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Low Reynolds number swimming in a stratified fluid[1] AMIN DOOSTMOHAMMADI, University of Notre Dame, ROMAN STOCKER, Massachusetts Institute of Technology, AREZOO ARDEKANI, University of Notre Dame — Significant progress has been made in analyzing low-Reynolds number locomotion in homogeneous fluids. Even though many aquatic environments are influenced by vertical variations in density, the effects of stratification on the hydrodynamics of swimming of small organisms are very poorly understood. In this article, by using a squirmer model, we show that motility, energy expenditure, and nutrient uptake of small organisms in a density stratified fluid can be largely influenced due to buoyancy effects. Not only does the stratification suppress the swimming velocity, but it also enhances the nutrient uptake and the energy required for a squirmer to swim across pycnoclines.

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