



Solid State Institute
המכון למצב מוצק

TECHNION
Israel Institute
of Technology



הטכניון
מכון טכנולוגי
לישראל

SPECIAL SEMINAR

סמינר מיוחד

Light Manipulation of Opaque Dense Colloids

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Abstract

Colloidal nanosuspensions have been widely used to study light-matter interactions due to the multifaceted interplay between light and matter. The study of light manipulation of particles suspended in a liquid started with the discovery of the gradient force and the subsequent invention of optical tweezers by Ashkin, who was awarded Nobel Prize in 2018. Over the years, such studies primarily focused on dilute colloids under the assumption that dense colloids do not support deep penetration of light due to high scattering. The first experimental demonstration of light manipulation in highly scattering dense colloids (~10%) was done a few years ago by a colleague, in which a density shock was generated, characterized by discontinuous particle density induced by optical forces.

In my talk, I will describe the phenomenon and explain it through a two-fluid model, where the particulate and the water phases are approximated as two interpenetrating continua, and are numerically simulated by two coupled transport equations. Subsequently, I will show the scenarios where two density shocks strategically interact with one another to generate various interacting patterns. Finally, I will present our study on the liquid-air interfaces of the colloids under optical forces, and demonstrate a rise in its capillary height caused by increased surface tension, which is brought by the removal of particles from the surface via light radiation pressure.

ההרצאה תתקיים ביום ראשון, ה-23.6.24 בשעה 12:30

באודיטוריום המכון למצב מוצק, קומת כניסה

**The lecture will take place on Sunday, 23.6.24 at 12:30
at the Solid State Institute auditorium, entrance floor**

Ph.D Student of Distinguished Professor Moti Segev