

Abstract Submitted
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Optomechanical force sensors JONATHAN CRIPE, GORDON SHAW, National Institute of Standards and Technology — The radiation pressure force produced by reflecting light off a surface provides a useful tool in force metrology for measuring and calibrating forces across a large dynamic range. Current implementations, however, rely on transducing the optical power used to create the force into a optical power measurement with a readout using a power meter. This method introduces uncertainty on the order of 1 % at the point of the power meter. An alternative approach is to conduct a force measurement by monitoring the displacement of the force sensor using cavity optomechanics. Measuring the displacement of a calibrated optomechanical sensor presents an opportunity to reduce the uncertainty in the force measurement. We report on the concept and development of two radiation pressure-based force sensors, one for laser powers on the order of 1 W and the other for measuring the small forces produced by quantum radiation pressure noise.

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