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Atomic Fock State Preparation and Rydberg Dynamics

MATTHEW EBERT, ALEXANDER GILL, MICHAEL GIBBONS, MINHO KWON, MARK SAFFMAN, THAD WALKER, University of Wisconsin - Madison — We present a method for preparing atomic ensembles in an optical lattice with sub-Poissonian number fluctuations using Rydberg blockade. Experimental results demonstrating preparation of $N=1, 2$ atom Fock states are shown, along with observation of coherent dynamics of ensemble qubits in a Rydberg blockaded ensemble. This work is supported by the NSF and the AFOSR Quantum Memories MURI.

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