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**Enhanced Downward Acceleration of a Bouncing Droplet Due to the Lubrication Force** DAVID CHAPPELL, University of La Verne, MATTHEW CESSNA, ALI NADIM, Claremont Graduate University — We explore the dynamics of moderately viscous (50-100 cSt) silicone oil drops bouncing on a vertically vibrated oil bath. When the driving acceleration of the bath is larger than a threshold value, drops can bounce indefinitely due to the presence of a thin air layer separating the drop from the bath. We present experimental evidence that the drop can temporarily "stick" to the oil bath during the rebound process causing it to be pulled downward briefly with the downward-accelerating bath. Thus, for a small time interval during each bounce, the drop's downward acceleration can exceed that of gravitational free-fall. A simple model incorporating the lubrication force between the drop and the bath, allowing for the deformation of the latter, is developed and found to match the observed dynamics closely.

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