

Interaction of electric and magnetic modes in a plasmonic lattice

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We study surface plasmon interactions in a stacked nanowire-based composite material. In case of closely spaced nanowire arrays, near-field induced surface plasmon hybridization results in the formation of magnetic (subradiant) and electric (superradiant) plasmon modes.

It is shown that the spectral overlap of the two supported collective plasmon resonances leads to a Fano-like interference phenomenon. The observed spectral interference can be controlled by adjusting the lateral wire displacement d_s . Such nanostructures allow a broad range of applications including novel metamaterials, filters, and sensors.

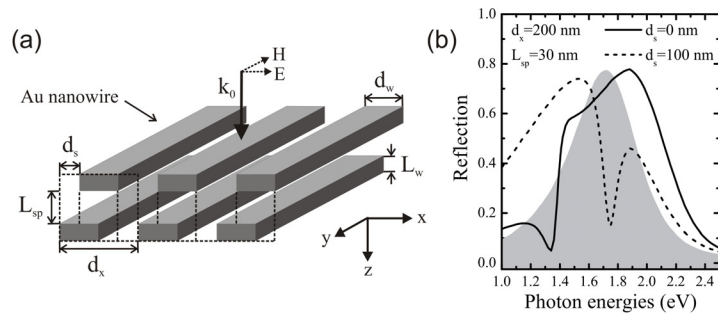


Fig.1: (a) Schematic view of the metallic multilayer structure. (b) Numerically obtained reflection spectra of a single layer (shaded area) and of two stacked gratings. In-phase (solid line) and out-of-phase (dashed line) arrangements are shown.