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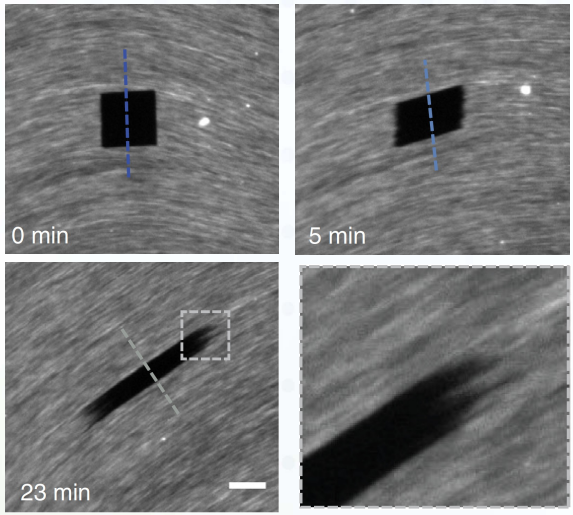
Multiscale Microtubule Dynamics in Active Nematics

[1]Hagan, [1]Fraden, [2]Dogic
[1]Brandeis University, [2]UCSB

In microtubule-based active nematics, motor-driven extensile motion of microtubule bundles powers chaotic large-scale dynamics. Here, the interfilament sliding motion is quantified both in isolated bundles and in a dense active nematic. These measurements highlight the challenge of connecting the extension rate of isolated bundles to the multimotor and multifilament interactions present in a dense 2D active nematic.



Photographs of fluorescently labeled microtubules forming an active nematic. A square area is bleached. Initially the boundaries are sharp. The zone extends along the nematic direction and roughens.

DMR DIVISION OF MATERIALS RESEARCH
DIRECTORATE FOR MATHEMATICAL AND PHYSICAL SCIENCES

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