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Pattern formation in Active Polar Fluids[1] ARVIND GOPINATH, MICHAEL HAGAN, Martin A Fisher School of Physics, Brandeis University, APARNA BASKARAN, Martin A Fisher School of Physics, Brandeis University — Systems such as bacterial suspensions or cytoskeletal filaments and motility assays can be described within the paradigm of active polar fluids. These systems have been shown to exhibit pattern formation raging from asters and vortices to traveling stripes. A coarse-grained description of such a fluid is given by a scalar density field and a vector polarization field. We study such a macroscopic description of the system using weakly nonlinear analysis and numerical simulations to map out the emergent pattern formation as a function of the hydrodynamic parameters in the context of two specific microscopic models - a quasi-2D suspension of cytoskeletal filaments and motor proteins and a system of self propelled hard rods that interact through excluded volume interactions.

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