Colloquium

Inaugural lecture: Julian Léonard & Latha Venkataraman

Julian Léonard & Latha Venkataraman
ISTA

Host: Mikhail Lemeshko

Julian's Title: Assembling quantum systems atom by atomJulian's Abstract: Controlling the quantum world at the microscopic level opens the door to groundbreaking discoveries in many-body physics and paves the way for powerful new technologies, such as quantum computers and secure communication. A particularly promising approach to achieving this is with neutral atoms: simple, well-understood particles that can be precisely controlled using laser light. Thanks to recent breakthroughs, manipulating individual atoms with incredible accuracy is now possible—even in large, organized arrays. In this talk, I will introduce the key ideas and techniques behind this progress, show how we can build scalable quantum systems atom by atom, and explore the exciting possibilities this brings for the future of quantum physics and technology. Latha's Title: Physics and Chemistry of Single-Molecule DevicesLatha's Abstract: The past decade has seen tremendous progress in realizing molecular analogues of macroscale electronic components, such as resistors, diodes, switches or transistors, where the molecular circuit property is determined by the chemical structure and physical properties of the metal-molecule-metal junction. This progress has been enabled by the scanning tunneling microscope (STM)-based break-junction technique that my group has pioneered, which facilitates reliable and reproducible measurements of single-molecule devices. In this talk, I will first describe how we developed this technique to probe fundamental properties of circuit elements created with organic molecules and then give an example of how we created long and highly conducting molecular wires using one-dimensional molecular analogs of topological insulators.

Monday, May 5, 2025 11:30am - 12:30pm
RLH

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