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“Quantum magnetism in ongoing ultracold molecule and ion experiments”

I will discuss our theoretical results on strongly correlated quantum magnetism in ultracold systems, especially far-from-equilibrium. I will discuss our collaboration with Penning trap ion and ultracold molecule experiments at JILA and NIST-Boulder. These systems' capacities for simulating strongly correlated quantum magnetism have exploded in the last couple years. Ion experiments can now coherently work with 100's of ions, while control ~15 ions has reached exquisite levels. For molecules, sufficient coherence of the rotational states, which are used to mimic spin-1/2's, has been experimentally demonstrated. I will describe how far-from-equilibrium dynamics in these experiments is revealing signatures of quantum magnetism and the theoretical methods we have developed to describe them. I also will explain interesting aspects of the dynamics: creating metrologically useful entangled states is just one example.

(All are welcome to attend)