

Walking-dilaton hybrid inflation with $B - L$ Higgs embedded in dynamical scalegenesis

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We propose a hybrid inflationary scenario based on eight-flavor hidden QCD with the hidden colored fermions being in part gauged under $U(1)_{B-L}$. This hidden QCD is almost scale-invariant, so-called walking, and predicts the light scalar meson (the walking dilaton) associated with the spontaneous scale breaking, which develops

the Coleman-Weinberg (CW) type potential as the consequence of the nonperturbative scale anomaly, hence plays the role of an inflaton of the small-field inflation.

The $U(1)_{B-L}$ Higgs is coupled to the walking dilaton inflaton, which is dynamically induced from the so-called bosonic seesaw mechanism.

We explore the hybrid inflation system involving the walking dilaton inflaton and the $U(1)_{B-L}$ Higgs as a waterfall field.

We find that observed inflation parameters tightly constrain the $U(1)_{B-L}$ breaking scale as well as the walking dynamical scale to be $\sim 10^9$ GeV and $\sim 10^{14}$ GeV, respectively, so as to make the waterfall mechanism worked.

The lightest walking pion mass is then predicted to be around 500 GeV. Phenomenological perspectives including embedding of the dynamical electroweak scalegenesis and possible impacts on the thermal leptogenesis are also addressed.

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