

Abstract Submitted
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Mechanical and dynamical responses of pinned drops and polymer balloons CHUN-TI CHANG, SUSAN DANIEL, PAUL STEEN, Cornell University — Surface tension is responsible for the nonlinear response of individual spherical-cap drops. This nonlinearity determines the aggregate behavior of a system of interacting drops. Potential applications for droplet systems include switchable-adhesion devices and micro-dosing of personalized pharmaceutical drugs. For a single spherical-cap drop, the pressure-volume (pV) response exhibits one maximum. With the coverage of its free surface by a soft polymer film, the drop becomes a polymer balloon and can change its stability as a result of the reinforced surface tension. The appearance of a second turning point, for example, increases considerably the complexity of the system behaviors exhibited. In this study, we contrast the static and dynamical responses of drops and polymer balloons, taking the perspective that their nonlinear behaviors fall into 1-parameter continuum of pV-responses. Behavior observed in experiment for both excited and unexcited situations will be reported.

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