Abstract Submitted
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Settling of a sphere through a fluid-fluid interface: influence of the Reynolds number[1] JEAN-LOU PIERSON, Institut de mcanique des fluides de Toulouse, JACQUES MAGNAUDET, Institut de mcanique des fluides de Toulouse - CNRS — When a particle sediments through a horizontal fluid-fluid interface (a situation frequently encountered in oceanography as well as in coating processes), it often tows a tail of the upper fluid into the lower one. This feature is observed in both inertia- and viscosity-dominated regimes. Nevertheless the tail evolution and the particle motion are found to highly depend on the ratio of the two effects, i.e. on the Reynolds number. In this work we study numerically the settling of a sphere through a horizontal fluid-fluid interface using an Immersed Boundary Method combined with a Volume of Fluid approach. To get some more insight into the underlying physical mechanisms, we combine this computational approach with a semi-analytical description based on the concept of Darwin "drift" which allows us to predict the interface evolution, hence the thickness of the film encapsulating the sphere, in the two limits of Stokes flow and potential flow.

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