Abstract Submitted
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Development of a tilt-free seismometer KATHERINE DOOLEY, U. of Mississippi — Seismometers play an integral role in the seismic isolation of gravitational wave detectors. They are used as sensors of ground and isolation table translation to provide feedback and feedforward control to quiet the motion of the interferometer mirrors. The problem is that the seismometers cannot distinguish between translation and tilt. This limits the extent of potential longitudinal control of the mirrors at frequencies where ground tilt dominates (below about 100 mHz), thus increasing the root-mean-square mirror motion. This reduces the detector up-time and induces excess technical noise in other interferometer control systems that affect the sensitivity to gravitational waves. We present the motivation, design and early results of a prototype low-noise seismometer that mechanically filters ground tilt to reduce the tilt-horizontal coupling. Such a tilt-free seismometer may be implemented in the future as an upgrade to the Advanced LIGO detectors.

Katherine Dooley
Univ of Mississippi

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