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SEMINAR **סמינר**

Mapping transport in space: A new window into ballistic and hydrodynamic flow of electrons

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Abstract

The measurement of transport properties in electronic systems is the most common way to characterize their properties. This method, despite its numerous advantages, is inherently limited by the simple fact that it measures only globally averaged quantities that are accessed by adding contacts to the device. In this talk we discuss a new measurement technique, using a scanning single electron transistor, that enables us to map both the current and voltage at each spatial point in a two-dimensional electronic system, thereby acquiring a wealth of previously hidden information on the nature of electronic flow within it. We first demonstrate the technique by visualizing the flow of electrons around a bend and mapping the resistivity in a graphene sample. We then focus on the measurement of flow profiles in ultra-clean graphene channels, where a transition from ballistic to hydrodynamic flow of electrons is expected to take place at elevated temperatures. Hydrodynamic electronic flow is a new and little explored transport regime, which brings the notion of viscosity into the forefront of research in interacting electrons. We demonstrate for the first time parabolic flow profiles of electrons in a conducting channel, which constitutes a viscosity dominated Poiseuille flow regime, in stark contrast with the conventional Ohmic and ballistic pictures.

ההרצאה תתקיים ביום רביעי, ה-3.4.19 בשעה 12:30
באודיטוריום המכון למצב מוצק, קומת כניסה
The lecture will take place on Wednesday, 3.4.19 at 12:30
at the Solid State Institute auditorium, entrance floor

Host: Assistant Porfessor Yoav Sagi