



Solid State Institute
המכון למצב מוצק

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סמינר

Sub-cycle multidimensional spectroscopy of strongly correlated materials

Prof. Olga Smirnova

Technical University of Berlin and Max-Born-Institute, Germany

Abstract

Strongly correlated solids are extremely complex and fascinating quantum systems, where new states continue to emerge and where interaction with light may trigger interplay between them. In this interplay, sub-laser-cycle electron response is particularly attractive as a tool for ultrafast manipulation of matter at PHz scale.

We introduce a new type of non-linear multidimensional spectroscopy, which allows us to unravel the sub-cycle dynamics of strongly correlated systems interacting with few-cycle infrared pulses and the complex interplay between different correlated states evolving on the sub-femtosecond time-scale. We demonstrate that single particle sub-cycle electronic response is extremely sensitive to correlated many-body dynamics and provides direct access to many body response functions.

For the two-dimensional Hubbard model under the influence of ultra-short, intense electric field transients, we demonstrate that our approach can resolve pathways of charge and energy flow between localized and delocalized many-body states on the sub-cycle timescale and follow the creation of a highly correlated state surviving after the end of the laser pulse. Our findings open a way to a regime of imaging and manipulating strongly correlated materials at optical rates, beyond the multi-cycle approach employed in Floquet engineering with the sub-cycle response being a key tool for accessing many body phenomena.

ההרצאה תתקיים ביום רביעי, ה-8.2.23 בשעה 12:30

באוודיטוריום המכון למצב מוצק, קומת כניסה

The lecture will take place on Wednesday, 8.2.23 at 12:30
at the Solid State Institute auditorium, entrance floor

Host: Professor Oren Cohen