



Solid State Institute
המכון למצב מוצק

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Spatial Adiabatic Passage with neutral atoms in dynamic optical tweezer array

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Abstract:

During the past three decades, researchers have explored various platforms for quantum simulation and computation, but no clear technological leader has emerged. In the field of ultracold atoms, quantum simulation has been achieved through long-range interactions of Rydberg excitations. The use of single fermions in optical tweezers and short-range exchange interactions has also been proposed. In my Ph.D., we developed a new experimental apparatus with a one-dimensional array of optical tweezers tailored for fermionic atoms, specifically potassium 40. In this seminar I will provide an overview of our system, highlighting key aspects of using fermions for quantum simulations and computation. My primary focus in the initial stages of the research was on understanding the tunneling mechanism between traps. I will discuss the preparation and detection of a few atoms in an optical tweezer and present our results on tunneling between two optical tweezers, including the characterization of spatial dependence. I will then present the first implementation of Spatial Adiabatic Passage (SAP) for massive particles using controlled tunneling in optical tweezers.

ההרצאה תתקיים ביום רביעי, ה-2.8.23 בשעה 12:30

באוודיטוריום המכון למצב מוצק, קומת כניסה

The lecture will take place on Wednesday, 2.8.23 at 12:30
at the Solid State Institute auditorium, entrance floor

Ph.D. Student of Associate Professor Yoav Sagi