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Simplified smooth hybrid inflation in supersymmetric SU(5)

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A scheme of simplified smooth hybrid inflation is realized in the framework of supersymmetric $SU(5)$. The smooth model of hybrid inflation provides a natural solution to the monopole problem that appears in the breaking of $SU(5)$ gauge symmetry. The supergravity corrections with nonminimal Kahler potential are shown to play important role in realizing inflation with a red-tilted scalar spectral index $n_s < 1$, within Planck's latest bounds. As compared to shifted model of hybrid inflation, relatively large values of the tensor-to-scalar ratio $r \leq 0.01$ are achieved here, with nonminimal couplings $-0.05 \leq \kappa_S \leq 0.01$ and $-1 \leq \kappa_{SS} \leq 1$ and the gauge symmetry-breaking scale $M \simeq (2.0 - 16.7) \times 10^{16}$ GeV.

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