



# Electric dipole-free interaction of visible light with silver metadimers

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In subwavelength-sized particles, light-induced multipole moments of orders higher than the electric dipole are usually negligibly small, which allows for the light-matter interaction to be accurately treated within the electric dipole approximation. In this work we show that in a specially designed meta-atom, a disc metadimer, the electric quadrupole and magnetic dipole can be the only excitable multipoles. This condition is achieved in a narrow but tunable spectral range of visible light both for individual metadimers and for a periodic array of such particles. The electromagnetic fields scattered by the metadimers fundamentally differ from those created by electric dipoles. A metamaterial composed of such metadimers will therefore exhibit unusual optical properties.

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