

Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Density Matrix Reconstruction from a Time-Independent Continuous Measurement SETH MERKEL, University of Waterloo, CARLOS RÍOFRÍO, University of New Mexico, STEVE FLAMMIA, Perimeter Institute, IVAN DEUTSCH, University of New Mexico — In this paper we examine measurement records that are derived from a continuous probe of a quantum system undergoing time-independent dynamics. We show that this type of measurement is insufficient to perfectly reconstruct every quantum state, but that for very generic conditions the unmeasurable observables occupy only a vanishingly small fraction of operator space. We present numerical simulations that show that tomography based on these incomplete measurement records yield estimates with very high average fidelity for states drawn from ensembles of pure or mixed states. We also look at using the Floquet operator of the quantum delta kicked top as a means of generating a this type of measurement record in an atomic spin system.

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Date submitted: 19 Nov 2009

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