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Defect-Stabilized Phases in Extensile Active Nematics GABRIEL REDNER, STEPHEN DECAMP, ZVONIMIR DOGIC, MICHAEL HAGAN, Brandeis University — Active nematics are liquid crystals which are driven out of equilibrium by energy-dissipating active stresses. The equilibrium nematic state is unstable in these materials, leading to beautiful and surprising behaviors including the spontaneous generation of topological defect pairs which stream through the system and later annihilate, yielding a complex, seemingly chaotic dynamical steady-state. In this talk, I will describe the emergence of order from this chaos in the form of previously unknown broken-symmetry phases in which the topological defects themselves undergo orientational ordering. We have identified these defect-ordered phases in two realizations of an active nematic: first, a suspension of extensile bundles of microtubules and molecular motor proteins, and second, a computational model of extending hard rods. I will describe the defect-stabilized phases that manifest in these systems, our current understanding of their origins, and discuss whether such phases may be a general feature of extensile active nematics.

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