

Abstract Submitted
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Quantum Measurements Using Electron-Multiplying Charge-Coupled Devices (EMCCDs) JONATHAN MACKRORY, JEREMY THORN, DANIEL STECK, University of Oregon, Physics Department — We outline the possibilities of realizing the Heisenberg microscope with a modern electron-multiplying charge-coupled device (EMCCD) camera. In particular, we assume we are imaging a single atom illuminated by resonant light using an EMCCD camera. The measurement from imaging the scattered light allows an observer to update their state for the atom's location using Bayesian estimation. The observer updates their state for the atom by continuously integrating a stochastic master equation (SME). We present a model of the inefficiencies and noise sources in an EMCCD camera, and use this model to derive an SME and integration method that incorporates the information from the imaging camera. Finally, we fit our model of an EMCCD to some commercially available EMCCD cameras, and use the fit parameters to evaluate the feasibility of this experiment.

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