Lagrangian Coherent Structures for Inertial Particles

G. Haller and T. Sapsis

MIT, Cambridge, USA (ghaller@mit.edu)

In this talk, I will discuss recent results on the asymptotics of inertial (i.e., finite-size) particle motion. The asymptotic particle motion turns out to be governed by a slow manifold that can be constructed explicitly up to any order of precision. Particle motions synchronize with inertial Lagrangian coherent structures (ILCS) obtained from the reduced dynamics on the slow manifold. For larger particle sizes, the slow manifold develops local instabilities that can be located analytically. As applications, I discuss droplet motion in hurricanes, source inversion for contaminants in an urban environment, and predator-prey interaction in jellyfish feeding.