Contributed Talk

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Title: Calibration of laser interferometric Gravitational Wave Detector

Abstract: In 2015, the first direct detection of gravitational waves was reported. Data analysis indicated that the waves had originated from the violent collision of two black holes, which scattered them through space–time as Einstein predicted. That detection was made possible by many advances in measurement technology, mainly vibration isolation of the detector optics, since, at 10 Hz, the motion of the laser-interferometric detector mirrors is at least one billion times smaller than the seismic motion of the ground. As well, it is difficult to lock the laser in the detection configuration in a large band of the spectrum; this was made possible by using many feedback and feed-forward control loops. However, in order to meet the many demanding requirements, more than a hundred of such active systems are included in a detector to allow locked acquisition and locked stability to, eventually, reach the desired sensitivity. In this work, challenges faced to reach some of these requirements will be described and we analyze how this scenario impacts the calibration of such detectors. In order to help reduce false alarm rates and provide data for veto systems, in this work we propose a specific kind of resonant-mass detector to operate in coincidence with laser-interferometric ones.