



Solid State Institute  
המכון למצב מוצק

TECHNION  
Israel Institute  
of Technology



הטכניון  
מכון טכנולוגי  
לישראל

**SPECIAL SEMINAR**

**סמינר מיוחד**

## Universality, short-range physics, and quantum computing for the quantum many-body problem

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### Abstract

Quantum many-body systems are at the heart of various research fields, including nuclear, atomic, and condensed-matter physics. Fascinated by the beauty and elegance of universal features common to very different and complex many-body systems, I focus on studying universality and on utilizing it for developing predictive tools for the many-body system. Specifically, I will present a theory for describing short-range physics in such systems. To demonstrate its validity, I will consider nuclear systems, and show how it provides a comprehensive picture of short-range correlations and captures quantitatively the impact of short-range correlated pairs on different quantities. I will then focus on recent efforts to construct a systematic framework for the description of short-range physics, extending the relevance and applicability of the theory and opening the path for description of different properties of quantum many-body systems. I will discuss the connection to major experimental efforts, studies of physics beyond the Standard Model, and relevance to different subfields of physics. If time permits, I will also share my work on quantum computing and plans for the future, with the goal of providing an accurate description of dynamics in quantum many-body systems.

**ההרצאה תתקיים ביום המישי, ה-1.2.24 בשעה 12:30**

**באודיטוריום המכון למצב מוצק, קומת כניסה**

**The lecture will take place on Thursday, 1.2.24 at 12:30  
at the Solid State Institute auditorium, entrance floor**

**Host: Associate Professor Yoav Sagi**