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Loading of single atoms in an optical dipole trap using Rydberg blockade[1] XIANLI L. ZHANG, ALEX T. GILL, LARRY ISENHOWER, THAD G. WALKER, MARK SAFFMAN, University of Wisconsin — Deterministic preparation of single atom occupancy in optical traps is an important prerequisite for implementation of neutral atom quantum computing. We present experimental progress towards that goal using Rydberg blockade interactions of cold Rb atoms. Starting with 5-15 atoms in an optical trap a sequence of optical pulses that implement Rydberg blockade dynamics is used to remove all but one of the atoms. We demonstrate single atom preparation with $> 55\%$ probability and discuss factors limiting the current performance.

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