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Getting Things Sorted With Lagrangian Coherent Structures SEVERINE ATIS, THOMAS PEACOCK, Massachussets Institute of Technology; EndLab, 77 Massachusetts Avenue, Cambridge MA 02139, ENVIRONMENTAL DYNAMICS LABORATORY TEAM — The dispersion of a tracer in a fluid flow is influenced by the Lagrangian motion of fluid elements. Even in laminar regimes, the irregular chaotic behavior of a fluid flow can lead to effective stirring that rapidly redistributes a tracer throughout the domain. For flows with arbitrary time-dependence, the modern approach of Lagrangian Coherent Structures (LCSs) provide a method for identifying the key material lines that organize flow transport. When the advected tracer particles possess a finite size and nontrivial shape, however, their dynamics can differ markedly from passive tracers, thus affecting the dispersion phenomena. We present details of numerical simulations and laboratory experiments that investigate the behavior of finite size particles in 2-dimensional chaotic flows. We show that the shape and the size of the particles alter the underlying LCSs, facilitating segregation between tracers of different shape in the same flow field.

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