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Nematic Order Without Excluded Volume Interactions In a Confined Active Fluid.[1] DANIEL GOLDSTEIN, BULBUL CHAKRABORTY, Brandeis Univ — Recent experiments in active filament networks reveal interesting rheological properties. This system consumes ATP to produce an extensile motion in bundles of microtubules. This extension then leads to self generated stresses and spontaneous flows. We propose a minimal model where the activity is captured by self-extending force dipoles that are part of a cross linked network. This network can reorganize itself through buckling of extending filaments and cross linking events that alter the topology of the network. The competition of emergent time scales and interaction with the boundary leads to nematic order without excluded volume interactions. A dynamic length scale emerges on which the motion of points in the active fluid are correlated. The competition between this length scale and the confinement allows for interesting patterns of nematic order to emerge.

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Daniel Goldstein
Brandeis Univ

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