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The Current Status of TOrsion-Bar Antenna (TOBA) Experiment

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Torsion-bar antenna (TOBA) is a ground-based gravity gradiometer proposed for measurement of gravity gradient fluctuations such as gravitational waves and gravity gradient noise. TOBA consists of two perpendicular torsion pendulum, and the low mechanical resonant frequency of torsion pendulums enables us to measure gravity gradient of frequencies around 0.1 Hz. TOBA aims to achieve the sensitivity 10ˆ(-19) / √Hz at 0.1 Hz. For the final sensitivity goal we are developing a prototype Phase-III TOBA in order to investigate technical issues and establish noise reduction scheme. One of the key topic of Phase-III TOBA is cryogenic suspension system for the reduction of the thermal noise. Another key point is the readout system with monolithic interferometer. We will show the current situation of the developments and future upgrade plans for further improvement.

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