Sliding droplets on soft substrates

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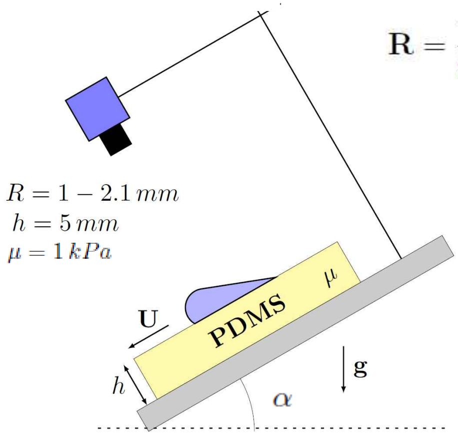
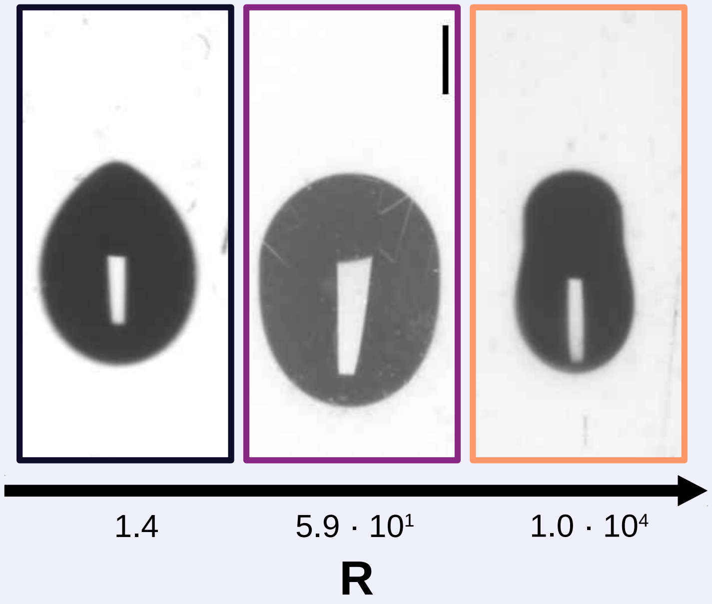
Abstract: We study sliding drops on viscoelastic solids. Weight induces the motion while viscous dissipation in both liquid and substrate brakes it. The ratio **R** of those dissipations is a key parameter of our system. It modifies both drop shape and the relation between weight and speed. When dissipation in the solid overcomes that of the liquid, an apparent hysteresis elongates the drop and the rear curvature is smaller.

$$\mathrm{Bo}_\alpha = \frac{\rho g R^2}{\gamma}\sin\alpha \qquad \mathrm{Ca} = \frac{\eta U}{\gamma}$$

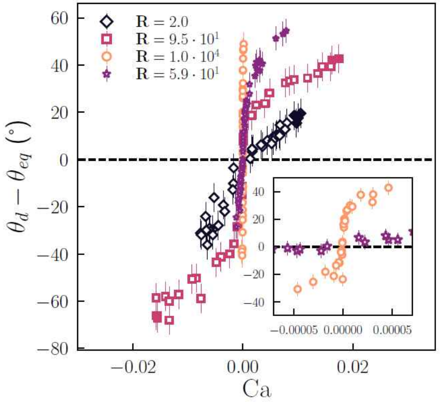
$$\mathbf{R} = \frac{\gamma\tau}{\eta l_s}$$



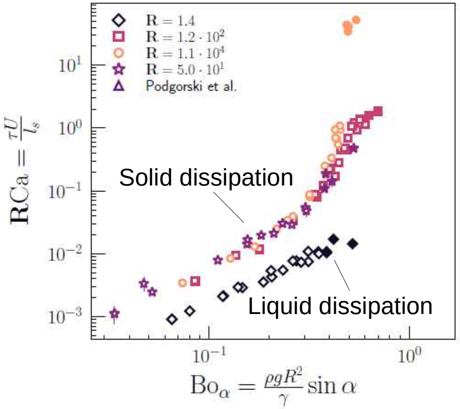
Dissipation ratio governs shapes and dynamics



Contact angle vs speed: Soft hysteresis at high R



Speed vs weight:



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