BU Photonics Center

Dr. Frederico Capasso, Harvard University

Talk Title: Flat Optics Based on Metasurfaces

Abstract: 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.[1-7] Dr. Capasso will focus in particular on recent advances in polarization optics, that have led to a generalization of Fourier Optics and to the demonstration of a new high performance ultracompact polarization sensitive camera based on this advance [7]; depth cameras mimicking the eyes of jumping spiders; broad band achromatic metalenses and high resolution miniature spectrometers.

Bio: Federico Capasso is the Robert Wallace Professor of Applied Physics at Harvard University, which he joined in 2003 after 27 years at Bell Labs where his career advanced from postdoctoral fellow to Vice President for Physical Research. He pioneered bandgap engineering of heterostructure semiconductor materials and devices, leading him to the invention of the quantum cascade laser, and flat optics based on metasurfaces, including the generalized laws of refraction and reflection and high performance metalenses. He developed MEMS based on the Casimir force and measured for the first time the repulsive Casmir force. He is a member of the National Academy of Sciences, the National Academy of Engineering, the National Academy of Inventors and a Fellow of the American Academy of Arts and Sciences (AAAS) and a recipient of numerous awards including the Balzan Prize, The King Faisal Prize, the IEEE Edison Medal, the APS Arthur Schawlow Prize, the AAAS Rumford Prize, the OSA Woods Prize and the Enrico Fermi Prize.

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