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Phase measurements on a subwavelength optical metamaterial based on metallic paired strips[1] KARA MALLER, THOMAS JARVIS, XIAOQIN LI, DMITRIY KOROBKIN, GENNADY SHVETS, Department of Physics, University of Texas at Austin, Austin TX 78712-0264, MARCELO DAVANCO, XUHUAI ZHANG, Department of Physics, University of Michigan, Ann Arbor MI 48109-1040, STEPHEN R. FORREST, Department of Physics, Department of Electrical Engineering and Computer Science, University of Michigan, Ann Arbor MI 48109-1040,2122 — There is no known naturally occurring material with negative index of refraction because the electrical and magnetic resonances in naturally occurring materials do not overlap in frequency. However, artificially engineered materials, known as metamaterials, can be designed to exhibit such peculiar properties. We study a subwavelength optical metamaterial composed of paired gold strips separated by a continuous gold film. According to theoretical calculations, this structure is expected to display a negative index of refraction in the near-infrared. We perform phase measurements of the material using a polarization interferometer and a tunable femtosecond laser. The phase information of the transmitted wave at various wavelengths is used to characterize the index of refraction.

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