

Colloquium Notice

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Tailoring Light-Matter Interactions with Fano-Resonant Metamaterials

Metamaterials, the artificial electromagnetic media with properties beyond those found in natural materials, have been a subject of intensive studies for over a decade and as the field evolves, new avenues for their applications are emerging. In this talk, I will focus on the possible applications of Fano resonant metamaterials stemming from their ability of enhancing light-matter interaction due to strong confinement of electromagnetic field by subradiant modes. I will show how metamaterials can be endowed with new unique functionalities by combining them with other complex media, such as magnetic materials, biomolecules, and graphene. In particular, the nonreciprocity can be engineered and ultra-thin optical diodes can be created by combining metamaterials with magneto-optical materials. It will also be shown how the interaction of high-quality mid-IR modes of Fano-resonant metamaterials with the vibrational modes of biomolecules facilitates the detection of protein monolayers and their characterization to an unprecedented degree. Finally, I will present our recent theoretical and experimental results on light scattering in metamaterial/graphene heterostructures and propose how such hybrid photonic-electronic systems can be used to build tunable photonic devices.

Monday

February 11, 2013

Starts at 12:15 PM

Coffee at 12:00 PM

Physics Conference Room, SB B326