

Demonstration of multi-degree of freedom test mass read-out

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Abstract

We report on a test of an optical read-out system to be used in a torsion pendulum currently developed at the Albert Einstein Institute and University of Hannover. The read-out is via modulation/demodulation technique based on four optical levers with quadrant photodiodes. The functionality of the proposed device has been already demonstrated in bench-top measurements and is planned to be tested at the torsion pendulum facility. First results show that with this configuration we can extract distance information on three degrees of freedom from the quadrant photodiode's voltage signals having a resolution of mrad for angular displacements, which is as good as a conventional autocollimator, and in addition provides low-noise readouts for the two pendulum-swing degrees of freedom, which will be used for platform stabilization.