# סמינריון

הנך מוזמן/ת להרצאה סמינריונית של הפקולטה להנדסת מכונות, שתתקיים ביום ד' 6.09.17 (טו' באלול, תשע"ז), בניין דן-קאהן, אודיטוריום 1 , 13:30.

**מרצה**: איגור יולביץ'

**מנחה**: פרופ' ארז חסמן

**על הנושא:**

# Optical Rashba Effect in Geometric Phase Metasurfaces

The seminar will be given in Hebrew

**להלן תקציר ההרצאה:**

Optical Rashba effect is a spin-dependent transportation phenomenon of light as an analogy to its counterpart in condensed matter physics where electrons with opposite spins undertake different trajectories in a current flow. This discovery paved a unique way to manipulate particles by spin degree of freedom and opened up the research area of spintronics. In the field of spinoptics, optical Rashba effect provides a route to control light, whereby the photon helicity – spin angular momentum – degeneracy is removed due to a geometric phase gradient onto a metasurface. Metasurfaces are metamaterials with reduced dimensionality that produce an abrupt change of the phase over a subwavelength distance, ushering in molding optical wavefronts. We report that the alliance of spinoptics and metasurfaces via the geometric phase offers to govern the light-matter interaction of a structured matter in a polarization helicity-dependent manner. Particularly, we show that polarization-controlled optical modes of periodically structured metasurfaces arise, where the spatial inversion symmetry is violated. The inversion asymmetric metasurface is obtained via anisotropic optical antenna patterns. We also observed optical spin-controlled modes from a quasicrystalline metasurface as a result of an aperiodic geometric phase induced by anisotropic subwavelength structure. When geometric phase defects are introduced in the aperiodic structured surface, five-fold rotational symmetry is broken, resulting in polarization helicity dependence of optical modes. Geometric phase metasurfaces constitute a broad platform for spin-controlled nanophotonic applications based on the design of the metasurface symmetry properties. We believe our findings will leverage a new era of spin-enabled optics for future optical components.

בברכה,

פרופ"מ שמואל אוסובסקי
מרכז הסמינרים