

Non-dipolar & magnetic interactions with optical antennas

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Abstract

Plasmonic antennas are ideal to manage the interaction with single photon emitters, such as quantum dots or fluorescent molecules [1]. Tailoring the electromagnetic mode one can control electronic transitions rates and angular emission patterns, which is key for bright directed single photon sources [2]. Here we present three different examples of hybrid emitter-antenna coupled systems where electric dipole, quadrupole or magnetic dipole moments are dominant. Experimental angular radiation patterns show striking differences in the emission of resonant and non-resonant magnetic modes excited by local light sources [3]. Finally we present a magneto-electric antenna: by exploiting the interference between magnetic and electric modes we experimentally realize a compact and robust optical antenna for directed photon emission, which outperforms larger, multi-element antennas in both bandwidth and directionality.

References

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