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Capillary aggregates of floating particles as an attractive granular media MICHAEL BERHANU, ARSHAD KUDROLLI, Clark University — Aggregation of cohesive particles floating in a medium is a very broad physical phenomena occurring in colloidal systems, soot particles, and intergalactic dust under gravitation. We investigate the geometrically constrained dynamics of aggregation with new experiments using floating spheres (3 mm) at the air-liquid interface. A short range attractive force can be induced by the combination of buoyancy and capillarity to create self-assembled particle structures which can be tracked by imaging. First, the particles are placed randomly at the interface, and then aggregation is induced by smoothly decreasing the area of the interface which causes the particles to come within the attractive force range caused by capillarity. We study the aggregation phenomena due to the fusion of initial small clusters in one large cluster. Once it is formed, we are interested by its mechanical properties, and the question of the cluster rigidity is discussed. Finally we study the structural properties of aggregates. Thus we can exhibit significant differences with a classical two dimensional granular media due to attraction between particles.

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