

Abstract Submitted  
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**Dual species entanglement of Rb and Cs qubits with Rydberg blockade for crosstalk free qubit measurements**<sup>1</sup> KEVIN BAKER, ZHAONING YU, MATTHEW EBERT, YUAN SUN, MARK SAFFMAN, Department of Physics, University of Wisconsin-Madison — One of the outstanding challenges facing neutral atom qubit approaches to quantum computation is suppression of crosstalk between proximal qubits due to scattered light that is generated during optical pumping and measurement operations. We have recently proposed a dual species approach to solving this challenge whereby computational qubits encoded in Cs atoms are entangled with Rb atoms via an interspecies Rydberg interaction[1]. The quantum state of a Cs atom can then be readout by measuring the state of a Rb atom. The difference in resonant wavelengths of the two species effectively suppresses crosstalk. We will present progress towards experimental demonstration of dual species entanglement using Rb and Cs atoms cotrapped in a single beam optical trap. [1] I. I. Beterov and M. Saffman, Phys. Rev. A **92**, 042710 (2015).

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