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**Mixing in suspensions of active particles** DMITRI O. PUSHKIN, JULIA M. YEOMANS, University of Oxford — Microscopic active particles self-propelling in the surrounding fluid create flows that eventually lead to emergence of non-equilibrium states with long-ranged fluctuations. One of the technologically important consequences of these fluctuations is enhanced mixing of the surrounding fluid. It is also critical for understanding the ecology of a particular type of biological active systems, bacterial suspension, as the enhanced mixing strongly alters the fluxes of nutrients. We consider the theoretical foundations of fluid mixing enhancement in dilute suspensions of active force-free swimmers. We describe the impediments to fluid mixing imposed by the physical nature of fluid flows created by swimmers, and different ways of overcoming them. We show that fluid mixing in 3D suspensions of force-free (dipolar) swimmers is dominated by the effect of curvature of their trajectories, and obtain an exact analytical expression for the corresponding effective diffusion coefficient. Our results highlight limitations of alternative "effective temperature" approaches and may serve as a quantitative tool for designing technological applications.

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