

Abstract Submitted
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Shelving-style phonon-number detection in quantum optomechanics YARIV YANAY, AASHISH CLERK, McGill University — A central goal of quantum optomechanics is to detect the quantization of mechanical energy. We propose and analyze a novel method for optomechanical quantum non-demolition detection of phonon number, based on a "shelving" style measurement. The scheme uses a cavity with two optical modes whose energy difference is near-resonant with the mechanical frequency. The combination of a strong optical drive and the underlying nonlinear optomechanical interaction gives rise to spin-like dynamics which facilitate the measurement. We discuss the advantages of our scheme over approaches that focus on regimes where the optomechanical coupling can be treated perturbatively; in particular, our approach allows a parametrically faster measurement.

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