

Flat Optics with Metasurface

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The design of fundamental optical components such as lenses, relying on textbook refractive and diffractive optics, has remained essentially unchanged for decades. Subwavelength structured surfaces known as metasurfaces are leading to a fundamental reassessment of such designs with the emergence of optically thin, ultracompact components that circumvent the limitations of standard optics and have the ability to shape the wavefronts of light in arbitrary ways.¹ Our formulation of the generalized Snell law² for metasurfaces has led us to demonstrate single planar metalenses that correct aberrations.³⁻⁴ Using a novel atomic layer deposition process we have fabricated high numerical aperture diffraction limited lenses at visible wavelengths with subwavelength imaging capabilities. Metalenses are expected to find high volume applications in areas such as cameras, displays, wearable optics for virtual/augmented reality and microscopy.

1. N. Yu and F. Capasso *Nature Materials* **13**, 139 (2014)
2. N. Yu et al. *Science* **334**, 333 (2011)
3. F. Aieta et al. *Science* **347**, 1342 (2015)
4. M. Khorasaninejad et al. *Science* **352**, 1190 (2016)