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Spatiotemporal persistence of spectral fluxes in two-dimensional weak turbulence[1] DOUGLAS H. KELLEY, NICHOLAS T. OUELLETTE, Yale University — Nonlinearity in a dynamical system necessarily leads to coupling between different spatial and temporal frequencies. Using a recently developed filtering technique, we study the spatiotemporal properties of the scale-to-scale fluxes of energy and enstrophy in a weakly turbulent experimental quasi-two-dimensional flow. Although these spectral properties vary in time and space, we show that they persist along the Lagrangian trajectories of fluid elements for times that can be nearly as long as the correlation time of the velocity field itself. Additionally, we show that at small scales, the spectral energy flux persists longest for fluid elements in strongly hyperbolic regions of the flow, whereas at large scales it persists in strongly elliptic regions.

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