SWIMMING AND SCATTERING AT LOW REYNOLDS NUMBER

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ABSTRACT

Because of their size bacteria and fabricated microswimmers swim at low Reynolds number, a regime where the effect of hydrodynamics can be counterintuitive. The Stokes equations, which govern the zero Reynolds number limit, are invariant under time reversal and hence to move at all the microswimmer must have a swimming stroke which is irreversible in time.The current interest in microswimming has been fuelled both by advances in nanotechnology which have led to novel experiments aimed at fabricating microswimmers and micropumps, and by an increasing ability to perform quantitative investigations of bacterial motion.

I will describe research using analytic and numerical approaches to model swimming at low Reynolds number. We are interested in understanding the velocity fields of the swimmers and their dependence on the symmetry of the swimming stroke, the form and relevance of hydrodynamic interactions between swimmers, and the anomalous statistics of passive tracers in dilute bacterial suspensions.