

Plasmonic Hot-Spots: Creation, Characterization and Control

G.V. Pavan Kumar

Photonics and Optical Nanoscopy Laboratory, Department of Physics and of Chemistry,
Indian Institute of Science Education and Research (IISER), Pune 411008, India

Email: pavan@iiserpune.ac.in

There are two fundamental plasmonic excitations at the surface of a metal: surface plasmon polaritons (SPPs) and localized surface plasmons (LSPs). SPPs can be harnessed for nano-optical waveguiding and LSPs for nanoscale optical sources. In this talk, I will discuss about our efforts to utilize SPPs in isolated metal nanowires and LSPs in a variety of nanoscale metallic geometries to create, characterize and control plasmonic hot-spots at subwavelength scale. These hot-spots are location of enhanced optical fields and play a critical role in nanoscale light-matter interactions. One of the main utilities of plasmonic hot-spots is in single molecule surface enhanced Raman scattering (SERS). I shall describe some fundamental aspects of single molecule SERS in the context of plasmonic hot-spots.