Abstract Submitted
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Undulatory Swimming in Fluids with Polymer Networks[1] DAVID GAGNON, XIAONING SHEN, PAULO ARRATIA, University of Pennsylvania — In this talk, we systematically investigate the motility behavior of the nematode Caenorhabditis elegans in polymeric solutions of varying concentration using tracking and velocimetry methods. As the polymer concentration is increased, the solution undergoes a transition from the semi-dilute to the concentrated regime, where these rod-like polymers entangle, align, and form networks. Remarkably, we find an enhancement in the nematode's swimming speed of approximately 65 percent in concentrated solutions compared to semi-dilute solutions. Using velocimetry methods, we show that the undulatory swimming motion of the nematode induces an anisotropic mechanical response in the fluid. This anisotropy, which arises from the fluid micro-structure, is responsible for the observed increase in swimming speed.

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