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Capillary trapping of particles in thin-film flows[1] EMILIE DRESSAIRE, FAST NYU Tandon School of Engineering, MICHAEL GOMEZ, Oxford University, BENEDICTE COLNET, ALBAN SAURET, SVI (CNRS/Saint Gobain)
— When a thin layer of suspension flows over a substrate, some particles remain trapped on the solid surface. When 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 the dynamics of the liquid films. Here, we characterize how capillary interactions affect the transport and deposition of non-Brownian particles moving in thin liquid films and the resulting loss of transported material. 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 drainage dynamics exhibits behavior that cannot be captured with a continuum model, due to the deposition of particles on the substrate.

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