

Abstract Submitted  
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**Carrier concentration dependence of the tunability of the dipole resonance peak in optically excited metamaterials** IOANNIS CHATZAKIS, LIANG LUO, JIGANG WANG, NIAN HAI SHEN, THOMAS KOSCHNY, COSTAS SOUKOULIS, Department of Physics and Astronomy and Ames Laboratory, Iowa State University, Ames, Iowa 50011, USA — Currently, there is strong interest to explore the dynamic control of the electromagnetic properties of metamaterials, which have important implications on their optoelectronic applications. While the design, fabrication and photo-doping of metamaterial/semiconductor structures have been actively pursued, some fundamental issues related to highly photo-excited states, their dynamic tuning and temporal evolution remain open. Using optical-pump terahertz probe spectroscopy, we report on the pump fluence dependence of the electric dipole resonance tunability in metamaterials. We find a previously undiscovered large non-monotonic variation on the strength of the dipole resonance peak with the photo-injected carrier concentration.

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