

Scattering of nanowire surface plasmons coupled to quantum dots with azimuthal angle difference

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Coherent scatterings of surface plasmons coupled to quantum dots have attracted great attention in plasmonics. Recently, an experiment has shown that the quantum dots located nearby a nanowire can be separated not only in distance, but also an angle φ along the cylindrical direction. Here, by using the real-space Hamiltonian and the transfer matrix method, we analytically obtain the transmission/ reflection spectra of nanowire surface plasmons coupled to quantum dots with an azimuthal angle difference. We find that the scattering spectra can show completely different features due to different positions and azimuthal angles of the quantum dots. When additionally coupling a cavity to the dots, we obtain the Fano-like line shape in the transmission and reflection spectra due to the interference between the localized and delocalized modes.