Title: A model for elastic filaments bundling
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Abstract:

Bacteria such as E. coli swim with several rotating flagella that present bundling during their run-and-tumble swimming mode. It has been long believed that one crucial factor of flagellar bundling is the hydrodynamic interactions. In this study, we derive a model for bundling driven by hydrodynamic interactions between elastic filaments at a long wavelength limit. A dimensionless number named bundling number Bu is defined to depict the dynamics. Our model provides a precise mathematical way to study flagellar bundling and can be extended to many problems in biological physics.