Old Dominion University
Department of Physics

Colloquium

Tuesday, April 11, 2023

"Sub-Molecular Level Vibrational Characterization with Inelastic Electron Tunneling and Photon"

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Abstract: A molecule's vibrational and rotational features contain rich information about its chemical conformation and are broadly used as fingerprinting signatures for chemical identification. Though the homogeneous vibrational/rotational properties of chemicals have been extensively explored at the ensembled level with infrared adsorption, Raman scattering, and/or microwave spectroscopy, the inhomogeneous characters of individual molecules in response to the nano-scale variation in their chemical environment remains a rarely explored territory. In this talk, I will introduce two STM-based approaches my team uses to explore the rotation/vibration of molecules. In the first approach, the electrons tunneling inelastically to the molecules can trigger the molecular rotation/vibration with sub-molecular precision. In the second approach, the nucleus motion in a molecule is excited by light and probed locally with tunneling electrons. These two approaches provide a window to view the inhomogeneous characteristics of vibrations/rotations, and enable the investigation of their transient dynamics with joint spatial-temporal resolution.

Presentation: OCNPS 200 @ 3:00 pm
Refreshments: OCNPS Atrium @ 2:30 pm

All interested persons are cordially invited to attend.