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The role of shape for a Brownian microswimmer interacting with walls JEAN-LUC THIFFEAULT, HONGFEI CHEN, University 0f Wisconsin - Madison — We consider a simple model of a two-dimensional microswimmer with fixed swimming speed. The direction of swimming changes according to a Brownian process, and the swimmer is interacting with boundaries. This is a standard model for a simple microswimmer, or a confined wormlike chain polymer. The shape of the swimmer determines the range of allowable values that its degrees of freedom can assume — its configuration space. Using natural assumptions about reflection of the swimmer at boundaries, we compute the swimmer's invariant distribution across a channel consisting of two parallel walls, and the statistics of spreading in the longitudinal direction. This gives us the effective diffusion constant of the swimmer's large scale motion. When the swimmer is longer than the channel width, it cannot reverse, and we then compute the mean drift velocity of the swimmer. This model offers insight into experiments of scattering of swimmers from boundaries, and serves as an exactly-solvable baseline when comparing to more complex models.

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