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The effect of large coherent rings on small-scale turbulence LUMINITA DANAILA, CORIA, U. Rouen, PAUL DIMOTAKIS, California Institute of Technology, K.-F. KRAWCZYNSKI, BRUNO RENOU, CORIA, U. Rouen —
In an experimental partially stirred reactor (PaSR), fluid is injected through a set of 16 pairs of opposed jets and ejected via porous top and bottom walls. The resulting fluid circulation pattern creates pairs of alternately-rotating, large-scale coherent rings. The large-scale properties of the mean flow, i.e., the large-scale vorticity and strain rate, lead to rotating, quasi-2D turbulence at large scales, about 128 Kolmogorov scales in size. In these large structures, turbulence is locally homogeneous and the vorticity field is spatially correlated over a range of scales as large as the rings. This flow configuration is novel, since the vorticity field is usually classified as a smallscale field. The inertial range of secondorder structure functions of enstrophy scales as log(r), where, r is the separation between two spatial points, as is the case for 2D turbulence. An analytical approach is developed to statistically describe the enstrophy over the whole range of scales.

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