

Granular rafts

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Small objects trapped at an interface are very common in Nature (waterstriders, ant rafts, bubbles or pollen, membranes...). They also find an application in industrial processes since they can act as stabilizing agents for emulsions or foams. Their study is therefore of practical as well as fundamental importance. In this talk I will present experiments describing the behavior of a monolayer of dense particles at an oil-water interface that we call a granular raft. In such system, the stability of the raft is governed by the interplay between gravitational and surface tension forces. Indeed when the number of particles in the raft is large enough the raft may become unstable and sink (Fig. 1).

We study experimentally the formation of such rafts. We first quantify the capillary interaction between two granular rafts and exhibit its dependency with the number of particles in each aggregate. Once the attracting force described, we focus on understanding the clustering dynamics and describe the mechanical properties of these granular monolayers.

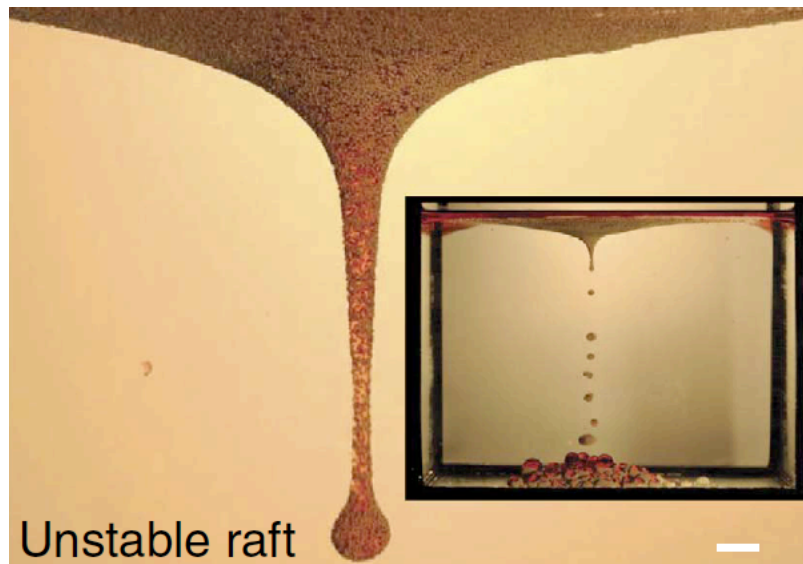


Figure 1 : Unstable granular raft at an oil-water interface. The raft starts sinking and destabilizes into an interfacial jet, which further breaks into armored droplets.