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## Impact of sources of Epoch of Reionization (EoR) on the 21-cm bispectrum

The fluctuations in the 21-cm radiation emitted by the neutral hydrogen(HI) in the Intergalactic medium(IGM) during different stages of the Epoch of reionization (EoR) is expected to be highly non-Gaussian. The degree of non-Gaussianity varies with the nature of the ionizing sources, state of the IGM and the underlying physical processes within the IGM. One of the crucial observable statistic that can be estimated from the radio interferometric observations of the EoR that can quantify non-Gaussianity present in the signal is the 21-cm bispectrum. In this work, we considered different reionization scenarios, which differ by how the number of ionizing photons is related to the host halo mass and the distribution of the rest frame energy of the photons. These variations are expected to result in a significant difference in the IGM 21-cm topology. We analyze the impact of these different reionization scenarios in the 21-cm bispectrum for all the unique k-triangles. Our findings reveal that the shape, sign, and magnitude of the 21-cm bispectrum combinedly outperforms the power spectrum in distinguishing the different reionization scenarios. Additionally, we found that the sign changes in the squeezed-limit bispectrum are unique tracers of the HI distribution and capture two important topological transitions during reionization. These results highlight the potential of using the 21-cm bispectrum for constraining different reionization models.

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