuing development of an experimental technique that exploits the fundamental fluctuation spectrum of the electron ensemble in any electrically conductive material. The fluctuation spectrum, when measured in the hydrodynamic or low frequency regime through *Dynamic Electron Scattering* (DES), consists of two primary spectral sources: acoustic plasma oscillations and a random thermally diffuse component often referred to as Johnson/Nyquist noise. A great deal of transport property information is carried in the structure factor and correlation functions of the spectrum. The underlying physics behind DES will be explained followed by the transport properties accessible to the experimentalist through DES.

Publications:

1. "Ultra-stable matter-wave gyroscopy with counter-rotating vortex superpositions in Bose-Einstein condensates", Sulakshana Thanvanthri, Kishore T. Kapale, & **Jonathan P. Dowling**, Journal of Modern Optics Volume 59, Issue 13, 2012, pages 1180-1185.
2. "Quantum-enhanced magnetometer with low-frequency squeezing", Travis Horrom, **Robinjeet Singh, Jonathan P. Dowling**, and Eugeny E. Mikhailov, Phys. Rev. A 86, 023803 (2012).