

Probing gravitational wave birefringence

Ezquiaga et al. 2020, showed that the lensing of gravitational waves (GWs) by intervening mass, in the theories beyond general relativity (GR) can mix and alter the speed of GW polarisations. As a result, the individual polarisations would reach detector with a time delay in between. In this study, we follow up on observational prospects of the scrambling of GWs, i.e. when the time delay between the (+, ×) polarisations is less than the duration of signal coming from the compact binary coalescences (CBCs). We show that from the low FAR events detected by LIGO-Virgo one can identify the birefringence caused by beyond GR lensing with the help of Bayesian inference. From the non-observation of birefringence, we additionally put constraints on the beyond-GR lensing cross-section.

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