



## Federico Capasso

Robert L. Wallace Professor of Applied Physics  
Vinton Hayes Senior Research Fellow in Electrical Engineering  
Harvard John A. Paulson School of Engineering and Applied Sciences  
Harvard University

**Tuesday, June 4 • 4 pm Tech Ryan Auditorium – L165**

### Talk 2: Multifunctional Flat Optics

Metasurfaces enable arbitrary control of the wavefront of light by locally manipulating polarization in addition to amplitude and phase. As a result, multiple optical functions can be encoded with greatly reduced complexity that be accessed by changing the input polarization, wavelength and k-vector. Unique ways to generate structured light, a new polarization optics that greatly surpasses the capabilities of the standard and a new class of lenses that correct aberrations without requiring multiple stacked lenses have emerged from this approach. I will present spin-to-total angular momentum converters (J-plates) that create complex entangled states with applications in quantum optics and other fields, new polarimeters and polarization state generators and broadband achromatic lenses

**Federico Capasso** is a leader in nanophotonics and principal contributor to metasurfaces and Flat Optics since their beginnings. He pioneered bandgap engineering of artificially structured semiconductors which led him and his collaborators to the invention and development of the quantum cascade laser. He carried out fundamental studies of the Casimir effect including the first measurement of the repulsive Casimir force. He 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 VP for Physical Research. He is a member of the National Academy of Sciences, the National Academy of Engineering and a fellow of the American Academy of Arts and Sciences (AAAS) and the National Academy of Inventors. He is the recipient of numerous international awards such as the Balzan Foundation Prize in Applied Optics, the King Faisal International Prize for Science, the Rumford Prize of AAAS, the Arthur Schawlow Prize of The American Physical Society (APS), the IEEE Edison Medal, The Optical Society of America (OSA) Wood Prize; the SPIE gold Medal, the Wetherill Medal of the Franklin Institute and the Materials Research Society Medal. He is a Fellow of the OSA, the IEEE, and the APS.