

Gauge Non-Singlet Inflation in SUSY GUTs

Tuesday, 24 August 2010 16:12 (15 minutes)

We explore the novel possibility that the inflaton responsible for cosmological inflation is a gauge non-singlet in supersymmetric Grand Unified Theories. For definiteness we consider SUSY hybrid inflation where we show that the scalar components of gauge non-singlet superfields, together with fields in conjugate representations, may form a D-flat direction suitable for inflation.

We apply these ideas to SUSY models with an Abelian gauge group, a Pati-Salam gauge group and finally Grand Unified Theories based on $SO(10)$ where the scalar components of the matter superfields in the 16s may combine with a single $\bar{16}$ to form the inflaton, with the right-handed sneutrino direction providing a possible viable trajectory for inflation.

Assuming sneutrino inflation, we calculate the one-loop Coleman-Weinberg corrections and the two-loop corrections from gauge interactions giving rise to the “gauge eta-problem” and show that both corrections do not spoil inflation, and that the monopole problem can be resolved.

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Session Classification: Astro 24-2 Chair: L. Covi

Track Classification: Astro