

## Electro-Optics and Microelectronics Seminar

You are invited to attend a lecture by

הנכם מוזמנים להרצאה של

**Dr. Lior Cohen**

University of Colorado Boulder

On:

בנושא:

### **Quantum Information Processing with Light: from Single Photons to Continuous Variables**

In this talk, I will present my journey moving from working with single photons to continuous variables. The signal-to-noise ratio (SNR) of range measurements can be improved by quantum detection and quantum light sources (quantum ranging). In the first part, I will present the theory of quantum ranging in the framework of Gaussian states. I will show that an optimal detection strategy, which minimizes the detection errors, can be applied for an arbitrary return state from the target. Then I will discuss the use of quantum light in the same scenario. Optimal detection is important in high-loss mediums, such as underwater, where low signal returns and it is desired to maximize the information of it. In the second part, I will present experimental results of improved sensitivity of a temperature sensor and quantum simulations with single photons and will present my plans to do similar experiments with Gaussian states. Complex quantum simulations have the potential to advance the research of basic science. I will show simulations of a basic transition of quantum gravity theory and discuss scaling it up to complex transitions.

The lecture will take place On Wednesday, Jan 04, 2023  
at 12:30

In Solid State Institute auditorium, entrance floor  
Light refreshments will be served before the lecture

ההרצאה תתקיים ביום רביעי, 4 בינואר 2023  
בשעה 12:30

באודיטוריום המכון למצב מוצק - קומת כניסה  
כיבוד קל יוגש לפני ההרצאה