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Seeing Orbifold GUTs In Primordial Non-Gaussianities

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The minimal Standard Model (SM) running of the gauge couplings gives us a hint of a Grand Unified Theory (GUT) at $M_U \sim 10^{14}$ GeV — a scale, however, too high to probe directly via collider searches. Fortunately, since the inflationary Hubble scale H can be as high as 5×10^{13} GeV $\sim M_U$, such GUT scale states can be cosmologically produced during inflation and contribute to primordial non-Gaussianity (NG). In this talk, we will explore the possibility of doing on-shell, mass-spin spectroscopy of GUT-states by studying such NG contributions in an extra-dimensional framework of orbifold GUTs.

We localize the inflaton on one of the boundaries of an extra dimension and note that the inflationary vacuum energy can readily lead to the formation of a horizon in the bulk. We will identify an interesting and optimal regime where the extra dimension is stabilized close to the onset of such a horizon and find that both the KK gravitons and KK gauge bosons can mediate observable NG —providing a direct probe of orbifold GUTs.

Summary

Author: KUMAR, Soubhik (University of Maryland)
Co-author: SUNDRUM, Raman (University of Maryland)
Presenter: KUMAR, Soubhik (University of Maryland)
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