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**Intermittent Flow In Yield Stress Fluids Slows Down Chaotic Mixing** JALILA BOUJLEL, DAWN WENDELL, EMMANUELLE GOUILLART, FRANCK PIGEONNEAU, PIERRE JOP, Laboratoire Surface du Verre et Interfaces, LABORATOIRE SURFACE DU VERRE ET INTERFACES TEAM — Many mixing situations involve fluids with non-Newtonian properties: mixing of building materials such as concrete or mortar are based on fluids that have shear- thinning rheological properties. Lack of correct mixing can waste time and money, or lead to products with defects. When fluids are stirred and mixed together at low Reynolds number, the fluid particles should undergo chaotic trajectories to be well mixed by the so-called chaotic advection resulting from the flow. Previous work to characterize chaotic mixing in many different geometries has primarily focused on Newtonian fluids. First studies into non-Newtonian chaotic advection often utilize idealized mixing geometries such as cavity flows or journal bearing flows for numerical studies. Here, we present experimental results of chaotic mixing of yield stress fluids with non-Newtonian fluids using rod-stirring protocol with rotating vessel. We describe the various steps of the mixing and determine their dependence on the fluid rheology and speeds of rotation of the rods and the vessel. We show how the mixing of yield-stress fluids by chaotic advection is reduced compared to the mixing of Newtonian fluids and explain our results, bringing to light the relevant mechanisms: the presence of fluid that only flows intermittently, a phenomenon enhanced by the yield stress, and the importance of the peripheral region. This result is confirmed via numerical simulations.

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