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Mode-coupling theory for the glassy dynamics of self-propelled particles GRZEGORZ SZAMEL, ELIJAH FLENNER, Department of Chemistry, Colorado State University, LUDOVIC BERTHIER, Laboratoire Charles Coulomb, Universite Montpellier II — We examine glassy dynamics of self-propelled particles. The self-propulsion is modeled as a random force that evolves according to the Ornstein-Uhlenbeck process. Starting from the microscopic description of the dynamics, we derive an effective many-particle diffusion equation describing the time evolution of the probability density of the particles' positions. Next, we assume pair-wise additivity of the effective many-particle interaction and use the standard procedure to derive mode-coupling equations for the time-dependence of density fluctuations. The most important consequence of the self-propulsion is the replacement of the equilibrium structure factor by the self-propulsion-dependent steady state structure factor. To test the theory, we use steady state structure factors obtained from computer simulations of self-propelled particles.

Grzegorz Szamel
Department of Chemistry, Colorado State University

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