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Controlling Metamaterial Field Enhancement at Terahertz Frequencies GEORGE KEISER, HUSEYIN SEREN, XIN ZHANG, RICHARD AVERITT, Boston University — With the advent of metamaterials has come an unprecedented ability to manipulate and engineer the index of refraction, n, and impedance, Z of materials. Engineering these far field properties has led to exciting developments such as negative index materials, electromagnetic cloaks, and perfect lensing. However, metamaterials can also be used to engineer designer microscopic charge distributions, current distributions, and polarizabilities. For instance, the on-resonance charge distribution in the capacitive gap of a split ring resonator (SRR) creates a localized region of high electric field enhancement that has seen prominent application in recent work. Here, we present a method to tune the magnitude of this resonant electric field enhancement. Via structural manipulation of the coupling between the SRR and a non-resonant closed conducting ring, we are able to increase and decrease the oscillator strength of the SRR and thus the field enhancement in the SRR's capacitive gap. We present numerical simulations and experimental measurements at terahertz frequencies to confirm this result.

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