

RIPPLES OF DISCORD: ON GRAVITATIONAL WAVES

Relevant for: Science & Technology | Topic: Space Technology & related matters

On September 14, 2015, the Laser Interferometer Gravitational-wave Observatory (LIGO) made the [Nobel prize winning detection of gravitational waves](#). These waves are ripples in the fabric of space-time, arising from the merger of a pair of black holes in distant space, and their detection had been a long-time pursuit of physics. LIGO's feat was among the most electrifying announcements in recent years. Since detecting this binary black hole (BBH) merger, the LIGO Scientific Collaboration (LSC) has made six such observations. Five of these were mergers of black holes in very different locations in space and with very different characteristics such as mass, and one was the merger of a pair of so-called neutron stars (binary neutron stars). Such mergers had been modelled theoretically even before the detection. The measurement was made easier because the team had templates for the type of signals to expect. The last few detections have been done in conjunction with another detector, Virgo. After the first discovery, the LSC made public its data. Analysing this, in 2017 a group of scientists questioned the validity of the first detection. They argued that the two detectors belonging to LIGO were correlated and that this led to a correlation in the noise factor. Weeding out noise from the signal is crucial in any such experiment, and James Creswell *et al* claimed that this had not been done properly by the LSC. Since then, a version of their preprint has been published in the *Journal of Cosmology and Astroparticle Physics*. After a long silence, on November 1, the LSC has put up a clarification on its website.

Awestruck: on the Nobel Prize for Physics

The clarification is cryptic, referring to "misunderstandings of public data products and the ways that the LIGO data need to be treated" by those raising objections. This encompasses a range of things, starting with lacunae in the analysis of data by Mr. Creswell and his collaborators. It transpires that in their analysis Creswell *et al* had used the data supplied by LIGO for a figure in their paper rather than the raw time series data that were made publicly available. While responding with a defence regarding processing of data is fine, it is unfortunate that the LSC team supplied data for the figure in the published paper that differed from the raw data. That said, a simpler and more direct corroboration of LIGO's discovery stems from the wide variety of its sources. Now, the LSC plans to come out with a paper that carries detailed explanations. This would not be a second too soon. Put together, this is how science makes progress — in leaps and bounds, with thoughtful critiques and interventions in between. And in this case, the attendant controversy has captured the interest of even those beyond the world of science.

Firm intervention is needed to end the unsavoury controversy in the CBI

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