

DEPARTMENTAL COLLOQUIUM

Professor Jonathan Hood

Department of Chemistry
Purdue University



"Finding Coherence: From Ultracold Atoms to Organic Molecules"

I'll trace my journey from single atoms in optical tweezers, to assembling bialkali molecules two atoms at a time, to finding coherence in cryogenic organic molecules. I'll begin with why quantum coherence matters for the second quantum revolution and the challenges of preserving and using it. Since I arrived at Purdue in 2020, my group has pursued two parallel directions. In our atomic work, we have studied how to cool and control atoms, including through an unusual quadrupole transition. In our molecular work, we have generated coherent single photons from cryogenically cooled organic molecules, created entangled states of molecular pairs, and integrated these emitters with nanophotonic devices. I'll close with where we hope to go next: combining atoms and molecules in hybrid quantum systems and building and characterizing more complex entangled states.