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Stochastic geometry of turbulence

GREGORY FALKOVICH, Weizmann Institute of Science

Geometric statistics open the window into the most fundamental aspect of turbulence flows, their symmetries, both broken and emerging. On one hand, the study of the stochastic geometry of multi-point configurations reveals the statistical conservation laws which are responsible for the breakdown of scale invariance in direct turbulence cascades. On the other hand, the numerical and experimental studies of inverse cascade reveal that some families of isolines can be mapped to a Brownian walk (i.e. belong to the so-called SLE class) and are thus not only scale invariant but conformally invariant. That means that some aspects of turbulence statistics can be probably described by a conformal field theory. The talk is a review of broken and emerging symmetries in turbulence statistics.