

Abstract Submitted
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The “caterpillar” simulation model for a biological filament¹

AIMEE BAILEY, Imperial College London, CHRISTOPHER LOWE, Universiteit van Amsterdam, ADRIAN SUTTON, Imperial College London — We present a simulation model for an elastic filament in a viscous fluid, relevant for systems ranging from suspensions of paper pulp to micro-organism motility. It incorporates the Stokeslet treatment of the hydrodynamic force. We show that a non-arbitrary choice of the hydrodynamic radius is necessary to recover known dynamic behavior of a fiber with a finite cross-section. Our simulations explore configurations inaccessible by theory. We illustrate the utility of the model by considering the simple scenario of a charged filament in an electric field. Results suggest a circularly polarized electric field is a viable means for aligning microtubules in solution.

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Aimee Bailey
Imperial College London

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