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Scale-Dependent Stress-Strain Rate Alignment and Spectral Transport in 2D Turbulence YANG LIAO, NICHOLAS T. OUELLETTE, Yale University, YALE UNIVERSITY TEAM — The flux of quantities such as energy or enstrophy between different scales can be expressed as the scalar product of an appropriate scale-dependent stress and a rate of strain. But regardless of their magnitudes, spectral transfer can be suppressed if the stress and strain rate are geometrically misaligned. Working with experimental data obtained from an experimental quasi-two-dimensional weakly turbulent flow, we explore the impact of geometric alignment on the spectral transfer of energy and enstrophy using filter-space techniques. We decompose the scale-dependent stress into three distinct components, and show that they tend to drive spectral transport in different directions. We also show that the net observed directionality of the inverse energy and forward enstrophy cascades are controlled by the scale-dependet geometric alignment of these quantities.

Yang Liao
Yale University

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