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**Plasmonic Cavity Transparency Induced by a Single Quantum Dot** THOMAS HARTSFIELD, Department of Physics, The University of Texas at Austin, WEI-SHUN CHANG, Department of Physics, Rice University, SUNG-CHEOL YANG, TZUHSUAN MA, Department of Physics, The University of Texas at Austin, JINWEI SHI, Department of Physics, Beijing Normal University, LI-UYANG SUN, GENNADY SHVETS, Department of Physics, The University of Texas at Austin, STEPHAN LINK, Department of Physics, Rice University, XI-AOQIN LI, Department of Physics, The University of Texas at Austin — There are a large number of studies devoted to designing and characterizing plasmonic cavities. However, few experiments investigate interaction of individual quantum absorbers and emitters with a plasmonic cavity, which is essential for exploring cavity quantum electrodynamic (QED) effects. The main experimental challenge lies in the difficulty of placing an absorber and emitter at the desired positions. The very virtue of the small mode volume of plasmonic cavities demands precise spatial placement of emitters. Here, we study the simplest plasmonic cavity: a spherical metallic nanoparticle (MNP). By placing a semiconductor quantum dot (QD) controllably in the close proximity of the MNP cavity, its scattering spectrum is modified drastically. A Fano resonance is observed due to interference between the plasmonic resonance of the MNP and the exciton resonance in the QD. Our experiment demonstrates that transparency of the MNP cavity can be effectively induced by a single quantum dot, achieving an important step toward realizing plasmonic quantum devices.

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