Abstract Submitted
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Modeling flexible active nematics[1] MICHAEL VARGA, ROBIN SELINGER, Liquid Crystal Institute, Kent State University — We study active nematic phases of self-propelled flexible chains in two dimensions using computer simulation, to investigate effects of chain flexibility. In a "dry" phase of self-propelled flexible chains, we find that increasing chain stiffness enhances orientational order and correlation length, narrows the distribution of turning angles, increases persistence length, and increases the magnitude of giant density fluctuations. We further adapt the simulation model to describe behavior of microtubules driven by kinesin molecular motors in two different environments: on a rigid substrate with kinesin immobilized on the surface; and on a lipid membrane where kinesin is bonded to lipid head groups and can diffuse. Results are compared to experiments by L. Hirst and J. Xu. Lastly, we consider active nematics of flexible particles enclosed in soft, deformable encapsulation in two dimensions, and demonstrate novel mechanisms of pattern formation that are fundamentally different from those observed in bulk.

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