

Newtonian Noise

Andrew Matas¹, Jan Harms², Vuk Mandic³, Patrick Meyers⁴

¹Albert-Einstein-Institute, Potsdam-Golm, Germany (Speaker)

²Gran Sasso Science Institute, L'Aquila, Italy

³University of Minnesota, Minneapolis, Minnesota, USA

⁴University of Melbourne, Melbourne, Australia

The low-frequency sensitivity of current and future ground-based gravitational-wave detectors will ultimately be limited by seismic and Newtonian noise. Improving the sensitivity at low frequencies is crucial for many science targets, including early sky localization of compact binary coalescences, detection of neutron star r -modes, and searches for the stochastic gravitational-wave background. Therefore it is essential to develop reliable estimates of these noise sources, and to develop strategies to mitigate them in order to inform design choices for future gravitational-wave detectors. In this talk I will first describe the radiometer algorithm, which has been developed in the context of gravitational wave data analysis and recently extended to seismology. Then I will describe the data set obtained by the Homestake array, a unique seismometer array approximately 1 cubic mile in volume. Finally, I will present projections for Newtonian Noise made by applying the seismic radiometer to Homestake data.