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Counting statistics and conditional evolution in a quantum electromechanical system STEVEN BENNETT, AASHISH CLERK, McGill University — We present a theoretical study of full counting statistics (FCS) and conditional evolution of a quantum point contact (QPC) coupled to a mechanical oscillator. Such a system has recently been studied in several experiments. Starting from a microscopic model, we derive a master equation for the reduced density matrix that contains several important differences from the usual equation used to describe conditional position evolution (*i.e.* the dynamics of the oscillator inferred from a particular measurement outcome of current through the QPC). The master equation may then be solved analytically to obtain the FCS and conditional evolution. We find that the oscillator can significantly affect the FCS, leading to a highly non-Gaussian distribution characterized by an enhanced third moment even for very weak coupling. In the conditional evolution we find clear evidence that the back-action of the QPC on the oscillator cannot simply be described as coupling to an effective thermal bath.

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