Contribution ID: **14** Contribution code: **P#30** Type: **Poster**

High Precision, Compact Inertial Sensors

Tuesday 7 May 2024 17:59 (1 minute)

ET's ambitious targets for low-frequency sensitivity require outstanding performance from its seismic isolation. A vital element of this will be the inertial sensors used to monitor ground motion and inform active control isolation schemes. Current inertial sensors used in LIGO are bulky, not vacuum-compatible, and unsuitable for cryogenic environments. Therefore, we aim to design inertial sensors better suited for next-generation gravitational wave detectors. However, reducing the size of inertial sensors requires careful design to avoid sacrificing the noise performance of the devices. These sensors use small, fused silica mechanical oscillators and interferometric readouts to achieve comparable performance to bulkier inertial sensors in a smaller, vacuum-compatible package. We will present the key results of two recent papers, one on the sensors' design and one on prototype sensors' results. The measurements shows ~ng/sqrt(Hz) performance in a broad band from 0.1-100Hz, with lower noise floors being theoretically possible, making their performance comparable to some of the best sensors today. The prototype design can easily be altered to meet ET's specific isolation requirements. With this talk, we will increase awareness in the community of these sensors and their usefulness as we design the seismic isolation strategy of ET.

Primary author: CARTER, Jonathan (AEI Hannover)

Co-author: GERBERDING, Oliver (Universität Hamburg, Institut für Experimentalphysik)

Session Classification: Posters

Track Classification: Instrument Science Board (ISB)