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Temporal asymmetry in Lagrangian two-dimensional turbulence[1]

ROBERT ECKE, Los Alamos National Laboratory, COLM CONNAUGHTON, University of Warwick, MAHESH BANDI, MICHAEL RIVERA, Los Alamos National Laboratory — Turbulence is an irreversible process with a net flow of energy from large to small scales in three-dimensional systems and from small to large scales in two-dimensional flows for scales larger than the injection scale. A measure of this irreversibility is the energy dissipation or, equivalently, for an inertial cascade the energy flux between spatial scales. We study temporal symmetry breaking in experimental and numerical studies of two-dimensional turbulence. We demonstrate that symmetry breaking in low-order Lagrangian correlation functions depends on the local Eulerian scale-to-scale energy transfer.

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