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Flow of interacting colloidal suspensions through a narrow channel RAUL CRUZ HIDALGO, SARA ARIETALEANIZ, University of Navarra, IGNACIO PAGONABARRAGA, University of Barcelona — In this work we numerically study the constitutive behavior of interacting colloidal suspensions at intermediate and high concentrations. The influence of the interaction potential strength on the system's response is examined, in suspensions flowing through narrow channels at low Reynold's numbers. Using Lattice Boltzmann methods, we analyze the rheological response of a colloidal suspension once the steady state is established. In dilute suspensions we always recover a newtonian behavior. At higher volume fractions, the range and strength of the interaction potential has a stronger impact in the behavior of the suspension. While for short range potentials, the non-newtonian response mostly depends on colloid concentration and confinement distance, for a Lennard-Jones potential we identify two rheological responses depending on the potential strength, ξ_{LJ}, at a given concentration. For weak ξ_{LJ} the effective viscosity, η_{eff} , decreases until a minimum is reached. On the contrary, at large values of ξ_{LJ} the effective viscosity η_{eff} increases when increasing the strength of interaction. This behavior has been correlated with the local structure of this complex fluid.

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