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Plasmonic Magnetic Nanostructure

FARBOD SHAFIEI, FRANCESCO MONITCONE, KHAI Q. LE, XING-XIANG LIU, THOMAS HARTSFIELD, ANDREA ALU, XIAOQIN LI, The University of Texas at Austin — AFM manipulation technique has been used to position individual 100 nm gold nanospheres into a subwavelength plasmonic metamolecule nanoring consisting of four closely spaced nanoparticles. This structure supported a strong magnetic response coupled to a broad electric responce in the visible range. Asymmetries in the assembled nanoring enable the interaction between electric and magnetic modes, leading to the first observation of a magnetic-based Fano scattering resonance at optical frequencies. Such a metamolecule is suitable building block for negative-index metamaterials. AFM manipulation technique gave us ability to modify the nanostructure in real time while we were monitoring the elctric and magnetic responses of the nanostructure.

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