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Mixing in sheared suspensions MATHIEU SOUZY, NORA CHERIFA ABID, IUSTI, EMMANUEL VILLERMAUX, IRPHE, BLOEN METZGER, IUSTI — Mixing occurs spontaneously in sheared suspensions, even at low Reynolds number. Under flow, successive collisions between particles deviate the laminar streamlines, and thus induce disturbances in the fluid phase, which produce very efficient mixing. We measure fluid velocity fields by performing high spatial resolution PIV experiments within a sheared suspension, and we numerically advect isolated scalar filaments in the flow using Diffusive Strip Method. Stretching law parameters are measured from the elongation of the filaments, and are used to fully characterize the process. The deformation statistics are found to be well modeled by a Langevin equation with multiplicative noise, which can be coupled with diffusion to infer the probability density function of the concentration in the medium.

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