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Molecular metrology based on ultracold alkaline-earth atoms in optical lattices CHRIS OSBORN, GAEL REINAUDI, KLEJDA BEGA, TANYA ZELEVINSKY, Columbia University — Diatomic molecules at ultracold temperatures offer novel possibilities for precision measurement, studies of many-body physics, and quantum control. Two-electron-atom based molecules in optical lattices are promising for precision experiments such as vibrational frequency metrology and constraining variations of the proton-electron mass ratio. We discuss progress toward a molecular clock, including forbidden-line molecular photoassociation in various lattice configurations.

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