ANOMALOUS SCALING IN COMPRESSIBLE KAZANTSEV-KRAICHNAN MODEL WITH SPATIAL PARITY VIOLATION

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The field theoretic renormalization group and the operator product expansion are used for the investigation of the inertial-range anomalous scaling behavior of the single-time correlation functions of the weak magnetic field within the framework of the compressible Kazantsev-Kraichnan. Two-loop expressions for the critical dimensions of the leading composite operators in the operator product expansion, which drives the anomalous scaling of the two-point single-time correlation functions of the magnetic field in the presence of the large-scale anisotropy, are found as functions of the compressibility and helicity parameters. The influence of the compressibility and the helicity of the turbulent system on the hierarchy of the anisotropic contributions to the anomalous dimensions is discussed and it is shown that the crucial role is played by the composite operator near the isotropic shell. It is shown that the presence of the helicity as well as of the compressibility of the electrically conductive turbulent environment can make the anomalous scaling more pronounced than in the incompressible and non-helical case. In addition, it is also shown that the persistence of the anisotropy deep inside the inertial interval is more visible especially when the spatial parity violation is present in the system.

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