MECHANICAL ENGINEERING STUDENT SEMINAR

Wednesday, January 29 2025 at 13:00, D. Dan and Betty Kahn Building, Room 217.
Online: https://technion.zoom.us/j/2704277681?omn=91237780985

Sensing and Actuation in Ultrasonic Acoustic Levitation Systems

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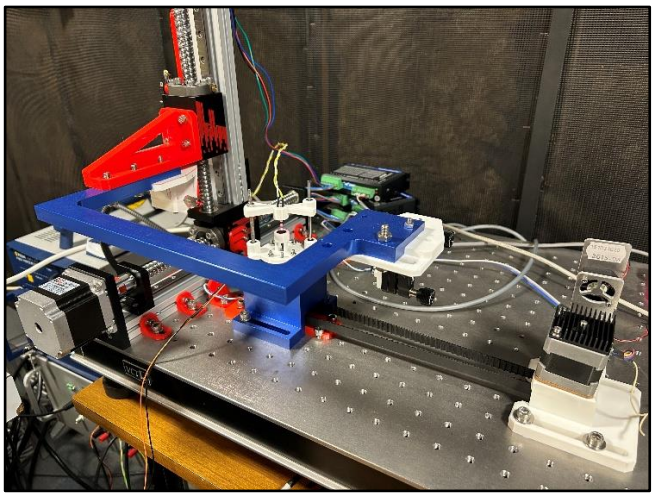
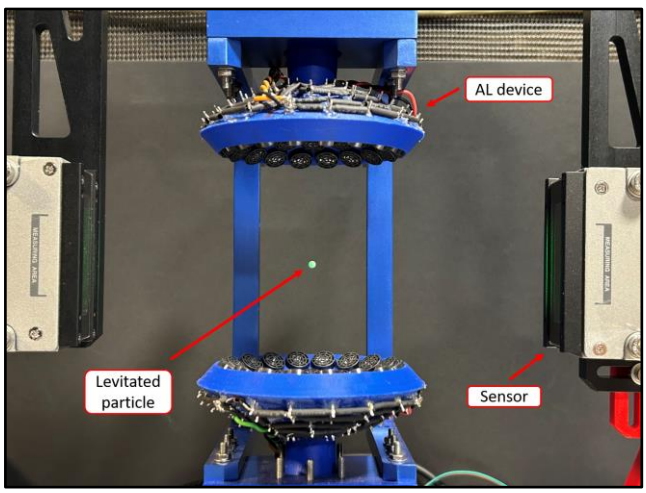
Adviser: Prof. Izhak Bucher

Acoustic levitation (AL) is a technique that employs ultrasonic sound waves to suspend and manipulate small objects in mid-air at specific locations. This method leverages a nonlinear phenomenon called acoustic radiation forces (ARF), which arise from a high-intensity acoustic field. However, effectively controlling and manipulating these airborne objects poses challenges due to the complex nature of the pressure field involved.

In this study, we present a method for measuring the spectral content of the acoustic field using non-invasive optical sensors and computational tomography. These measurements allow us to gain insights into how levitated objects influence the acoustic field. Furthermore, we demonstrate the capability to control the levitation point by adjusting the time phase between the acoustic actuators. This control is achieved by analytically expressing the acoustic field as a superposition of forward and backward propagating waves. The theoretical framework is substantiated through finite element analysis of the system. Both the sensing and control strategies have been validated and demonstrated through experimental systems.





Note: the seminar will be given in Hebrew

Seminars Coordinator: Assoc. Prof. Shmuel Gal.