

The elasticity of nanoparticle networks on liquid droplets

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1 Abstract

Inspired by recent experiments on the formation of linked nanoparticle networks [1] on the surface of water-in-oil droplets, we study the modification of the droplet surface elasticity due to the formation of a percolating network of linked nanoparticles. What coverage of nanoparticles is required to modify the elasticity of the droplet? Using Brownian dynamics simulations to model the slippery DLCA (diffusion limited cluster aggregation) of nanoparticles on the surface we construct these networks and monitor the appearance of an elastic contribution due to the nanoparticles at a critical nanoparticle area density. This transition is a type of rigidity percolation on a compact surface.

References

- [1] A.D. Dinsmore et al. *Science*, **298**, 1006, (2002)

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