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Search for an isotropic Gravitational Wave Background with ground based detectors and cosmological implications

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The gravitational wave background (GWB) is a superposition of weak, independent and unresolved gravitational wave (GW) sources. It can be sourced by both astrophysical and cosmological sources, among which we find unresolved compact binary coalescences, supernovae, first order cosmological phase transitions and cosmic strings. Since the beginning of its observational runs, the LIGO-Virgo-KAGRA (LVK) collaboration has been searching for the GWB, utilizing a cross-correlation technique. We have not made a GWB detection thus far. However, we have succeeded in establishing upper limits on the GWB's amplitude, providing invaluable insights into the model parameters governing its various sources. In this presentation, I will provide an overview of the GWB, explain how search for an isotropic GWB in the LVK collaboration and the multitude of data analysis challenges we encounter. Furthermore, I will delve into the implications of our searches for cosmological sources. Finally, I will explore the exciting prospects for future detection with third generation detectors, paving the way for groundbreaking discoveries in gravitational wave astronomy.

Collaboration you are representing

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