Abstract Submitted
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Shape oscillations of a pinned droplet[1] YASHIKA DHOTE, PARTHA S. GOSWAMI, RATUL DASGUPTA, Indian Institute of Technology Bombay — We study using numerical simulations, the shape oscillations due to surface tension, of a spherical cap comprising of quiescent fluid pinned to a solid substrate. The eigenmodes for this configuration, for small amplitude perturbations have been presented earlier in *Bostwick and Steen, J. Fluid Mech., vol. 760, 2014* and we use these in our numerical simulations. We test the limit of linearised theoretical predictions by exciting the first few eigenmodes. For sufficiently small perturbation amplitude, the agreement with linearised predictions is quite good although a systematic nonlinear correction to frequency is observed as the perturbation amplitude is increased, becoming particularly discernible after the first few oscillations. The simulations are carried out using the open source code Gerris (gfs.sourceforge.net) and we quantify the affect of non linearity and inertia of the outer fluid. A theoretical formulation taking into account the latter, will be presented. For a viscous drop, the role of the boundary layer formed at the interface, on the damping of free oscillations, will also be discussed.

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