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**Investigating the hydrodynamics of asymmetrically driven polymer brushes in micro-channels**[1] IBRAHIM SOUKI, MOHAMED LARADJI, University of Memphis, P.B. SUNIL KUMAR, Indian Institute of Technology Madras — The interfacial hydrodynamics between a polymer brush, under the influence of an asymmetric external driving field, and the surrounding solvent is explored across varying grafting densities, field strengths, and polymer chain lengths. A soft core model based on dissipative particle dynamics is used along with a 2-body FENE potential and a 3-body harmonic potential which define the internal mechanics of the polymer chains. The morphology of the polymer chains and the shearing produced at the interface layer between the polymer and solvent regimes is investigated as a function of hydrodynamic coupling to the external driving field. The momentum transfer and drag forces at the interface are shown to be the primary factors which lead to coupling and a directed non-zero net flow of the surrounding solvent through the coplanar nano-channel. The aim of the model is to introduce a novel mechanism to circumvent the large pressure gradients necessary to sustain fluid flow through micro/nano-pores as a consequence of Poiseuille's law.

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