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**Interfacing cold atoms with nanophotonics for many-body physics**

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Interfacing light with cold atoms localized near nanophotonic cavities and waveguides presents new opportunities for realizing scalable quantum networks and novel quantum phases of light and matter. Preliminary experimental successes include trapped atoms along nanofibers, photonic crystal cavities and waveguides. Owing to their small optical loss and tight optical field confinement, nanoscale dielectrics offer unprecedentedly strong coupling strength between single atoms and single photons. By tailoring the photonic density of states in nanophotonic structures and exploiting cold atom control toolbox, one can harness photon-mediated, coherent, as well as dissipative, long-range atom-atom interactions in a highly engineered setting. In this talk, I will discuss recent experimental progress toward achieving strong atom-atom interactions in a nanophotonic lattice for light, and prospects for inducing novel long-range quantum dynamics for many-body and topological physics.