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Statistics of relative velocities of heavy particles in turbulence[1]
DHRUBADITYA MITRA, AKSHAY BHATNAGAR, NORDITA, Stockholm, KRISTIAN GUSTAFSSON, BERNHARD MEHLIG, Dept. of Physics, University of Gothenburg — We consider heavy, inertial, passive, particles in homogeneous and isotropic turbulent flows. Using direct numerical simulations we study the statistics of relatives velocities of identical particles. We calculate the p^{th} order moments $m_{\text{p}}(R)$ of the collision velocity as a function of particle size. We find that, in agreement with theory, the moments show bifractal scaling behavior confirming the effects of caustics. We also compute the joint probability distribution functions (PDFs) of relative velocity and separation between two closeby particles and compare with theory at intermediate and large Stokes numbers.

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