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Colloidal cluster array formation by weak ac electric fields[1]
WENCESLAO GONZÁLEZ-VIÑAS, RAHEEMA ASLAM, MOORTHI PICHUMANI, University of Navarra — We study experimentally the influence of weak alternating electric fields on dilute colloids with a free surface open to the air. When the experimental conditions minimize the evaporation of the solvent, a well-defined one-dimensional cluster array is formed along the straight contact line. The cluster array evolves due to a hydrodynamical instability which can be controlled by the applied field [1]. Once the clusters are formed, if the evaporation is favored, the contact line recedes. Under these conditions, the capillary flows towards the clusters strengthen. As a consequence, elongated columns of particles are deposited on the substrate. The characteristic length between these columns is controlled during the initial stages of the cluster formation [2]. To shed light on the cluster formation mechanisms, further work is currently carried out for identifying similar phenomena without the existence of a free surface.

[1] M. Pichumani et al. Phys. Rev. E 83 (2011), 047301
[2] R. Aslam et al. In preparation

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