Abstract Submitted
for the DFD19 Meeting of
The American Physical Society

Spatiotemporal Control of an Extensile Active Nematic Suspension[1] MICHAEL NORTON, MICHAEL HAGAN, SETH FRADEN, Brandeis University — Active nematic suspensions are self-driven fluids that exhibit rich spatiotemporal dynamics characterized by director field buckling, defect nucleation/annihilation and chaotic trajectories of those defects. Towards developing experimental methods for controlling these dynamics, we consider an optimal control problem which seeks to find the spatiotemporal pattern of active stress strength required to drive the system towards a desired director field configuration. As an exemplar, we consider an extensile active nematic fluid confined to a disk which, in the absence of control, produces two topological defects that perpetually circulate, and seek the time-varying active stress field that drives the system to circulate in the opposite direction.

[1]We acknowledge support from NSF DMREF-1534890 and NSF MRSEC, Bioinspired Soft Materials, DMR-1420382.

Michael Norton
Brandeis University

Date submitted: 01 Aug 2019 Electronic form version 1.4