

Abstract Submitted
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Anisotropic nanostructured metamaterials for broadband all-angle negative refraction and flat lens imaging¹ WENTAO LU, SRINIVAS SRIDHAR, Department of Physics and Electronic Materials Research Institute, Northeastern University, Boston, Massachusetts 02115, USA — We show that a metamaterial consisting of aligned metallic nanowires in a dielectric matrix has strongly anisotropic optical properties. For filling ratio $f < 1/2$, the composite medium shows two surface plasmon resonances (SPRs): the transverse and longitudinal SPR with wavelengths $\lambda_t < \lambda_l$. For $\lambda_t > \lambda_l$, the longitudinal SPR, the material exhibits $\text{Re } \varepsilon_{//} < 0$, $\text{Re } \varepsilon_{\perp} > 0$, relative to the nanowires axis, enabling the achievement of broadband all-angle negative refraction and flat lens (superlens) imaging systems. High performance systems made with Au, Ag or Al nanowires in nanoporous templates are designed and predicted to work from the infrared up to ultraviolet frequencies.

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