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Type: **Contributed Talk (20 minutes)**

Implications for first-order cosmological phase transitions and the formation of primordial black holes from the third LIGO-Virgo observing run

Wednesday 8 June 2022 12:40 (20 minutes)

Abstract:

We place constraints on the normalised energy density in gravitational waves from first-order strong phase transitions and then from the formation of primordial black holes using data from Advanced LIGO and Virgo's first, second and third observing runs. First, adopting a broken power law model, we place 95 % confidence level upper limits simultaneously on the gravitational-wave energy density at 25 Hz from unresolved compact binary mergers and strong first-order phase transitions. We then consider two more complex phenomenological models, limiting at 25 Hz the gravitational-wave background due to bubble collisions and the background due to sound waves at 95 % confidence level for phase transitions occurring at temperatures above $1e8$ GeV. We then do a similar search assuming a background sourced by the formation of primordial black holes and unresolved compact binary mergers. For a very generic spectrum describing the primordial black hole background, we place 95% confidence level upper limits on the gravitational-wave energy density at 25 Hz.

Which topic best fits your talk?

Cosmological Sources of GW

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