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Hydrodynamics of self-propulsion near boundaries SAVERIO SPAGNOLIE, ERIC LAUGA, University of California, San Diego — The swimming kinematics and trajectories of many microorganisms are altered by the presence of nearby boundaries, be they solid or deformable, and often in perplexing fashion. When an organism's swimming dynamics vary near such boundaries a question arises naturally: is the change in behavior biological, fluid mechanical, or perhaps mediated by other physical laws? Of interest then is a general framework for determining the extent to which fluid mechanics passively alter swimming behaviors in the presence of a wall. To this end, we explore a far-field description of swimming organisms and provide a general framework for studying the fluid-mediated modifications to swimming trajectories, and consider trapped/escape trajectories and equilibria for model organisms of varying shape and propulsive activity. This framework may help to explain surprising behaviors observed in the swimming of many microorganisms and synthetic swimming devices.

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