

High Performance Flat Optics

Federico Capasso

John A. Paulson School of Engineering and Applied Sciences
Harvard University
Cambridge MA USA 02138

capasso@seas.harvard.edu

Metasurfaces are leading to the emergence of new optical components that circumvent the limitations of standard refractive and diffractive one and with entirely new functionalities. Our formulation of the generalized laws of reflection and refraction for metasurfaces has led us recently to demonstrate for the first time achromatic, diffraction limited lenses across the entire visible. Multifunctional components such as metalenses for chiral imaging, ultracompact spectrometers and high efficiency holograms in the visible will be also discussed. I will conclude by presenting recent advances in polarization optics including novel compact polarimeters matching the performance of state-of-the-art bulky ones and ultracompact high performance polarization sensitive cameras.

References:

1. N. Yu and F. Capasso *Nature Materials* 13, 139 (2014)
2. N. Yu et al. *Science* 334, 333 (2011)
3. M. Khorasaninejad et al. *Science* 352, 1190 (2016)
4. M. Khorasaninejad and F. Capasso *Science* 358,1146 (2017)
5. R. C. Devlin et al. *Science* 358, 896 (2017)
6. Wei-Ting Chen et al. *Nature Nanotechnology Nature Nanotechnology* (2018)
doi:10.1038/s41565-017-0034-6
7. N. Rubin et al. *Science* (2019) 365,DOI: 10.1126/science.aax1839