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.

Lemma, Fraden, Hagan and Dogic, PRL 127 (2021). DOI: 10.1103/PhysRevLett.127.148001