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Flat lens without optical axis: Imaging theory W. T. LU, S. SRIDHAR, Department of Physics and Electronic Materials Research Institute, Northeastern University — We derive a general theory for imaging by a flat lens without optical axis. We show that the condition for imaging requires a material having elliptic dispersion relation with negative group refraction. The medium can be viewed as having an effective anisotropic refractive index. Imaging can be achieved with both positive and negative refractive indices, although the image quality can vary greatly and multiple images may be present. The Veselago-Pendry lens is a special case of the theory with isotropic negative refractive index of -1. Snell's law for group refraction is valid and leads to ray diagrams. Realizations of the imaging conditions using anisotropic media and inhomogeneous media, particularly photonic crystals, are discussed. Numerical examples of imaging and consequences for sub-wavelength imaging are also presented. Work supported by NSF and AFRL.

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