Lagrangian statistics in forced two-dimensional turbulence
OLIVER KAMPS, RUDOLF FRIEDRICH, Institute for Theoretical Physics, University of Muenster — In recent years the Lagrangian description of turbulent flows has attracted much interest from the experimental point of view and as well is in the focus of numerical and analytical investigations. We present detailed numerical investigations of Lagrangian tracer particles in the inverse energy cascade of two-dimensional turbulence. In the first part we focus on the shape and scaling properties of the probability distribution functions for the velocity increments and compare them to the Eulerian case and the increment statistics in three dimensions. Motivated by our observations we address the important question of translating increment statistics from one frame of reference to the other [1]. To reveal the underlying physical mechanism we determine numerically the involved transition probabilities. In this way we shed light on the source of Lagrangian intermittency.

[1] R. Friedrich, R. Grauer, H. Hohmann, O. Kamps, A Corrsin type approximation for Lagrangian fluid Turbulence , arXiv:0705.3132

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