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Reduction of Seismic Coupling Noise for TOBA

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TOBA(TOrsion-Bar Antenna) is a gravitational wave detector using a torsion pendulum. The resonant frequency of torsional motion is ~1mHz, therefore it is sensitive to gravitational waves at lower frequency band (0.1-10Hz) even on the ground. Two prototype TOBAs were developed and they achieved strain sensitivity h ~ 1e-8/rtHz @0.1Hz - 1e-10/rtHz @5Hz. One of the dominant noise sources for them was seismic noise, especially coupling noise from translational seismic motion to test mass rotation. In order to improve the sensitivity and detect gravitational waves, it is indispensable to reduce this coupling noise. Here we show the specified five coupling routes and reduction methods for them.

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