Contribution ID: **21** Type: **poster**

Sensor Placement Optimization for Broadband Newtonian Noise Cancellation in GW Detectors

Thursday, 20 May 2021 16:27 (1 minute)

The sensitivity of second-generation gravitational-wave detectors is limited in the low frequency region by Newtonian noise. Noise cancellation using Wiener filters has been shown to mitigate the effects of seismic Newtonian noise. This involves placing an array of seismometers around the test mass to monitor the ground fluctuations. Optimal positioning of the seismometers around the test mass will result in maximal subtraction of noise. So far the positions of the seismometers around the test mass have been optimized for a single seismic-wave frequency only. But in reality, the Newtonian noise at detector site is substantial over the frequency band $(8-20)$ Hz. Our work expands the sensor placement optimization problem to a multi-objective optimization problem, to ensure that the sensor positions are optimal over the entire desired frequency range. Our results show a significant improvement from the single objective optimization case, and is limited only by the seismometer self-noise.

Primary authors: Ms JOSE, Roselyn (Indian Institute of Technology Madras); Dr KALPANA KALAIMANI, Rachel (Indian Institute of Technology Madras)

Presenter: Ms JOSE, Roselyn (Indian Institute of Technology Madras)

Session Classification: Poster session 2

Track Classification: Advanced detectors: Experience from current detectors