

Abstract Submitted
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Coupling of Interfacial Mixing Events in Stratified Taylor–Couette Flow¹ JAMIE PARTRIDGE, DAMTP, U. of Cambridge, ANNE-CLAIRE LE BIHAN, Ecole Polytechnique, C. P. CAULFIELD, BP Institute & DAMTP, U. of Cambridge, STUART DALZIEL, DAMTP, U. of Cambridge, PIERRE AUGIER, Laboratoire des Ecoulements Geophysiques et Industriels — We examine experimentally the coupling of mixing events that occur in stratified Taylor–Couette flow. It has previously been observed that in a density-stratified Taylor–Couette flow consisting of two homogeneous layers there is a periodic mixing event that occurs on the interface separating the two layers. Additionally, if the fluid in the annulus is initially linearly stratified, layers spontaneously form, and an apparently similar quasi-periodic mixing event appears on each of the interfaces. By tracking the mixing event around the annulus we show that the mixing event is not temporally intermittent but is continuously advected around the annulus. Moreover, we demonstrate that the mixing events on adjacent interfaces can couple and become phase locked with an almost constant phase shift between events on each interface. We investigate how robust this coupling is and how it depends on the initial conditions and time evolution of the flow.

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