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Nonlinear Deformation in Weak Turbulence[1] NICHOLAS OUELLETTE, DOUGLAS KELLEY, YANG LIAO, Department of Mechanical Engineering & Materials Science, Yale University — Turbulent and chaotic flows are well known to mix efficiently: by repeatedly stretching and folding material volumes, material lines stretch exponentially quickly and gradients of an advected scalar field can become very large. By adapting a technique originally introduced to study plasticity in glassy solids, we explicitly separate stretching (a linear transformation) from folding (a nonlinear transformation) in a quasi-two-dimensional experimental flow and study them independently. We compare results from two forcing schemes: one that is dominated by rotation, and another that is dominated by shear.

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