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A field theory approach to the dynamics of classical particles DAVID MCCOWAN, GENE MAZENKO, University of Chicago — For nearly 30 years, mode-coupling theory (MCT) has been regarded as the *de facto* theoretic description of dense fluids and the transition from the fluid to glassy state. But MCT is limited by its ad hoc construction and lacks a mechanism to institute corrections. We present a new fundamental theory for the kinetics of systems of classical particles which represents a unification of kinetic theory, Brownian motion and field theory. It is developed from first principles via a self-consistent perturbation in terms of an effective two-body potential, and we use this theory to investigate the existence of ergodic-nonergodic (ENE) transitions near the liquid-glass transition. After a brief introduction of the theory, we will address the development of a kinetic equation of the memory function form. The memory function kernel (or self-energy) determined by the theory shares properties with the MCT form, however our theory provides the crucial advantage of well-defined, perturbative corrections.

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