

Abstract Submitted  
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**A new apparatus for microscopic control of ultracold strontium**  
MATTHEW NORCIA, AARON YOUNG, ADAM KAUFMAN, NIST, JILA, University of Colorado at Boulder — We present progress towards a new experimental system that combines the capabilities afforded by alkaline earth atoms, optical tweezers and lattice-based quantum gas microscopy. We aim to use bosonic and fermionic neutral strontium atoms to provide a rich system with well-controlled tunneling properties, multiple long-lived electronic and spin states, and high-fidelity site and state-resolved readout. By utilizing narrow-linewidth optical transitions in strontium, we expect to achieve rapid high-fidelity ground-state cooling of atoms within tweezers, which can then be loaded in a state-preserving manner into an optical lattice to prepare arbitrary low-entropy states. We think that this system will have applications in quantum information science, both through extending the exploration of sampling problems, and through the simulation of condensed matter systems.

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