האוניברסיטה העברית בירושלים
THE HEBREW UNIVERSITY OF JERUSALEM

הפקולטה למתמטיקה ולמדעי הטבע
Faculty of Science

HUJI Dept. of Applied Physics

A Special Seminar

Sunday, February 9 2020, At 12:00

Bergman Bldg., Seminar Hall

Refreshments will be served at 11:45

"Bulk photovoltaic effect and anomalous acceleration in magnetic compounds"

Speaker: Dr. Tobias Holder

Weizmann Institute of Science

Abstract

Among the many phenomena of the light-matter interaction in complex materials the conversion of incident light into a dc-current seems particularly tantalizing. However, in semiconductors this bulk photovoltaic effect is normally small. Recently, experiments in Weyl semimetals have revealed an unusually large second-order optical response. This has called into question the established explanation by a dynamical shift of the center of mass in a wave packet.
I discuss the second-order dc current in realistic systems with finite quasiparticle lifetimes, focusing on the consequences of the time-reversal-symmetry breaking. Three mechanisms which generate a dc photocurrent emerge, i.e. the Berry curvature, the quantum metric and the diabatic motion. All three effects can be understood semiclassically from the anomalous acceleration of the quasiparticles. As an example CrI3 is presented, a recently discovered two-dimensional ferromagnetic insulator, predicting a switchable magnetic photovoltaic effect with very large photocurrents. The presented insights can be connected to the wider question how non-linear or also non-local response ought to be concisely characterized.

Short Bio:

Tobias Holder is a postdoc in the group of Ady Stern at the Weizmann Institute of Science. His work focuses on the unusual transport features of Weyl semimetals and other materials with low electron density. Before that, he did his PhD with Walter Metzner at the Max Planck Institute for Solid State Research, studying the dynamics of nematic quantum criticality in metals.

If you are interested in meeting with the speaker, please contact Galia Shneor–galiashn@savion.huji.ac.il