סמינריון

הנך מוזמן/ת להרצאה סמינריונית של הפקולטה להנדסת מכונות שתתקיים ביום ד׳ 17.03.21 (ד׳ בניסן, תשפ״א), בשעה 13:30 באמצעות הזום :

https://technion.zoom.us/j/9251063729

מרצה : אבי ראובן

מנחה : פרופ׳ ארז חסמן

על הנושא:

Photonic Rashba effect from quantum emitters mediated by a Berry-phase defective photonic crystal

The seminar will be given in English

תקציר ההרצאה :

Heterostructures combining a thin layer of quantum emitters and planar nanostructures enable custom-tailored photoluminescence in an integrated fashion. Here, we demonstrate a photonic Rashba effect from valley excitons in a WSe2 monolayer, which is incorporated into a photonic crystal slab with geometric phase defects, that is, into a Berry-phase defective photonic crystal. This phenomenon of spin-split dispersion in momentum space arises from a coherent geometric phase pickup assisted by the Berry-phase defect mode. The valley excitons effectively interact with the defects for site-controlled excitation, photoluminescence enhancement and spin-dependent manipulation. Specifically, the spin-dependent branches of photoluminescence in momentum space originate from valley excitons with opposite helicities and evidence the valley separation at room temperature. To further demonstrate the versatility of the Berry-phase defective photonic crystals, we use this concept to separate opposite spin states of quantum dot emission. The incorporation of a WSe_2 monolayer into a photonic crystal slab with geometric phase defects enables spin-dependent manipulation of the emission from valley excitons of the WSe_2, as well as from randomly placed quantum emitters. This spin-enabled manipulation of quantum emitters may enable highly efficient metasurfaces for customized planar sources with spin-polarized directional emission. The foreseen applications include wavefront manipulation of single quantum emitters and spin engineering in nanostructured light-emitting diodes.

* Photonic Rashba effect from quantum emitters mediated by a Berry-phase defective photonic crystal, *K. Rong, B. Wang, A. Reuven, E. Maguid, B. Cohn, V. Kleiner, S. Katznelson, E. Koren, and E. Hasman //* Nature Nanotechnology 15, 927 (2020)

* Photonic Rashba effect, *A.Krasnok //* Nature Nanotechnology 15, 893 (2020)

בברכה,

פרופ״ת אתי סאס

מרכז הסמינרים