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Hybrid inflation and gravitational waves from accidentally light scalars

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We construct a hybrid-inflation model where the inflaton potential is generated radiatively, as gauge symmetries guarantee it to be accidentally flat at tree level. The model can be regarded as a small-field version of Natural Inflation, with inflation ending when the mass of a second scalar, the waterfall field, turns tachyonic. This provides a minimal, robust realisation of hybrid inflation, which predicts specific correlations among CMB observables. Tachyonic preheating leads to the production of gravitational waves which, for a low inflationary scale, might be detected by upcoming experiments. Simple variations of the model can give rise to topological defects, such as unstable domain walls. Their dynamics produces a stochastic gravitational-wave background, which can be compatible with the recent detection by pulsar timing arrays.

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