Abstract Submitted
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Contact angle dependence of the resonant properties of sessile drops[1] JAMES SHARP, University of Nottingham — A simple optical deflection technique was used to monitor the vibrations of microlitre sessile drops of glycerol/water mixtures with glycerol compositions ranging from 0% to 75%. A photodiode was used to detect time dependent variations in the intensity of laser light reflected from the droplets. The intensity variations were Fourier transformed to obtain information about the resonant properties of the drops (frequency and width of the resonance). These experiments were performed on a range of different substrates where the contact angle formed by the droplets varied between $38 \pm 2^\circ$ and $160 \pm 4^\circ$. The measured resonant frequency values were found to be in agreement with a recently developed theory of vibrations which considers standing wave states along the profile length of the droplet. The widths of the resonances were also compared with theories which predict the influence of substrate effects, surface contamination effects and bulk viscous effects on the damping of capillary waves at the free surface of the droplets. These experiments indicate that the dominant source of damping in sessile liquid droplet is due to bulk viscous effects but that for small contact angles damping due to the droplet/substrate interaction becomes more important.

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