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Propulsion of water striders: capillarity and hydrodynamics PENG GAO, JAMES FENG, Department of Chemical and Biological Engineering, University of British Columbia — We present a numerical investigation of the propulsion of water striders. The flow produced by the stroke of the leg is modeled as that around a hydrophobic circular cylinder astride the interface. We use a diffuse-interface model to compute the moving contact line and the interfacial deformation, and to probe the origin of the propulsive force acting on the leg. The movement of the leg produces a significant deformation of the interface: The upstream meniscus is curved by the dynamic pressure, while the downstream meniscus is flattened by the low-pressure wake associated with vortex shedding. Due to this asymmetry, the force produced by interfacial tension dominates the propulsion.

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