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Ciliary kinematics of Chlamydomonas reinhardtii in Complex Fluids: Role of viscosity ARVIND GOPINATH, Department of Physics and Astronomy, Haverford College, BOYANG QIN, PAULO ARRATIA, School of Engineering and Applied Sciences, University of Pennsylvania — The motility behavior of microorganisms can be significantly affected by the rheology of their fluidic environment. Guided by our experiments on the swimming gait of Chlamydomonas reinhardtii in viscoelastic fluids, we focus on ciliary waveforms in Newtonian fluids and systematically study the effect of increasing viscosity. We find that the beat frequency as well as the wave speed are both strongly influenced by fluid viscosity. Interestingly, ciliary waveforms at low viscosity show a larger influence of the cell body than waveforms at higher viscosity. We use slender body theory and principal component analysis to elucidate the role of fluid viscosity in regulating the kinematics of the swimming process.

Arvind Gopinath
Department of Physics and Astronomy, Haverford College

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