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How does the diffusion fish swim?[1] GUNNAR PENG, DAMTP, University of Cambridge, NEIL BALMFORTH, Department of Mathematics, University of British Columbia, WILLIAM YOUNG, Scripps Institution of Oceanography, University of California at San Diego — An asymmetric object (such as a wedge) placed in a stably stratified fluid moves with a steady horizontal speed. We explain how this spontaneous motion is caused by the diffusion-driven buoyancy layers that form on the sloping surfaces of the object, and calculate the speed for a variety of two-dimensional configurations using the method of matched asymptotic expansions. Surprisingly, in many cases, the leading-order speed depends on neither the viscosity nor the stratification strength.

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