

Plenary Talk PV XV Thu 9:45 RW 1
Ultracold polyatomic molecules for quantum science — ●JOHN DOYLE — Harvard University, Cambridge, USA

Nineteenth century physics and chemistry, in particular spectroscopy, laid the groundwork for the development of quantum mechanics. The richness of molecular spectra was at the same time beautiful and bedeviling, leading to models of wave resonances and vortices in molecules. Today, detailed spectroscopy has given us full quantum control over

small molecules. We can now hold single polyatomic (CaOH) molecules in optical tweezer arrays and have developed new qubits. This approach embodies one of the themes in the continuing development of quantum research in this century - the taming of increasingly complex quantum objects and the assembly of fully controllable engineered quantum systems. I will also describe our work in Metrology-based Particle Physics, where we are using cold and ultracold molecules to search for new CP-violating physics beyond the Standard Model, in the mass range >10 TeV, and to search for ultralight Dark Matter.