Contribution ID: **109** Type: **Poster**

Seismic isolation for the AEI 10m prototype

The 10m Prototype facility at the Albert-Einstein-Institute (AEI) in Hanover, Germany, employs three large seismic attenuation systems to reduce mechanical motion. The AEI Seismic-Attenuation-System (AEI-SAS) uses mechanical anti-springs in order to achieve resonance frequencies below 0.5Hz. This system provides passive isolation from ground motion by a factor of about 400 in the horizontal direction at 4Hz and in the vertical direction at 9Hz. The presented isolation performance is measured under vacuum conditions using a combination of commercial and custom-made inertial sensors. Detailed analysis of this performance led to the design and implementation of tuned dampers to mitigate the effect of the unavoidable higher order modes of the system. These dampers reduce RMS motion substantially in the frequency range between 10 and 100Hz in 6 degrees of freedom. Furthermore, mechanical upgrades that will be installed in the third attenuator are presented.

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Session Classification: Poster session