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Optical monitoring of a wavelength-scale mechanical resonator via cavity scattering AKO CHIJIOKE, JOHN LAWALL, National Institute of Standards and Technology — Phase-sensitive Fabry-Perot interferometry provides high-sensitivity optical monitoring of mechanical motion, but is restricted to objects with lateral dimensions many times the optical wavelength. For objects that are wavelength-scale or smaller, approaches based on scattering are appropriate. We demonstrate an enhanced-sensitivity scattering-based scheme for optical readout of the motion of a wavelength-scale mechanical beam, by exploiting the loss it induces when placed in a high-finesse Fabry-Perot cavity. This is of interest for optical probing of nanomechanical resonators. Static calibration, dynamic monitoring and feedback cooling are presented.

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