

Abstract Submitted
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Progress towards a dual species quantum repeater node with a high-finesse fiber resonator¹ GARRETT HICKMAN, MATTHEW EBERT, TRENT GRAHAM, XIAOYU JIANG, SUDHEER VANGA, RANDALL GOLD-SMITH, MARK SAFFMAN, University of Wisconsin-Madison — We report on progress towards a high finesse fiber resonator to be used in the construction of a dual species quantum repeater node. A high-finesse cavity will be used to allow the state of a single incoming photon to be efficiently mapped onto the collective atomic state of an ensemble of Rb atoms. Entanglement swapping between the Rb ensemble and a qubit defined by the ground state hyperfine manifold of a Cs atom simultaneously trapped within the cavity can then be performed using Rydberg interactions. We describe our work on a preliminary implementation of this system, in which an ensemble of cold Rb atoms is trapped within a high-finesse fiber cavity. This system will allow for the study of Rydberg excitation of Rb atoms in the vicinity of stray electric fields due to surface charges on the fiber tips.

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