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Quantum nondemolition squeezing of a nanomechanical resonator[1] RUSKO RUSKOV[2], University of California, Riverside, KEITH SCHWAB, Laboratory for Physical Sciences, ALEXANDER KOROTKOV, University of California, Riverside — We discuss squeezing of the nanoresonator state produced by periodic measurement of position by a quantum point contact or a single-electron transistor. The mechanism of squeezing is the stroboscopic quantum nondemolition measurement generalized to the case of continuous measurement by a weakly coupled detector. The magnitude of squeezing is calculated for the harmonic and stroboscopic modulations of measurement, taking into account detector efficiency and nanoresonator quality factor. We also analyze the operation of the quantum feedback, which prevents fluctuations of the wavepacket center due to measurement back-action. Verification of the squeezed state can be performed in almost the same way as its preparation; similar procedure can also be used for the force detection with sensitivity beyond the standard quantum limit.

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