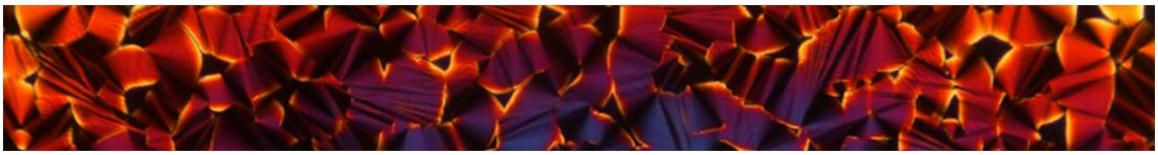

SOFT MATERIALS RESEARCH CENTER

SPECIAL SEMINAR SERIES

Nanoscale Vibrational Spectroscopy of Molecular Motion, Coupling and Ordering in Heterogeneous Materials

Eric Muller

Department of Physics
University of Colorado

Tip-enhanced vibrational spectroscopy probes structure, inter- and intra-molecular coupling, and dynamical motions of nanoscale sub-ensembles within complex and interacting systems. We show nanoscale maps of crystallographic structure in molecular materials through characteristic normal modes using infrared scattering-scanning near-field optical microscopy (s-SNOM). We observe nanoscale defects through spatial variation in the molecular orientation of otherwise morphologically well-ordered thin films. We present an extension to the single molecule limit using high resolution tip-enhanced Raman spectroscopy (TERS). From temperature dependent line narrowing and splitting, we quantify ultrafast vibrational dephasing, intramolecular coupling, and conformational heterogeneity. Through statistical correlation analysis of fluctuations of individual modes, we observe rotational motion and spectral fluctuations of a single molecule.

Wednesday, February 17th at 1:30 p.m. Duane Physics G126

Sponsored by the Soft Materials Research Center
Department of Physics, University of Colorado.

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