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Boltzmann Monte-Carlo simulations of a suspension of non-spherical particles in a parallel-wall channel MAURICIO ZURITA-GOTOR, JERZY BLAWZDZIEWICZ, Yale University, ELIGIUSZ WAJNRYB, IPPT Poland — The evolution of a dilute suspension of axisymmetric particles confined between two parallel planar walls is investigated under creeping-flow conditions. The suspension undergoes a shear flow that results from the relative motion of the walls. The hydrodynamic interactions are accurately evaluated using our Cartesian-representation algorithm. In the absence of interparticle interactions the suspended particles undergo periodic motions, similar to Jefferey orbits in free space. However, the periods in the confined system are not identical. Due to the associated phase shifts a stationary state is reached at long times. Finite-concentration effects are included via a Boltzmann Monte-Carlo method. The state of the system is described by an ensemble of periodic particle trajectories, which are characterized by the vertical position and orientation of the particles crossing the horizontal plane. The ensemble is updated by computing a large number of binary collisions. Implications of our simulations for particle separation in microchannels are examined.

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