

# The Imprints of Primordial Non- Gaussianity on the Scalar-Induced Gravitational-Wave Background

*Wednesday, 4 March 2026 10:50 (20 minutes)*

Scalar-induced gravitational waves (SIGWs) are produced nonlinearly by enhanced curvature perturbations and serve as a promising probe of primordial non-Gaussianity (PNG) in the early Universe. In this talk, I will present our systematic study of local-type PNG imprints on the SIGW background. I will introduce a “renormalized” diagrammatic approach we developed, which simplifies calculations of the SIGW energy-density spectrum for high-order PNG and enables analysis up to arbitrary order. Using this framework, we study the key spectra that describe different aspects of the SIGW background: the energy-density fraction spectrum for isotropic component, the angular power spectrum for anisotropies, and the angular bispectrum and trispectrum for non-Gaussianity. Focusing on PNG up to quartic order ( $h_{NL}$  order), our numerical results demonstrate that PNG can significantly enhance the SIGW energy density and generate distinctive anisotropic and non-Gaussian signatures. These findings highlight the potential of the SIGW background as a sensitive probe of primordial physics.

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