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Two-mode squeezed states in cavity optomechanics via single-mode reservoir engineering MATTHEW WOOLLEY, UNSW Canberra, AASHISH CLERK, McGill University — The generation and verification of a macroscopic, all-mechanical entangled state is a major goal and (at present) outstanding task in the study of mechanical systems in the quantum regime. The canonical continuous-variable entangled state is the two-mode squeezed state. Here we describe how to prepare and detect a highly-pure, all-mechanical two-mode squeezed state in an optomechanical system via coupling to only one (rather than two [1,2]) cavity mode(s). The approach taken may be viewed as a perturbation of a two-mode back-action-evading measurement [3], and generalizes an earlier proposal for single-mode mechanical squeezing [4].

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