

STAVROS NIARCHOS FOUNDATION – FORTH SEMINAR SERIES

Tuesday 03 December 2019

16:00 – 17:00

A. Payatakes Seminar Room

"Achromatic Metasurfaces for Temporal and Spatial Control of Electromagnetic Waves"

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Abstract

Metasurfaces are ultra-thin, two dimensional versions of metamaterials. They hold the promise of revolutionizing wave control by replacing conventional bulky optical components, thus leading to important size, weight, and planar fabrication advantages. However, conventional metasurfaces suffer from large chromatic aberrations and cannot sustain their performance over broad spectral bandwidths.

In this talk, we will discuss the theoretical and practical requirements for designing achromatic metasurfaces that can accommodate broadband signals encountered in real-world applications.

In the first part, we will focus on achromatic metasurfaces that can delay broadband pulses without distorting the pulse shape; the relevant applications include delay lines and short-time memory modules.

In the second part, we will discuss achromatic metasurfaces for wavefront control with an emphasis on beam steering and beam focusing operations; the relevant applications include microscopy, antennas, and spatial light modulators.

More generally, we will show that 3D bulk structures such as lenses, wedges and gratings can be squeezed into a single 2D surface, bearing important physical and technological implications.