

Abstract Submitted  
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**Teleportation of electronic many-qubit states via single photons** MICHAEL LEUENBERGER, University of California San Diego, MICHAEL FLATTE, University of Iowa, DAVID AWSCHALOM, University of California Santa Barbara — We propose a teleportation scheme that relies only on single-photon measurements and Faraday rotation, for teleportation of many-qubit entangled states stored in the electron spins of a quantum dot system. The interaction between a photon and the two electron spins, via Faraday rotation in microcavities, establishes Greenberger-Horne-Zeilinger entanglement in the spin-photon-spin system. The appropriate single-qubit measurements, and the communication of two classical bits, produce teleportation. This scheme provides the essential link between spintronic and photonic quantum information devices by permitting quantum information to be exchanged between them.

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