Metasurfaces: From flat optics to structured light

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Subwavelength structured surfaces known as metasurfaces are leading to a fundamental reassessment of optical design with the emergence of optical components that circumvent the limitations of standard ones and with entirely new functionalities such as the ability to shape wavefronts in unprecedented ways by means of flat optics [1-4]. I will present recent advances on structured light: spin-to-total angular momentum converters (J-plates), which create complex helical beams with potential for applications in quantum optics and other fields [5], followed by resent research on polarization optics, broad band achromatic planar lenses and wavelength-controlled focusing and orbital angular momentum generation.

[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).