

Abstract Submitted
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Using shear to assemble colloidal strings ITAI COHEN, XIANG CHENG, Dept. of Physics, Cornell University — Sheared colloidal suspensions exhibit various fascinating phases under the influence of hydrodynamic, interparticle and thermal interactions. These shear-induced phases have been intensively studied for suspensions well above the crystalline threshold, but remain relatively unexplored for amorphous suspensions. Here, we report a novel string phase in less concentrated colloidal suspensions under shear, where particles assemble into long strings normal to the plane of shear. This finding contradicts previous numerical results that predict the formation of particle strings along the shear velocity direction. We systematically investigate how the phase depends on the shear rates, the confinement of shear plates, and the volume fractions of samples. We demonstrate the relation between the string phase of low volume fraction samples and the shear-induced crystallization of high volume fraction samples. A simple mechanism for the formation of this novel phase is suggested.

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