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Dark energy, QCD axion, BICEP2, and trans-Planckian decay constant

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To interpret DE as the potential energy of the approximate U(1) dark energy global symmetry, one must find color-anomaly free U(1). This necessarily invites to consider U(1)de symmetry together with U(1)PQ symmetry such that one gluon-anomaly free combination is constructed. This gives a hilltop potential of height GUT scale energy density. Since the recent BICEP2 result forbid the hilltop inflation, the chaoton is introduced to fit to the BICEP2 data at bull's eye. The DE symmetry, the PQ symmetry, and the Lyth bound are described from a unified view from string derived discrete symmetries.

Summary

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