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Microstructural theory for colloidal suspensions in active microrheology EHSSAN NAZOCKDAST, JEFFREY MORRIS, Levich Institute & Chemical Engineering of CUNY — The active microrheology problem where a probe particle is pulled through a bath of colloidal particles with a constant external force F^{ext} is studied using a theoretical framework based on the Smoluchowski equation, with emphasis on concentrated colloidal suspensions far from equilibrium. The probability distribution of bath particles with respect to the probe, $g(r)$, is determined from an integro-differential equation solved by iterative numerical methods at different set of Pe (ratio of external to Brownian forces) and volume fractions. The role of inter-particle interactions on microstructure is studied by using different types of pair potentials with the intention to model systems ranging from hard-spheres to soft colloids. The obtained distribution is then used to compute the apparent shear viscosity. The predictions of microstructure and rheology are compared with our Accelerated Stokesian Dynamics simulations and available experimental results.

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