

# Theory of strong coupling between quantum emitters and propagating surface plasmons

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## Abstract

In this talk we present the theoretical foundation of the strong coupling phenomenon between quantum emitters and propagating surface plasmons observed in two-dimensional metal surfaces [1]. For that purpose, we develop a quantum framework that accounts for the coherent coupling between emitters and surface plasmons and incorporates the presence of dissipation and dephasing. Our formalism is able to reveal the key physical mechanisms that explain the reported phenomenology and also to determine the physical parameters that optimize the strong coupling. A discussion regarding the classical or quantum nature of this phenomenon is also presented.

[1] A. González-Tudela, P.A. Huidobro, L. Martín-Moreno, C. Tejedor and F.J. García-Vidal, Phys. Rev. Lett. **110**, 126801 (2013).