

UCLA Department of Physics & Astronomy

COLLOQUIUM

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High-precision physics and chemistry
with ultracold molecules

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Techniques for controlling the internal quantum states and motion of atoms have led to extremely precise clocks and state-of-the-art studies of degenerate gases. Extending such techniques to various types of molecules further enriches the understanding of fundamental physics, basic chemical processes, and many-body science. Samples of ultracold diatomic molecules can be created by binding laser-cooled atoms, or by direct molecular laser cooling. We explore both approaches and demonstrate a high-precision optical-lattice based molecular clock, as well as chemical processes in the quantum domain that manifest very differently than at room temperature.