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Capillary trapping in thin-film flows of particles[1] ALBAN SAURET, SVI, CNRS/Saint-Gobain Recherche, MICHAEL GOMEZ, University of Oxford, EMILIE DRESSAIRE, New York University — Flows of suspensions have been modeled on a continuum level by using constitutive relations to capture how the viscosity varies with the particle concentration. However, in thin liquid films, where the thickness of the liquid layer is comparable to the particle size, the particles deform the liquid interface, which leads to local interactions. These effects modify the transport of particles and could result in the contamination of the surface and the loss of transported material. Here, we characterize how capillary interactions affect the transport and deposition of non-Brownian particles moving in thin liquid films. We focus on gravitational drainage flows, in which the film thickness becomes comparable to the particle size. Depending on the concentration of particles, we find that the dynamics of the drainage exhibits behavior that cannot be captured with a Newtonian model, due to the deposition of particles on the substrate.

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