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Title

Near-field signature of electromagnetic coupling in metamaterial arrays: a terahertz microscopy study

Source

Optics Express, vol.19, no.18, 29 Aug. 2011, 17283-92. Publisher: Optical Society of America, USA.

Abstract

Using terahertz near-field imaging we experimentally investigate the interaction between split-ring resonators (SRRs) in metamaterial arrays. Depending on the inter-SRR spacing two regimes can be distinguished for which strong coupling between SRRs occurs. For dense arrays SRRs couple via their electric and magnetic near-fields. In this case distinct deformations of the SRRs' characteristic near-field patterns are observed as a signature of their strong interaction. For larger separations with a periodicity matching the resonance wavelength, the SRRs become diffractively coupled via their radiated fields. In this regime hybridization between plasmonic and lattice modes can be clearly identified in the experimentally obtained near-field maps. (36 References).