

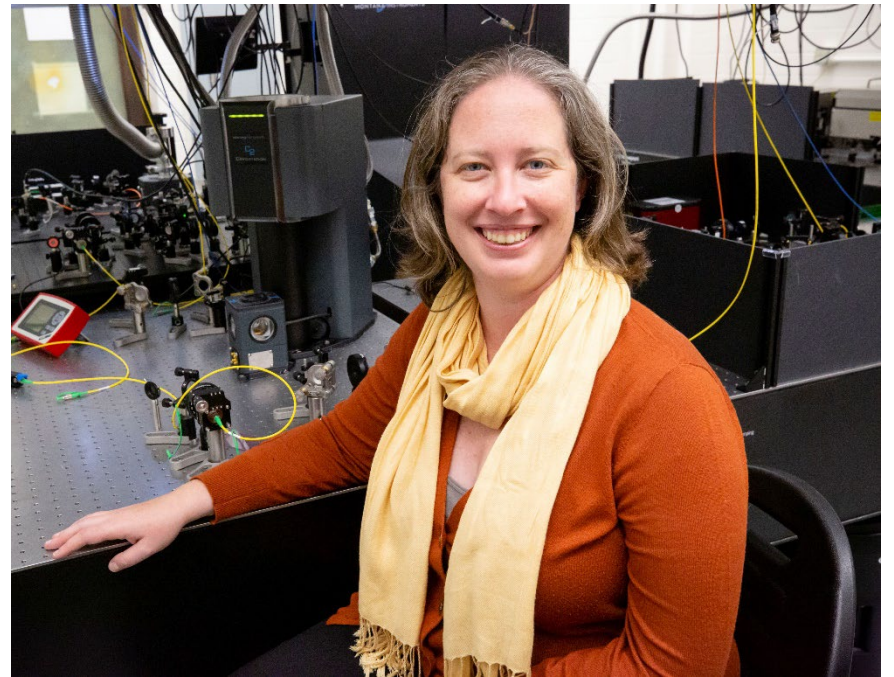
Thursday, February 16<sup>th</sup>, 2023

Refreshments at 3:15pm in PSF 186  
Colloquium from 3:30 PM – 4:30 PM in PSF 101

## Quantum Networking with Solid-State Atom-like Emitters

Professor Elizabeth Goldschmidt

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### Abstract:

Optically active and highly coherent atom-like emitters in solids are a promising platform for a wide variety of exciting quantum information applications. They are particularly well-suited as the building blocks of quantum networks, acting as light-matter interfaces that transduce quantum information back and forth between stationary matter-based qubits and optical "flying qubits" in order to transmit quantum information over distances that range from a few mm to thousands of km. I will give an overview of this broad field and then discuss my work with a particular class of solid-state emitters, rare-earth atoms in solids, whose record long coherence times and compatibility with a wide range of host materials make them extremely promising. I will discuss some ongoing projects, including our efforts to identify and grow new materials with rare-earth atoms at stoichiometric concentrations in order to reduce the disorder-induced inhomogeneous broadening and our work investigating nanophotonic integration of rare-earth doped samples that aims to increase the light-atom interaction in order to make practical quantum devices.

### Biography:

Elizabeth Goldschmidt is an assistant professor in the Department of Physics at the University of Illinois Urbana-Champaign where she leads an experimental research program in quantum optics and quantum information. She received her bachelor's in physics from Harvard University and her doctorate in physics from the University of Maryland. Her graduate research as a Joint Quantum Institute graduate fellow was on single photon technologies and optical quantum memory. She was a National Research Council postdoctoral fellow at the National Institute of Standards and Technology where she studied ultracold and Rydberg excited atoms in optical lattices for quantum simulation, and then a staff scientist at the US Army Research Laboratory studying quantum optics in solid-state systems.

Host: Profs. Kanu Sinha and Will Terrano

View our Spring 2023 Physics Colloquium schedule at <https://physics.asu.edu/colloquia>