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Statistical Properties of Helical Magnetic Fields and their Cosmological Application

Tuesday 8 May 2018 18:15 (15 minutes)

We have studied the statistical properties and the associated realizability condition for helical primordial magnetic fields. These have been related to the smoothed magnetic fields generally used to constrain the fields from observational data. In particular, we have looked at fields generated during inflation which have a scale-invariant spectrum. We have determined the relation between the correlation length of these fields and the low-k cutoff of the perturbations during inflation. It is shown that the observational signatures on the CMB due to these inflationary fields depend on this scale. We have also numerically studied how the k^{-1} spectral shape changes over time with turbulent evolution.

Based On:

Axel Brandenburg, Ruth Durrer, Tina Kahniashvili, **Sayan Mandal**, Weichen Winston Yin, "*Statistical Properties of Scale-Invariant Helical Magnetic Fields and Applications to Cosmology*", arXiv:1804.01177.

Axel Brandenburg, Tina Kahniashvili, **Sayan Mandal**, Alberto Roper Pol, Alexander G. Tevzadze, Tanmay Vachaspati, "*Evolution of hydromagnetic turbulence from the electroweak phase transition*", Phys.Rev. D96 (2017) no.12, 123528.

Axel Brandenburg, Tina Kahniashvili, **Sayan Mandal**, Alberto Roper Pol, Alexander G. Tevzadze, Tanmay Vachaspati, "*The dynamo effect in decaying helical turbulence*", arXiv:1710.01628.

Summary

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