



Harvard **Quantum** Initiative  
IN SCIENCE AND ENGINEERING

## SPECIAL JOINT COLLOQUIUM



**Hannes Pichler**

*University of Innsbruck*

**Wednesday, May 31, 2023 - 4:00 PM**

Jefferson 250, Harvard Physics

***“From Many-Body Physics to Quantum Information Processing with Rydberg Atom Arrays”***

Individually trapped neutral atoms offer a promising platform for the controlled, bottom-up engineering of quantum many-body systems. This talk aims to provide a comprehensive overview of the physics of Rydberg atom arrays, explore the quantum many-body phenomena observable within these systems, and outline various strategies for leveraging these systems in quantum information processing tasks. I will delve into the exploration of many-body phenomena both in and out of equilibrium. Next, I will illustrate the connection between these phenomena and quantum optimization and computation. I will also introduce several proposals for the design of universal quantum processors with Rydberg atom arrays.