Technion-Israel Institute of Technology
Faculty of Mechanical Engineering

הטכניון-מכון טכנולוגי לישראל
הפקולטה להנדסת מכונות

סמינריון

הנך מוזמן/ת להרצאה סמינריונית של הפקולטה להנדסת מכונות, שתתקיים ביום ה׳
4.10.2018 (כ״ה בתשרי, תשע״ט), בניין דן קאהן, אודיטוריום 1, 13:30.

מרצה: מיכאל ינאי

מנחה: פרופ׳ ארז חסמן

על הנושא:

עירוב ספקטראלי באמצעות מטא-משטחים מבוססי פאזה גאומטרית

Spectrally Interleaved Geometric Phase Metasurfaces

The seminar will be given in English

תקציר ההרצאה:

Photonic metasurfaces are metamaterials of reduced dimensionality, composed of subwavelength-scale meta-atoms, enabling a custom-tailored electromagnetic response of the medium. Geometric phase based on Pancharatnam-Berry phase is a promising approach for achieving an abrupt phase change by space-variant polarization manipulations.

In previous works by Hasman's group, the generation and manipulation of multiple functions from a single geometric phase metasurface was extensively studied, by utilizing and comparing various multiplexing techniques. Nevertheless, the efficiency of such multiplexing techniques towards multi-functionality is limited by the number of functions incorporated within the metasurface. We present a shared-aperture extinction cross-section approach relying on interleaving of spectrally selective nano-antenna arrays, each having a large extinction cross-section, thus allowing to overcome this limitation.

We report on the spectral interleaving of an ordered and a disordered system within a geometric phase metasurface. Using the shared-aperture extinction cross-section approach, we realize a Silicon based spectrally interleaved metasurface for spectrum dependent disguise, holographic tagging and imaging of a target object.

We present the spectral interleaving of topological states of light using a geometric phase metasurface. We realize a dielectric spectrally interleaved metasurface generating multiple interleaved vortex beams at different wavelengths. By harnessing the space-variant polarization manipulations enabled by the geometric phase mechanism, a vectorial vortex array is implemented.

The shared-aperture extinction cross-section approach paves the way for the generation of multiple, efficient, and spectrally-resolved functions in an ultra-thin photonic device. The presented order-disorder interleaving concept offers new prospects for the manipulation of light's entropy. The multiplexed topologies approach can greatly enhance the functionality of advanced microscopy and communication systems.

בברכה,

פרופ״מ מתיו סוסו

מרכז הסמינרים