

Abstract Submitted
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Quantum state reconstruction via continuous measurement ANDREW SILBERFARB, IVAN DEUTSCH, University of New Mexico, GREG SMITH, POUL JESSEN, University of Arizona, Tucson — We present a new protocol for quantum state reconstruction based on weak continuous measurement of an ensemble average. This procedure applies the techniques of quantum control theory and quantum measurement theory to achieve a more efficient reconstruction than those performed using standard projective measurement techniques. This efficiency allows reconstruction of a quantum state using a single ensemble with minimal quantum backaction, setting the stage for state-based feedback control. An experimental demonstration of the technique will be presented in the context of reconstruction of the spin state of the $F=3$ hyperfine ground-state manifold of Cs-133 using continuous polarization spectroscopy.

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