



CYCLE DE CONFÉRENCES

Séminaire général du département de physique
de l'École polytechnique

METAOPTICS: STRUCTURED LIGHT WITH METASURFACES



par **Federico CAPASSO**

Harvard John Paulson, School of Engineering and Applied Sciences
Harvard University Cambridge, MA

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. Our formulation of the generalized laws of reflection and refraction for metasurfaces has led us recently to demonstrate ultrathin visible and near-IR dielectric metalenses with diffraction limited focusing that can correct monochromatic and chromatic aberrations without using composite lenses. Using a novel Titanium Oxide atomic layer deposition process along with designs based on the Berry phase we have fabricated high numerical aper-

ture lenses in the red, green and blue which outperform state-of-the-art objectives as well as new lenses for chiral imaging. I will also discuss axicons with wavelength independent focusing, broadband high efficiency holograms in the visible and spin-to-orbital angular momentum converters which create complex multicharged helical beams, outperforming liquid-crystal q-plates, with potential for applications in quantum optics and other fields. I will conclude by presenting a new approach to polarimetry based on scattering from a single metasurface that has allowed us to measure the Stokes parameters of a light beam, matching the performance of existing state-of-the-art bulky polarimeters.

**JEUDI
6 JUILLET
2017**

**17H-18H15
AMPHI PIERRE FAURRE
ÉCOLE POLYTECHNIQUE**