

Abstract Submitted
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Inertial Settling of Flexible Fiber Suspensions¹ MONA RAHMANI, University of British Columbia, ARASH ALIZAD BANAEI, KTH Royal Institute of Technology, MARK MARTINEZ, University of British Columbia, LUCA BRANDT, KTH Royal Institute of Technology — The inertial settling of suspensions of flexible and rigid fibers are investigated using an Immersed Boundary Method. For the settling of a suspension of inextensible and slender fibers at a Galileo number of $Ga = 160$, we examine a range of dimensionless bending rigidities and fiber concentrations that span dilute and semi-dilute regimes ($0.5 < nL^3 < 25$ with n being the fiber number density and L the fiber length). The settling fibers form streamers, regions where the fibers are packed and settle faster than the average settling velocity of the suspension. Flexible fibers exhibit higher packings inside the streamers compared to rigid fibers. Due to this higher packing in the streamers, the flexible fibers settle faster compared to the rigid fibers. While flexible fibers maintain the structure of the streamers as fiber concentration increases, rigid fibers form weaker streamers at high fiber concentrations and their settling velocity drops at higher fiber concentrations.

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