

Detection of Gravitational Waves by a network of detectors

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The first direct detection of gravitational waves (GW) happened in 2015 when the LIGO Scientific Collaboration and Virgo Collaboration (LVC) announced the first confirmed observation of gravitational waves from colliding black holes in February 2016. This discovery confirms a key prediction of Einstein's theory of general relativity. On October 16, 2017, the LVC announced the first observation of GW from a pair of inspiraling neutron stars. Electromagnetic emission from the resulting collision was also observed in multiple wavelength bands. This event opened up the field of multi-messenger astronomy. Another notable observation happened on August 2019 with the observation of a compact binary coalescence involving a 22.2 – 24.3 M_{sun} black hole and a compact object with a mass of 2.50 – 2.67 M_{sun} . The source has the most unequal mass ratio yet measured with GW. The secondary component was concluded either as the lightest black hole or as the heaviest neutron star ever discovered in a double compact-object system. Over the years, many sources have been detected and their parameters calculated. However, some sources are still elusive. One such highly anticipated source is the core collapse supernova. This talk will describe the GW detection, significant discoveries, methodologies used and anticipated sources.