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Dynamics of an overdamped active nematic liquid crystal[1] ELIAS PUTZIG, APARNA BASKARAN, Brandeis University — A continuum model for the dynamics of an overdamped (often termed "dry") active nematic liquid crystal will be presented here. This talk will focus on how such a model can be used to describe the formation and self-propulsion of defects which has been seen in active liquid crystals in experiments and simulations. We will start with a general model which shows phase-separations and structure formation near the critical density (for the isotropic-nematic phase transition), and show how this model can be extended to describe extensile active nematics which are deeper within the ordered phase. The spontaneous formation of defects occurs when the contribution of the extensile stresses, to the dynamics of the order parameter, gives rise to a bend instability. This leads to a steady state of defect formation and annihilation, and the self-propulsion of defects, as is seen in experiments and simulation.

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