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Experiments with bosonic atoms for quantum gas assembly[1]
MARK BROWN, YIHENG LIN, BRIAN LESTER, ADAM KAUFMAN, RANDALL BALL, LUDOVIC BROSSARD, LEONID ISAEV, TOBIAS THIELE, ROBERT LEWIS-SWAN, KAI-NIKLAS SCHYMIK, ANA MARIA REY, CINDY REGAL, JILA / University of Colorado at Boulder — Quantum gas assembly is a promising platform for preparing and observing neutral atom systems on the single-atom level. We have developed a toolbox that includes ground-state laser cooling, high-fidelity loading techniques, addressable spin control, and dynamic spatial control and coupling of atoms. Already, this platform has enabled us to pursue a number of experiments studying entanglement and interference of pairs of bosonic atoms. We discuss our recent work in probabilistically entangling neutral atoms via interference, measurement, and post-selection as well as our future pursuits of interesting spin-motion dynamics of larger arrays of atoms.

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