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Microscopic structure of confined colloidal suspensions under shear XINLIANG XU, STUART RICE, AARON DINNER, James Franck Institute, University of Chicago, XIANG CHENG, ITAI COHEN, Department of Physics, Cornell University — We report a study of driven colloidal suspensions by Stokesian dynamics simulation. The suspension is confined by two parallel plates, and is being driven far away from equilibrium by shearing induced by translation of the parallel plates. The separation of the plates is varied so the suspensions form either a single layer or two layers. Both the structure of the non-equilibrium steady state and the dynamics of the relaxation of the non-equilibrium state back to the equilibrium are examined, at a wide range of shearing strengths (the non-dimensional ratio quantifying the driven motion relative to the Brownian motion of the colloidal particles, the Peclet number is tuned from 0.1 to 100) and packing fractions. We observe string-like structures at low packing fractions and shear-induced crystallization at high fractions. A mechanism is proposed for how hydrodynamic interactions give rise to these structures.

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