

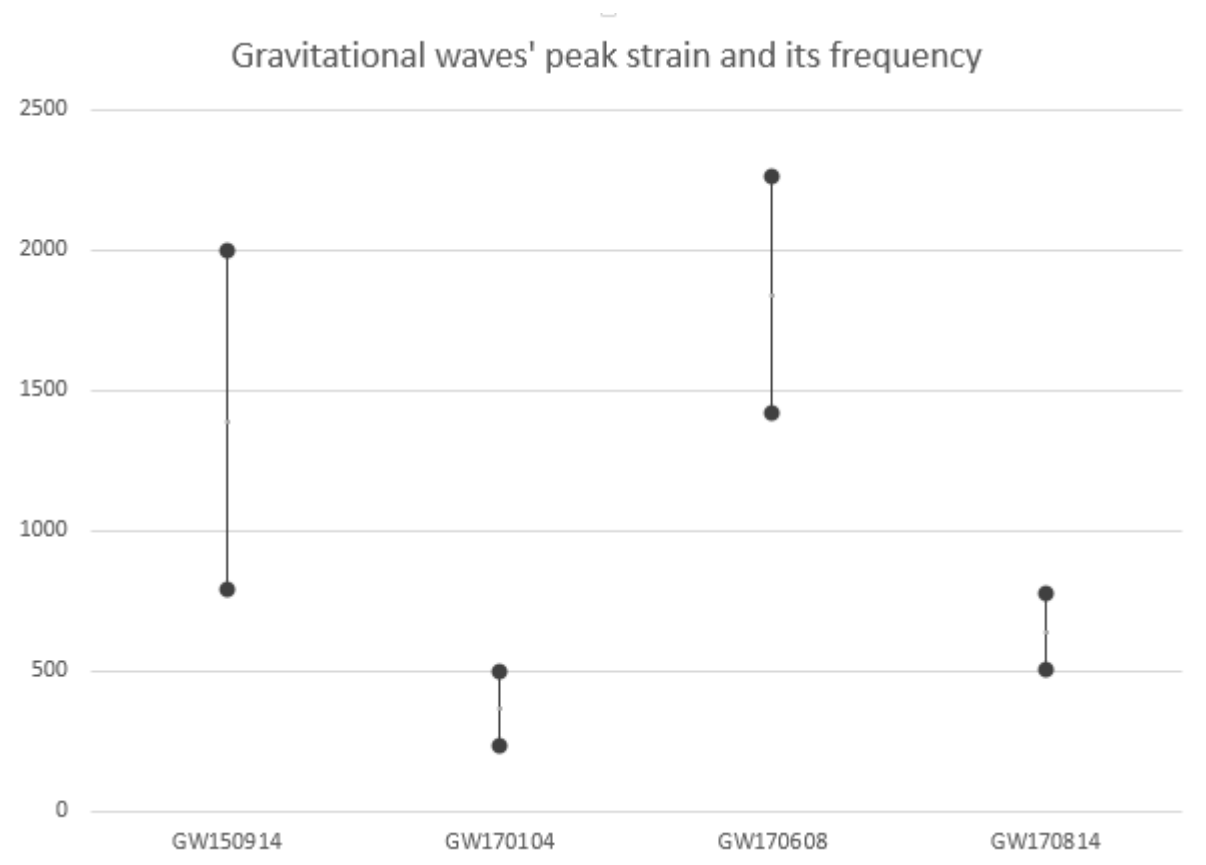
The analysis of gravitational waves

Ryoji Furui

A series of gravitational waves (GWs) has been detected since the first one on 14 Sep 2015. Now analyzing those on the theoretical basis of a paper (<http://ryoji.info/theory>) describing a model of gravitational wave at high energy scale.

The wave described in the paper was represented as $E=b/f$ (E: energy, b: constant, f: frequency). This wave is generated by mass to energy conversion like black hole merger. Therefore if we can consider that the observed peak of GWs by black hole merger came from such a conversion energy, the relation of frequency and its peak could be considered. Indeed, if we look into data of binary neutron star collision GW170817, there is no such peak or excitement but electromagnetic flash was observed as usual. It seems the data of GW170817 purely fits to the GWs considered by general relativity.

The picture below shows a calculation of configure peak GW strain and frequency. We consider energy of GW is proportional to its strain. All data used for calculation is based on fact sheet found at gw-openscience.org.



Calculation: Frequency at peak GW strain (Hz) * Peak GW strain ($\times 10^{-22}$) / Luminosity distance (Mpc)

This results can be concluded as that the relation could be still considered in the progress by including the effect of orbital angle of inclination or other elements, or by fixing varying parameters and calibrations or further detections with multiple well-synced detectors.