Coherent energy transfer in an asymmetric colloidal nanocavities

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We present a film-coupled colloidal building-block, comprising of a plasmonic core surrounded by a dielectric shell containing a fluorophore emitter. Due to the small mode volume and the strong loss rate, fluorescent lifetime of the emitter is significantly reduced and the emission rate is enhanced while the energy of the emitted photons remains unaffected.[1]

We systematically study the energy transfer mechanism on the single particle level by employing electron microscopy, scattering spectroscopy, fluorescence life-time imaging (FLIM) and time-correlated single photon counting on the same cavity.

Finally, we discuss the future direction in coupling of novel quantum dot lattices to plasmonic nanostructures using self-assembly of colloidal particles as fabrication method.[2]

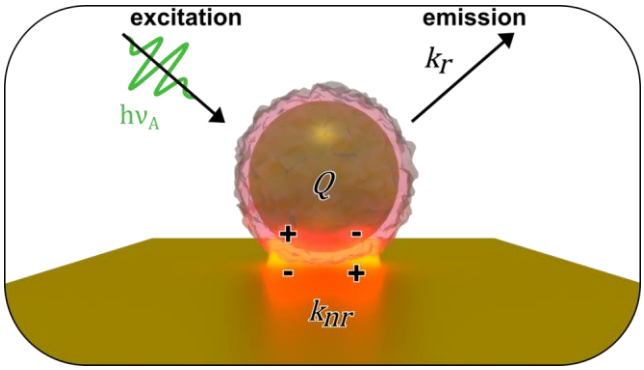

Figure 1. Schematic depiction of the particle-to-film coupled nanocavity consisting of the colloidal building blocks on a gold film acting as a plasmonic mirror.

[1] Max J Schnepf, Yannic Brasse, Fabian R. Goßler, Anja Maria Steiner, Julian Obermeier, Markus Lippitz, Andreas Fery, Tobias A F König, *Z. Phys. Chem.* **2018***, 232 (9-11)*, 1593-1606
[2] Martin Mayer, Max J Schnepf, Tobias A F König, Andreas Fery, *Adv. Opt. Mater*, **2019**, 7, 1800564

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