UCLA College | Physical Sciences Chemistry & Biochemistry

PHYSICAL CHEMISTRY SEMINAR

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Department of Chemistry
Department of Electrical & Computer Engineering
Rice University

Monday, October 31st, 2022
4:00 PM | YH 4222

Bhaumik Collaboratory
Yoo Seminar & Conference Room

Insights from Single Particle Spectroscopy of Plasmonic Nanostructures

Abstract: A surface plasmon in a metal nanoparticle is the coherent oscillation of the conduction band electrons leading to both absorption and scattering as well as strong local electromagnetic fields. These fundamental properties have been exploited in many different ways, including surface enhanced spectroscopy and sensing, photothermal cancer therapy, and color display generation. The performance of plasmonic nanoparticles for a desired application not only depends on the particle size and shape, but is tunable through nanoparticle interactions on different length scales that support near- and far-field coupling. Chemical synthesis and assembly of nanostructures are able to tailor plasmonic properties that are, however, typically broadened by ensemble averaging. Single particle spectroscopy together with correlated imaging is capable of removing heterogeneity in size, shape, and assembly geometry and furthermore allows one to separate absorption and scattering contributions. In this talk I will discuss our recent work on understanding the radiative, non-radiative, chiral, electrochemical, and mechanical properties of individual and coupled plasmonic nanostructures including the generation and transfer of hot electrons to semiconductors as well as to liquids, for applications seeking to harvest light energy with hybrid plasmonic materials.

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