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Cosmic Variance in Anisotropy Searches at Pulsar Timing Arrays

Wednesday, November 19, 2025 11:45 AM (15 minutes)

In the context of cosmology, the statistical uncertainty induced by a small sample size is typically referred to as cosmic variance. Several works have considered its relevance in the context of gravitational wave (GW) detection using pulsar timing array (PTA) experiments. In this talk, I will discuss the impact of cosmic variance on the measurement of anisotropies in the GW background using PTAs. In particular, I will show that, while low statistics induce apparent anisotropies in each realization of an isotropic GWB, statistical inference remains robust, meaning that the measurements remain consistent with the underlying assumption of isotropy. This talk is based on and briefly summarizes the main results obtained in the recent paper 2508.21131.

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