

Abstract Submitted  
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**Rheology and dynamics of active motor-filament mixtures** M. CRISTINA MARCHETTI, APHRODITE AHMADI, Physics Department, Syracuse University, Syracuse, NY 13244, TANNIEMOLA B. LIVERPOOL, Department of Applied Mathematics, University of Leeds, Leeds LS2 9JT, UK — We have developed a hydrodynamic description of both the isotropic and polarized phases of mixtures of polar filaments and molecular motors taking into account the fluctuations in both the motor and the filament densities. The various couplings in the hydrodynamic equations are related to microscopic parameters by comparing continuum equations written down on the basis of symmetry considerations to those obtained from a microscopic model of motor-filament interaction. Due to the anisotropy of filament diffusion, motors are capable of generating net filament motion relative to the solvent, resulting in filament convection along the direction of local alignment. The effect of this new term on traveling wave in the polarized phase is analyzed by numerical solutions of the nonlinear hydrodynamic equations. The equations are also used to study the linear rheology of active solutions (stress generated due to an imposed shear flow).

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