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Preliminary Noise Budget for the Laser Interferometer Lunar Antenna

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The sensitivity of today's gravitational wave detectors is limited by a multitude of noise sources, defining an exploitable frequency band around 10 Hz to 10 kHz. Although these instruments are isolated by several orders of magnitude from the Earth's seismic activity thanks to advanced isolation systems, seismic noise prevents any detection below a few Hz. During the Apollo missions, seismometers were deployed on the lunar surface. The analysis of these data showed that the Moon is extremely quiet, with an upper limit on the seismic background noise around 1000 times quieter than on Earth around 0.2 Hz. For this reason, the Moon is considered a unique environment for gravitational astronomy. Additionally, gravitational waves are known to excite free oscillations of rigid bodies. We will present a preliminary noise budget for the Laser Interferometer Lunar Antenna (LILA) project, which aims to build and operate a gravitational detector on the edge of a lunar crater, combining two methods of detection: a suspended test-masses interferometer as performed on Earth and a laser strainmeter to monitor excited normal modes of the Moon.

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Classification de Session: Contributions (15' + 5' de questions)