Abstract Submitted
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Enhancing seismometer performance at low frequencies through tilt-decoupling[1] MOHAMMAD AFROUGH, University of Mississippi, CAMILLO COCCHIERI, University of Mississippi and University of Pisa, NIAMKE BUCHANAN, Oxford High School, KATHERINE DOOLEY, University of Mississippi, LIGO COLLABORATION — Although LIGO has detected four gravitational waves so far, people are still conducting research to improve the sensitivity of the detectors in different aspects. In the low-frequency band, one of the main sources of noise is seismic vibration. Lowering the noise level in this band helps us to follow the coalescence of compact binary systems earlier in their transformation and increase the signal-to-noise ratio. It also allows us to detect the merger of more massive objects. Hence, an isolation system is required to reduce the seismic noise. As a part of an active isolation system, inertial sensors play an important role in monitoring the seismic vibration and provide input for the isolation system. However, these sensors have a weakness. They cannot distinguish between translational motion and tilt motion and at low frequencies (less than 1 Hz), the signal is dominated by tilt motion. We designed and built a suspended seismometer to attenuate the transmitted tilt to the seismometer. We applied a tilt and translational motion to the system and measured the transfer function of the suspended seismometer. We also investigated the effect of air current and temperature gradients on the suspended seismometer by designing a thermal enclosure

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