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## **Distributed seismic sensors for Newtonian Noise Cancellation in Gravitational Wave Detectors**

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Experiments in fundamental research are becoming more and more sensitive and are often limited by seismic noise and other environmental perturbations. The next generation of gravitational wave detectors on Earth needs to suppress seismic noise by additional 5-6 orders of magnitude (compared to current detectors) to measure gravitational waves at 10Hz emitted by so far unresolved cosmological binary objects. Below 10Hz, a new threshold is reached where mass changes in the Earth caused by seismic noise will exert a gravitational pull on the detectors limiting the gravitational wave measurement. This so-called Newtonian noise cannot be shielded due to its gravitational nature and other methods, such as coherence noise cancellation systems, must be developed. In this presentation, we will look at the sensor types and techniques proposed for Newtonian Noise Cancellation and the benefits of developing new optical distributed seismic fiber sensors, not only for gravitational wave detection but also for geophysics and seismology.

### **Category**

Particle / Astroparticle / Cosmology (Experiment)

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