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Searches for Gravitational Wave Background and Future Prospects

As of today, the LIGO-Virgo-KAGRA collaboration has cataloged nearly 200 GW detections from various compact object mergers. These discoveries began the endeavors to search for other kinds of GW sources. Among these, the Gravitational-Wave Background (GWB), arising as the superposition of individually undetectable cosmological and/or astrophysical sources, is one of the potential sources to observe with the network of ground-based GW observatories in the coming years. A cosmological GWB would carry unique signatures from the earliest epochs in the evolution of the Universe. Likewise, an astrophysical GWB would provide information about the population properties of the sources that generated it. To a first approximation, the GWB is assumed to be isotropic; one could determine its statistical properties by observing any part of the sky. However, these backgrounds can be anisotropic as well. Therefore, searches for both isotropic and anisotropic GWB have been conducted. In this talk, I will explain the search methods and the results from the most up-to-date quests for the GWB. In addition, I will outline the new analysis and searches planned for the upcoming runs of these detectors and the exciting results expected from these probes.

Secondary track

Author: SURESH, Jishnu

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