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Deformation of a flexible hair in a Poiseuille flow SRI SAVYA TANIKELLA, NATHAN JONES, EMILIE DRESSAIRE, University of California, Santa Barbara — Numerous biological systems rely on hair-like structures to sense their fluidic environment. Fluid-structure interactions can result in the elastic bending of flexible hairs. Recent theoretical work has shown that clamped elastic beams can act as direct strain sensors or as strain amplifiers by deforming their substrate. In this study, we investigate the deformation of a clamped elastic rod in a viscous flow. In our experiments, the elastomer rod and base are mounted on a wall of a rectangular channel, in which the flow field has a Poiseuille profile. We vary the geometry and Youngs modulus of the rod and the flow rate in the channel. We measure the deformation of the rod and show the influence of the confinement on deflection. We analyze our results using numerical simulations and scaling arguments for a slender body in a viscous flow.

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