

Abstract Submitted
for the DFD14 Meeting of
The American Physical Society

The effects
of translation and rotation on flagellar synchronization¹ JONATHAN H.
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Synchrony is often observed in studies of swimming microorganisms. Examples include collective behavior in large populations of microswimmers, metachronal waves passing through arrays of cilia, and flagellar bundling. In this work, we focus on the hydrodynamic interactions that occur between flagella in close proximity. Specifically, we use the method of regularized Stokeslets to numerically investigate the precise mechanisms through which phase synchrony occurs in a pair of side-by-side rigid helices. Because our “end-pinned” model enforces restoring forces at a single end of each helix, we are able to isolate and compare the respective effects of translational and rotational motions. We find that while certain degrees of freedom promote synchrony, others promote anti-synchrony or have little effect.

¹Funded by ONR grant N000141310551

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Date submitted: 01 Aug 2014

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