

Abstract Submitted
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All-angle negative refraction and imaging by anisotropic media YONGMIN LIU, DENTCHO GENOV, CHENG SUN, XIANG ZHANG, NSF Nanoscale Science and Engineering Center (NSEC), 5130 Etcheverry Hall, University of California, Berkeley, CA 94720-1740 — We have theoretically studied the optical property of silver/SiO₂ multilayers, as well as silver nanowires in a SiO₂ matrix. Under the approximation of the effective media theory, both structures can be described as highly anisotropic uniaxial materials. When the diagonal elements in the electric permittivity tensor of the effective media are opposite in signs, the transverse magnetic (TM) incident light can experience all-angle negative refraction and focusing due to the hyperbolic equal frequency contour. Moreover, this effect can be extended to a broad frequency region by adjusting the filling ratio of metals and the orientation of the structure. Full-wave simulations completely confirm the analytical predictions of the all-angle negative refraction and imaging phenomena. In comparison with left-handed metamaterials and photonic crystals, our approach with artificial anisotropic media opens up a simpler way to manipulate light propagation in the optical region, which has potential applications in photonic devices.

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