

Sensing High Frequency Gravitational Waves with Acoustic Resonators: an update on the MAGE experiment

Tuesday 5 December 2023 12:15 (12 minutes)

The Multimode Acoustic Gravitational wave Experiment (MAGE) is a high frequency gravitational wave detection experiment [1] that utilises quartz bulk acoustic wave resonators as precision strain sensors. In its first stage, the experiment features two near-identical quartz bulk acoustic wave resonators that act as strain antennas with spectral sensitivity as low as 6.6×10^{-21} [strain] / $\sqrt{\text{Hz}}$ in multiple narrow bands across MHz frequencies. As a natural continuation of the initial pathfinding run [2] in which strong background features were observed at ≈ 5 MHz; MAGE features various hardware upgrades in order to disentangle such signals from target gravitational events. The primary goals of MAGE will be to explore potential gravitational signals sourced by physics beyond that of the standard model, as well as identifying the source of the events seen in its predecessor run. Here we present an update and the current status of the MAGE experiment.

[1] <https://arxiv.org/abs/2307.00715>

[2] <https://arxiv.org/abs/2102.05859>

Primary author: CAMPBELL, William

Co-authors: GORYACHEV, Maxim; TOBAR, Michael

Presenter: CAMPBELL, William

Session Classification: Mechanical resonators