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Visible Far-Field Superlens for Two-Dimensional Imaging Below the Diffraction Limit EMILY RAY, RENE LOPEZ, University of North Carolina at Chapel Hill — Retaining the information carried by evanescent waves scattered from an object could allow for imaging features below the diffraction limit without time consuming scanning procedures. We show experimental results of sub-diffraction-limited imaging with visible light using a metal and dielectric multilayer structure with a 2-D diffraction grating. The multilayer structure has an effective negative index of refraction that enhances evanescent waves. Interaction with the diffraction grating converts waves from evanescent into propagating, enabling collection with conventional optics. We are able to tune this far-field superlens (FSL) to our choice of operating wavelengths by modulating the thickness of the metal and dielectric layers. For a wavelength of 532 nm, we used thicknesses of 20 and 100 nm for the Ag and Al_2O_3 layers, respectively, and simulated the evanescent waves by launching from beyond the critical angle of a 1.5 refractive index material. This data supports that a FSL of this type can be used in the visible to amplify evanescent waves in spite of the metal absorption.

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