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Natural Inflation with Hidden Scale Invariance

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We propose a new class of natural inflation models based on a hidden scale invariance. In a very generic Wilsonian effective field theory with an arbitrary number of scalar fields, which exhibits scale invariance via the dilaton, the potential necessarily contains a flat direction in the classical limit. This flat direction is lifted by small quantum corrections and inflation is realised without need for an unnatural fine-tuning. In the conformal limit, the effective potential becomes linear in the inflaton field, yielding to specific predictions for the spectral index and the tensor-to-scalar ratio, being respectively: n_s−1≈−0.025(N⊠/60)−1 and r≈0.0667(N⊠/60)−1, where N⊠≈30−65 is a number of e-folds during observable inflation. This predictions are in reasonable agreement with cosmological measurements. Further improvement of the accuracy of these measurements may turn out to be critical in falsifying our scenario.

The paper is available under the arXiv number 1602.04901, and has been accepted by Physics Letters B.

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