

Colloquium

Sub-wavelength plasmonic structures for opto-electronic and sensing applications

Shourya Dutta Gupta

IIT-H, Hyderabad

Sub-wavelength metallic structures, also called plasmonic metasurfaces, support plasmonic resonances that can be used to manipulate and control different properties of electromagnetic radiation. In this talk, I will present two different applications of plasmonic structures, namely, active opto-electronic devices and biological sensing.

In the first part of the talk, I will show how the integration of a single layer of graphene (SLG) with plasmonic metasurfaces makes it possible to actively control the resonance of the metasurface by applying a gate voltage. Note that such devices have been used for controlling the amplitude, phase and polarization of light in the mid-IR spectral region. Polarization generators and detectors based on these devices will be demonstrated. The temporal response of these devices will also be shown.

The second part of the talk will deal with diagnosis of cancer using plasmonic metasurfaces. Specifically, I will talk about how Surface Enhanced IR Absorption (SEIRA) spectroscopy can be used for diagnosis using only a few cells. The design as well as the limitations of using plasmonic metasurfaces for diagnosis will be highlighted. The talk will also include the various facets necessary for constructing such a sensor. Finally, I will explore some avenues of how such diagnostic platforms can be made at the tip of an optical fiber.

Wednesday, Mar 13th 2019

4:00 PM (Tea/Coffee at 3:30 PM)

Auditorium, TIFR-H