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**Extracting Turbulent Spectral Transfer from Under-Resolved Velocity Fields** NICHOLAS OUELLETTE, Yale University, RUI NI, GREG VOTH, Wesleyan University — The strong nonlinearities in turbulent flows drive the transfer of energy and other quantities among different scales of motion. In 3D turbulence, this transfer organizes into the classic Richardson-Kolmogorov cascade of energy to small scales; in 2D turbulence, it leads to an inverse cascade of energy to large scales and a forward cascade of enstrophy to small scales. Directly measuring this spectral transfer is difficult, particularly in experiments. Recent developments of filtering techniques allow spectral fluxes to be measured locally, but have been assumed to require finely resolved velocity fields that are typically not available in 3D experiments. Here we show, using experimental data in 2D and DNS data in 3D, that poorly resolved velocity fields can still be used to extract information about spectral transfer processes. Our results also have implications for locality in the cascades.

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