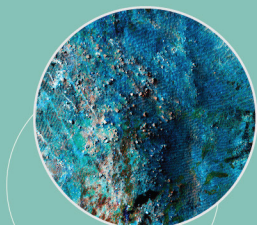




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TDiff-fuelled cosmic magnetic fields

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Abstract

We explore the consequences of the breaking of diffeomorphism (Diff) invariance in the electromagnetic sector. We consider the breaking of Diff symmetry down to the subgroup of transverse diffeomorphisms (TDiff) and analyze its impact on the generation and evolution of cosmic magnetic fields. We show that Diff breaking induces a breaking of conformal invariance that allows the production of magnetic fields from quantum vacuum fluctuations during inflation. In addition, the evolution of super-Hubble modes is shown to differ from the standard Diff-invariant electrodynamics. The effects of the highly conductive plasma in the evolution are also analyzed. We obtain the magnetic power spectrum today and discuss the parameter regions that yield intergalactic magnetic fields compatible with current observations.

