This talk will describe studies of the interactions in ultracold Rydberg atom gases including entangling dipole blockade and molecule formation.
Abstract: Ultracold Rydberg gases are a promising system for exploring entanglement of material particles, other novel states of matter, and many-body physics. These investigations can lead to the development of quantum devices such as single photon sources and quantum gates. A key to understanding ultracold Rydberg gases and making progress in these exciting directions is to understand how Rydberg atoms interact with each other and other atoms. In this talk, we will focus on describing Rydberg atom interactions that lead to dipole blockade as well as experiments on two types of novel molecule formation.

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