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Avalanche dynamics in a 2D tumbling drum with frictionless, cohesive oil droplets

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The macroscopic behaviours of granular materials are heavily dependent on their microscopic interactions. We explore the dynamics of microscopic frictionless oil droplets with a well controlled cohesive interaction in a 2D tumbling drum. The disordered, bidisperse aggregate of droplets rearrange in the rotating drum quasi-statically. We observe the angle at which the granular aggregate begins to flow, and the angle to which the system settles, post-avalanche. We explore buoyancy force to contrast the response of poly-crystalline and disordered aggregates, as well as the effect of the strength of cohesion between droplets.

Keyword-1

Avalanche

Keyword-2

Angle of repose

Keyword-3

Frictionless

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