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Dynamics of Droplet Detachment from a Granular Raft SUZIE PROTIERE, CNRS-Institut Jean le Rond d'Alembert, MATTHIEU ROCHE, CNRS-Laboratoire MSC — When we sprinkle dense particles at an oil/water interface these particles self-assemble due to long-range capillary interactions into a monolayer that we call a granular raft. Particles can progressively be added to the raft until it destabilizes due to the balance between the local buoyancy forces and the capillary forces at the border of the raft. When the raft destabilizes it sinks and forms oil-in-water armored droplets. We study the formation of such armored droplets and compare its detachment to the behavior observed in suspensions or in pure viscous fluids. Indeed for pure fluids the radius of the neck of the forming droplet decays linearly. Here, we find that depending on the size and on the density of the particles two types of behaviors are observed during droplet formation. Either the raft sinks and no particles are found along the neck during the armored droplet formation, or an "interfacial granular jet" forms which breaks, due to a Rayleigh-Plateau-like instability, into a multitude of small millimeter-sized armored droplets. We show that since the particles are adsorbed at the interface, those two types of behaviors depend on a dimensionless parameter that takes into account the particle size and density. Moreover we find that the position of the particles during the formation of the drop dramatically modifies the dynamics, proving that the initial conditions are important during droplet breakup.

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