



Solid State Institute  
המכון למצב מוצק

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הטכניון  
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SEMINAR

סמינר

## *Attosecond science on the nano-scale*

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### Abstract

Attosecond science is based on steering electrons by the electric field of a strong laser pulse. It has enabled the observation of electron dynamics in atoms, molecules and solids on its natural time scale, the attosecond domain ( $1\text{as} = 10^{-18}\text{s}$ ). In my talk, I will show that attosecond science can be extended to the nano-scale, opening up a new perspective for nanoscience and ultrafast spectroscopy. In a pioneering experiment, we demonstrate that electron emission from a metallic nanostructure can be controlled by the waveform of the electric field of a laser pulse. Depending on the absolute phase of the pulse, high-energy electrons are emitted within one or two time windows of attosecond duration. We also show how strong-field-driven photoemission can be used to sense electric fields with attosecond and nanometer resolution, providing new tools for nano-optics and nonlinear optics. Our research bears the prospect of realizing lightwave electronics, where a laser field can induce and control electric currents at optical (PHz) frequencies.

ההרצאה תתקיים ביום רביעי, ה - 24.1.2018 בשעה 12:30  
באודיטוריום המכון למצב מוצק, קומת כניסה

The lecture will take place on Wednesday, 24.1.2018 at 12:30  
at the Solid State Institute auditorium, entrance floor

Host: Associate Professor Oren Cohen