

Abstract Submitted
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Transport of Quantum Information Using Spin Wires¹ VANITA SRINIVASA, University of Pittsburgh, JEREMY LEVY, University of Pittsburgh, C. STEPHEN HELLBERG, Naval Research Laboratory, COSMQC TEAM — One-dimensional antiferromagnetically coupled spin systems have properties that make them useful as conduits for quantum information (PRL **90**, 047901 (2003)). Here we investigate possible mechanisms for using engineered spin chains as “spin wires” that can faithfully transport qubits. An analysis of the spin chains is carried out through numerical diagonalization of the effective spin Hamiltonian. We find that dimerized chains with a defect can support a highly localized qubit. We also demonstrate how it may be possible to propagate these kinks rapidly through a large system, thus providing a mechanism for producing “flying” spin qubits in the solid state.

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