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Intermittency and geometrical statistics of 3d homogeneous magnetohydrodynamic turbulence using wavelets KAI SCHNEIDER, M2P2-CNRS & CMI Aix-Marseille University, France, KATSUNORI YOSHIMATSU, Department of Computational Science and Engineering, Nagoya University, Japan, NAOYA OKAMOTO, Center for Computational Science, Nagoya University, Japan, YASUHIRO KAWAHARA, Department of Computational Science and Engineering, Nagoya University, Japan, MARIE FARGE, LMD-CNRS, Ecole Normale Superieure, Paris, France — Scale-dependent intermittency and geometrical statistics of 3d incompressible homogeneous magnetohydrodynamic turbulence without mean magnetic field are examined by means of the orthogonal wavelet decomposition. The field is computed by direct numerical simulation with a Fourier spectral method at resolution 512^3, and the magnetic Prandtl number is taken to unity. Scale-dependent second- and higher-order statistics of the velocity and magnetic fields allow to quantify the intermittency of the fields in terms of spatial fluctuations of the energy spectrum, the flatness and the probability distribution functions of both fields at different scales. Scale-dependent different relative helicities, yield geometrical information on alignment between different scale-dependent fields. At each scale, the scale-dependent alignment between the velocity and magnetic field is found to be more pronounced than the other alignments considered here. Finally, statistical scale-dependent analyses of both Eulerian and Lagrangian accelerations and the corresponding time-derivatives of the magnetic field are performed.

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