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Slipping slender bodies and enhanced flagellar locomotion YI MAN, ERIC LAUGA, University of Cambridge — In the biological world, many cells exploit slender appendages to swim, include numerous species of bacteria, algae and spermatozoa. A classical method to describe the flow field around such appendages is slender-body theory (SBT), which is often used to study flagellar motility in Newtonian fluids. However, biology environments are often rheologically complex due to the presence of polymers. These polymers generically phase-separate near rigid boundaries where low-viscosity fluid layers lead to effective slip on the surface. In this talk, we present an analytical derivation of SBT in the case where the no-slip boundary condition on the appendage is replaced by a Navier slip boundary condition. Our results demonstrate in particular a systematic reduction of the resistance coefficient of the slender filaments in their tangential direction, which leads to enhanced flagellar locomotion.

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