

## ICTS Seminar

Title : Leaving the collective: plasmonics from a hot electron's point of view

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Date : Friday, December 9, 2016

Time : 3:00 PM

Venue : Nambu Discussion Room(Left), ICTS Campus, Bangalore

Abstract : In nanoscale systems, efficient sub-wavelength light capture is possible using plasmonic resonances of metallic nanostructures, which generate energetic carriers that can drive photochemical or photovoltaic energy conversion processes. Combining electromagnetic simulations, electronic structure calculations and Boltzmann transport analyses, I show that both plasmonic hot carrier generation and transport are sensitive to electronic structure and electron-phonon interactions in the material. These calculations reveal strong anisotropies, electron-hole asymmetries and small transport distances for hot carriers in noble metals, and thereby elucidate the advances necessary to overcome bottlenecks in plasmonic energy conversion devices.

I will also briefly introduce our broader effort on combining electronic structure with coarse-grained theories, and the corresponding open-source software project JDFTx, for simultaneously capturing electronic details and interactions at the nanoscale in solid-state and electrochemical systems. The first-principles methods so developed will enable high-throughput computational screening to target desired electronic, optical and chemical properties in nanoscale systems comprising metals, semiconductors and liquids.