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A hydrodynamic study of corner flow with leakage to orient dilute suspensions of ellipsoids[1] JONATHAN BAUER, ERIC FURST, University of Delaware — The macroscopic characteristics of thin films are related to the microscale arrangement of the underlying particles. Directing the assembly of anisotropic colloids through the use of external fields, such as flow fields, can lead to materials with novel catalytic, transport, and optical properties. Such fields are used to bias particle orientation in solution before deposition onto a solid substrate. Corner flow with leakage, akin to the doctor blade used in the pulp and paper industry, is a solution-based, processing technique that has been used to create nanostructured materials. We present an analysis that describes how dilute suspensions of ellipsoids couple to this field. A Lagrangian and Eulerian perspective is necessary to identify regions with not only a high straining component but also a sufficient time scale for alignment. Trajectories that lie completely within these "hot spots" result in a distribution in which greater than 80% of the particles have an angle less than 20° with respect to the flow direction. Our results can be used to describe previously reported trends of particle orientation in literature. Overall, our work gives a broader understanding of some of the difficulties associated with using flow fields to fully align ellipsoids in dilute suspensions

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