Quantum emitters in Plasmonic Epsilon-Near-Zero Medium

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Materials with near zero parameters, such as the relative permittivity, constitute a new field of research with great opportunities for manipulating light in nanoscale. Plasmonic Epsilon-Near-Zero (ENZ) materials exhibit a number of unique features enabling not only light–matter interactions, but also the exploration of different wave dynamics. An interesting property of ENZ media is that it converts an incoming radiation into collective oscillations of electrons named bulk plasmons, that are able to fully transmit the mode through a distorted channel independently of the geometry of the deformation. Therefore, light experiences the so called supercoupling effect and in this manner, long-range communication might be performed.

We present, through numerical simulations, the possibility of combining plasmonic ENZ platforms with quantum emitters (QE), hoping that the interactions between quantum emitters connected via such ENZ channels may open new horizons in the field of quantum optics.

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