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Reconfigurable Tunable Hyperbolic Metamaterial THOMAS GRESOCK, BRADLEY YOST, DAVID LAHNEMAN, VERA SMOLYANINOVA, Towson University, IGOR SMOLYANINOV, University of Maryland — Hyperbolic metamaterials are artificially created materials that have unique properties for light transmitted in different polarization directions. For one polarization direction the material will behave as a metal, while for the other polarization direction the material behaves like a dielectric. This behavior allows hyperbolic metamaterials to manipulate light on the sub microscopic level, which has applications that range from cloaking to creating a perfect lens. We used a cobalt based ferrofluid in an applied magnetic field to attempt to recreate the effects of hyperbolic metamaterials. Ferrofluids selfassemble in nanocolumns in applied magnetic field. By measuring the polarization dependence of the light in the visible and infrared spectrum, we demonstrate that the ferrofluid exhibits hyperbolic metamaterial behavior. This study found a novel polarization property of the ferrofluid, which blocks the light polarized in one direction for a very narrow range of polarization angles. These novel properties have potential applications in efficient chemical and biological sensing. Supported by NSF Grant DMR-1104676

Thomas Gresock
Towson University

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