

Collective optical effects and local electron dynamics: Superradiance, Rabi splitting, and Marcus rates

Interviene

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Abstract

Utilizing strong light-matter interactions between quantum excitations and confined electromagnetic fields opens up new possibilities to impact chemical reactivity and charge transport. As electronic or vibrational excitations of a molecular ensemble are strongly coupled with photonic modes (for example near a plasmonic nanoparticle or in a microcavity), collective excitations among molecules lead to intriguing phenomena that are fundamentally distinct from conventional photoexcitation. Despite recent developments, understanding collective excitations remains challenging from theory and simulation perspectives. In this talk, I will present our recent efforts in modeling superradiance and cavity effects in a disordered system and our future endeavors to develop a theoretical toolbox for simulating collective excitation in materials.

Seminario

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