

Abstract Submitted
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Search for the origin of a site-wide, 4.2 Hz feature in ground motion at LIGO Livingston Observatory¹ PRITI RANGNEKAR, Stanford University, LIGO SCIENTIFIC COLLABORATION COLLABORATION² — A low-frequency feature in ground motion in the range of 4.1-4.2 Hz has been observed sitewide at LIGO Livingston. Early research, which focused on using spectrograms for short timeframes, found the feature to be intermittent in its amplitude and slightly variable in its precise frequency. We first develop a computational pipeline to acquire spectrum data for the feature's frequency and amplitude over time. Observed hints of periodicities are analyzed through Lomb-Scargle periodograms. We then extract its angle of incidence using the beam rotation sensors (BRS) and determine correlations, if any, with wind, temperature, and anthropogenic factors. Based on directional information acquired from this data analysis, we construct a plan for deploying a sensor array at LIGO Livingston, consisting of 15 L22 sensors and dataloggers, to collect more specific data. Locations for sensors are determined by transfer function computations yielding hints of relative phasing and time delay between site stations. Ultimately, this project will assist efforts to make adjustments to the detector and improve its sensitivity with respect to low-frequency noise. Our general procedure also provides an efficient and comprehensive mechanism to analyze similar features from unknown sources in the future.

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