ORAL DEFENCE ANNOUNCEMENT

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ELUCIDATING THE EFFECTS OF RADIANT AND SUB-RADIANT INTERACTIONS IN TERAHERTZ METAMATERIALS

Metamaterials are artificial structures that exhibit strong near-field interactions between the unit cells because of their sub-wavelength dimensionality of the constituent structures across the microwave to optical frequencies. Near-field interactions could be electric or/and magnetic in nature, controlling and manipulating such interactions in these metamaterials is a great deal of interest for the basic science as well as technological aspect of the structures. In this work, I will present the study of strong near-field interactions between the radiant and sub-radiant modes in metamaterial using passive and active way of tuning the metamaterial geometry under various asymmetries of the system in the terahertz frequencies. Such interactions give rise to new phenomena such as lattice induced transparency, resonant cloaking effects and multiple-input-output configurations in the near and far-field optical properties of the metamaterial. I will further discuss the technological relevance of these devices in the slow-light, ultrafast switching applications and as logic gates to perform the digital operations using the metamaterials at terahertz frequencies. Furthermore, the hybrid perovskite-metamaterial heterostructure interactions are probed that gives the signature of the localized plasmon-phonon quasiparticle coupling at terahertz frequencies at room temperature, which could be a platform for probing strong plasmon-phonon polaritonic interactions in the cryogenic and at room temperatures.

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Time: 10AM
Venue: Conference Room, Research & Graduate Studies Office, Level 2, SPMS
Supervisor: Asst Prof Ranjan Singh