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Investigating the mixing quality of a biological active nematic[1]
AMANDA TAN, ERIC ROBERTS, KEVIN MITCHELL, LINDA HIRST, Univ of California - Merced — Active matter consists of individual entities that consume energy and collectively move. Active matter systems can form emergent patterns. We study an active matter system composed of biomaterials that forms a self-mixing network with nematic liquid crystal characteristics. This active network system is composed of biopolymers (microtubules), and molecular motors (kinesin) confined in 2D at an oil-water interface. When confined in 2D, the network resembles an active nematic system that self-mixes. We are interested in quantifying the mixing quality by measuring the rate of separation of the filaments. We bound beads to the network, and measure the separation distance as a function of time for bead pairs. We found that the network exhibits exponential stretching, which may imply that it is a good mixer. We further investigate how changing the velocity in the system affects the mixing quality. We change the velocity of the filaments moving by altering the ATP concentration.

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