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The Effects of Wakes and Multiple Moving Bodies on Darwinian Drift

When a body passes through an unbounded fluid, it induces a net displacement of fluid particles. The difference between the initial and final positions of a fluid particle is defined as the particle's Darwinian "drift", and plays an important role in the characterization of the stirring occurring in multiphase flows and due to swimming bodies. For instance, there is evidence to suggest that the drift due to swimming bodies such as zooplankton or larger mammals in the oceans is a significant contributor to overall ocean circulation and nutrient transport. In this talk, we will discuss the effect of vortex wakes on the Lagrangian displacement of particles induced by the passage of an obstacle in a two-dimensional incompressible and inviscid fluid. Further, we will discuss the ongoing work concerning the drift induced by pairs or larger groups of moving obstacles where such flows can be studied using the formalism based on the Schottky-Klein prime function.