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Spectral separation of the cosmological SGWB for LISA in context of galactic and astrophysical background

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In pursuit of observing a stochastic gravitational wave background (SGWB) with LISA, it is crucial to investigate the spectral separability of cosmological, astrophysical backgrounds, and galactic foreground in order to make accurate estimations.

Our objective is to determine the observability of a cosmological background, considering the predicted astrophysical background and galactic binaries populations.

We aim to establish detectability limits for future measuring the SGWB in various cosmological models (Cosmic strings, First order phase transition).

We employ Adaptive Markov Chain Monte Carlo (Adaptive-McMC) techniques to generate estimates and characterize the posterior distribution of model parameters. Additionally, we assess the uncertainty in SGWB parameters using the inverse Fisher Information and the Whittle Likelihood method. The parameter estimation is conducted across three channels: A, E, and T. Furthermore, we simultaneously evaluate the noise levels, considering a LISA noise model and addressing multiple sources of noise contamination, as depicted in the Figure of Merit philosophy.

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