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The PIP, a novel seismic isolation filter for third-generation gravitational wave observatories

The low-frequency frontier is amidst the most important challenges for future gravitational waves detectors. Improved low-frequency sensitivity is crucial for detecting high-mass or high-z systems, improving source localisation, enabling timely alerts for electromagnetic follow-ups, and facilitating the detection of predicted gravitational waves from sources like rotating pulsars. In this contribution, we will present ongoing experimental and simulation efforts to support the Pendulum Inverted Pendulum, a novel filter prototype for mitigating low-frequency seismic noise. Such prototype aims at reducing the height and complexity of current attenuation systems, lowering cost and work needed to build the Einstein Telescope detector.

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