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Continuous Measurement Quantum State Reconstruction in an Almost Decoherence-Free Protocol[1] CARLOS RIOFRIO, SETH MERKEL, IVAN DEUTSCH, University of New Mexico — Quantum state reconstruction techniques based on weak continuous measurement have the advantage of being fast, accurate, and almost non-perturbative. Moreover, they have been successfully implemented in experiments on large spin systems (PRL 97, 180403 (2006)). The performance of these techniques is generally limited by decoherence, however, as controlling optical fields lead to spontaneous emission. In this talk, an application of the reconstruction algorithm developed by Silberfarb et al. (PRL 95, 030402 (2005)) is presented for the reconstruction of quantum states stored in the ground-electronic hyperfine manifolds (F=3, F=4) of an ensemble of ^{133}Cs atoms controlled by microwaves and radio- frequency magnetic fields. This system is advantageous in the sense that its evolution only depends on the dynamics of the ground state, giving as a result an almost decoherence-free protocol.

[1]NSF

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