

Quantum aspects of plasmons in graphene and other atomic-scale systems

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Plasmons in atomic-scale structures exhibit intrinsic quantum phenomena related to both the finite confinement that they undergo and the small number of electrons on which they are supported. Their interaction with two-level emitters is also evidencing strong quantum effects. In this talk I will discuss recent results from my group on several salient features of plasmons in graphene and other atomic-scale materials, and in particular their ability to mediate ultrafast heat transfer, the generation of high harmonics, their interaction with molecules and quantum emitters, and their extreme nonlinearity down to the single-photon level.