

Abstract Submitted  
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**The combined effect of gravity and stresslets on the instability of a uniform suspension of swimming micro-organisms** TIMOTHY PEDLEY, University of Cambridge — Uniform dilute suspensions of gyrotactic, swimming micro-organisms (bottom-heavy algae) become unstable because of the effect of gravity [1]; suspensions of head-heavy organisms are stable. In the absence of gravity, uniform suspensions of aligned swimmers become unstable because of the stresslet distribution generated by their swimming actions, whether they are pullers (algae) or pushers (bacteria) [2,3], but only pushers cause instability of an isotropic suspension [3]. Here we examine the effect of weak gravity on a suspension's instability, and find that even a small gravitational term leads to instability for bottom-heavy cells at small enough wavenumber, whatever the magnitude and sign of the stresslet term, but may not be enough to stabilise suspensions of head-heavy pushers at a high enough number density of cells. However, use of realistic parameter values suggests that gravity will normally be dominant.

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[2] R A Simha & S Ramaswamy, *Phys. Rev. Lett.* **89**,058101 (2002)

[3] D Saintillan & M J Shelley, *Phys. Fluids* **20**,123304 (2008)

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