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Microfluidic Separation of Chiral Particles MARCOS[1], Massachusetts Institute of Technology, HENRY FU, THOMAS POWERS, Brown University, ROMAN STOCKER, Massachusetts Institute of Technology — We present a combined theoretical and experimental investigation of the fluid mechanics of a helix exposed to a shear flow. In addition to classic Jeffery orbits, Resistive Force Theory predicts a drift of the helix across streamlines, perpendicular to the shear plane. The direction of the drift is determined by the direction of the shear and the chirality of the helix. We verify this prediction experimentally using microfluidics, by exposing Leptospira biflexa, a non-motile strain of helical-shaped bacteria, to a plane parabolic flow. As the shear in the top and bottom halves of the microchannel has opposite sign, we predict and observe the bacteria in these two regions to drift in opposite directions. The magnitude of the separation is in good quantitative agreement with theory. This setup can be used to separate microscale chiral objects.

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