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Squeezing of a mechanical resonator EMMA WOLLMAN, CHAN U LEI, AARON WEINSTEIN, JUNHO SUH, KEITH SCHWAB, Cal Inst of Tech (Caltech) — It is well-known that quantum mechanics places limits on the minimum energy of a harmonic oscillator via the ever-present zero point fluctuations of the quantum ground state. Through squeezing, however, it is possible to decrease the noise of a single motional quadrature below the zero point level. While squeezing below the quantum noise level has been achieved with light, squeezing of the motion of a mechanical resonator below its zero-point fluctuations has yet to be realized. A recent proposal by Kronwald, Marquardt, and Clerk (1) suggests a method of squeezing a single quadrature of the mechanics more than 3dB below the level of its zero point fluctuations. Such squeezing is achievable even if the resonator starts in a thermal state with occupation well above the ground state. We present phase-dependent measurements showing squeezing of mechanics approaching the quantum limit.

(1) A. Kronwald, F. Marquardt, and A.A. Clerk. arXiv:1307.5309 (2013).

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