

Plenary Talk PV X Fri 9:00 E 415
Efficient coupling of single photons and single molecules —
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Many pioneering experiments have explored the coupling of single quantum mechanical emitters such as atoms and ions to photons. Recently, we showed theoretically that in the linear excitation regime, an atom can block a freely-propagating light beam by up to 100% if it

is confined to an area comparable with its scattering cross section. In this talk I present an overview of the recent experimental work on the efficient interaction of light and single emitters with an emphasis on organic molecules. We will see that a single molecule can attenuate, transmit, amplify or phase-shift a focused laser beam. Furthermore, I will report on the first direct long-distance communication of two quantum emitters via single photons. I will then discuss strategies for the optimization of the interaction between photons and emitters by using plasmonic and dielectric antennas.