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Spectrum and photon statistics of an optomechanical cavity QED system ANDREW JACOBS, JAMES CLEMENS, Miami University — Work to date in cavity optomechanics has primarily focused on the coupling between the cavity field and the mechanical oscillator. We investigate a weakly driven, damped optomechanical cavity containing a two-level atom with an oscillating end mirror or an intracavity dielectric membrane. We carry out numerical simulations of the system using the framework of quantum trajectories implemented with the Quantum Toolbox in Python (QuTiP). We calculate the cavity probe spectrum and second-order field-field and atom-field correlations, finding they are modified by the coupling between the cavity field and the mechanical oscillator.

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