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Molecular Optical Lattice Clock TANYA ZELEVINSKY, Columbia University, SVETLANA KOTOCHIGOVA, Temple University, JUN YE, JILA, University of Colorado — Ultracold homonuclear molecules present a model-independent system for precision measurements, such as tests of time variations of the proton-electron mass ratio. These measurements would complement those utilizing atomic clocks or astronomical observations. Creation and manipulation of dimers based on ultracold bosonic alkaline-earth-metal atoms appears particularly attractive due to the simplicity of the zero-spin ground state molecular potentials. Furthermore, recent success with precision and accuracy of optical lattice clocks based on these atoms shows the potential of achieving extremely low systematic uncertainties in the tight-confinement regime in the lattice. We discuss specific schemes for obtaining the cold molecular sample, including the magic-frequency optical lattice technique for molecular vibrational transitions.

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