

Abstract Submitted
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Exploring Extra-Dimensions Through Gravitational Waves¹

EMMA LOCKYER, Marshall University — Two years ago, the LIGO team announced the detection of gravitational waves emitted by coalescing black holes. Since then, other signals were detected, which were made available to the public. The detected gravitational waves allows to search for new theories of unification between gravity and quantum physics, such as the Braneworld models and String Theory, because they are the only phenomena that can propagate through extra dimensions. Theory proves that gravitational waves carry information of extra dimensions such as extra polarizations, waves, and higher frequencies. GW170814 was observed by three detectors, and offers the best available data. We present our work in processing this data to determine whether or not extra dimensions can be observed in the signals. This is done by analyzing the raw data using the PyCBC software to find the best match, and to separate signals from instrumental noise through whitening. Next, the residual error is obtained by subtracting the strain data from the best fit model, and by the addition of the three residuals obtained. The random error should diminish by addition, while the systematic deviation from the model will increase, if there is any present. The existence of this systematic error in the residual error could be extra dimensions.

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Emma Lockyer
Marshall University

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