Detachment of a concentrated suspension drop

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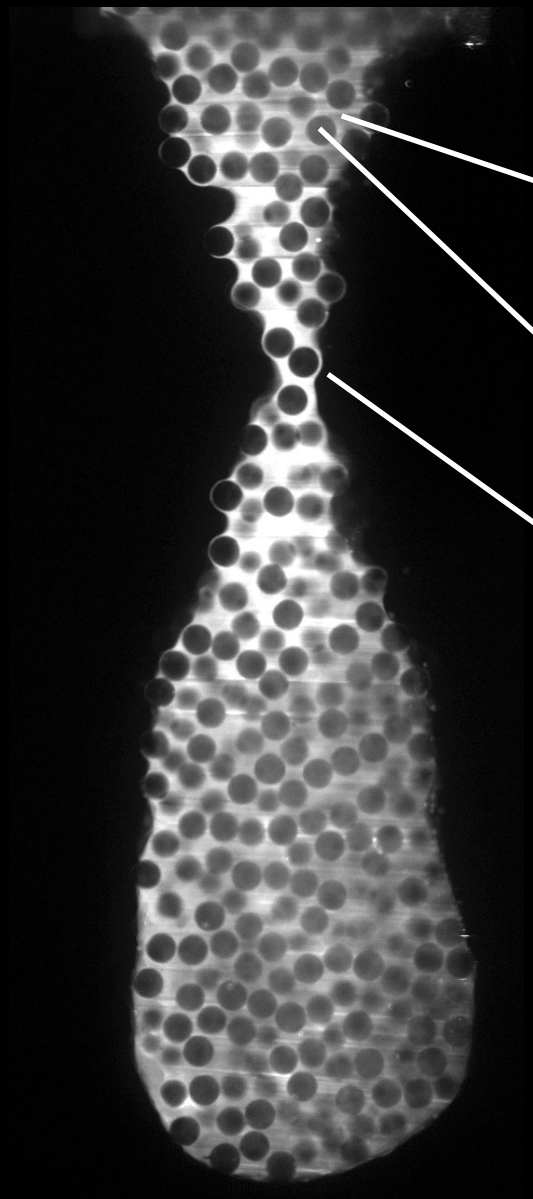
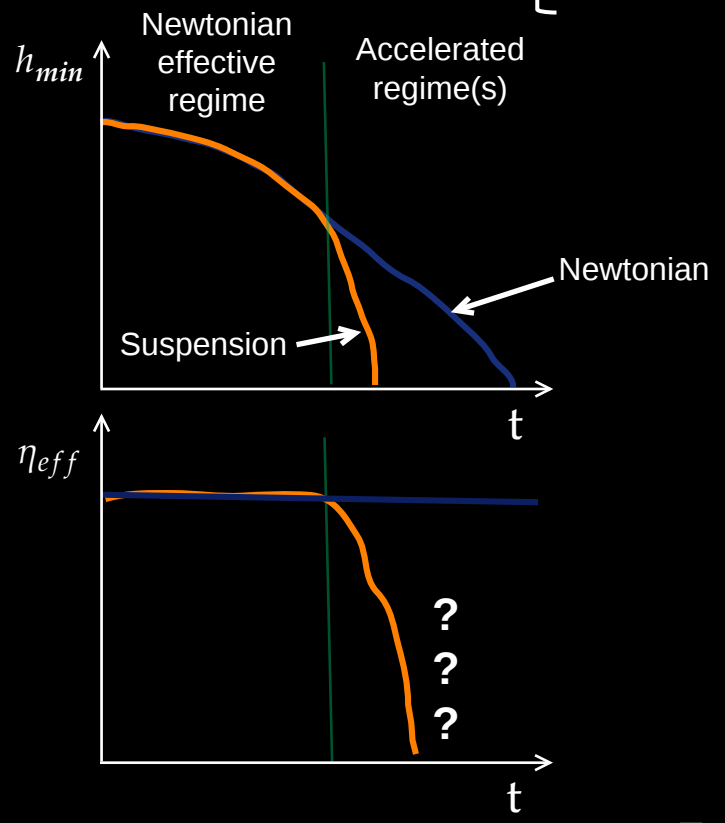


State of the art

Low to moderately high volume fraction

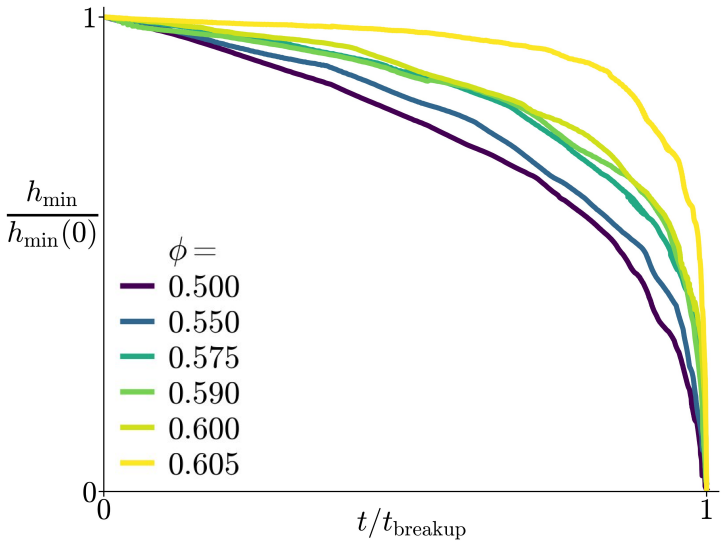
$$0 \ll \phi \lesssim 0.55$$
$$\phi \ll \phi_C \simeq 0.6$$



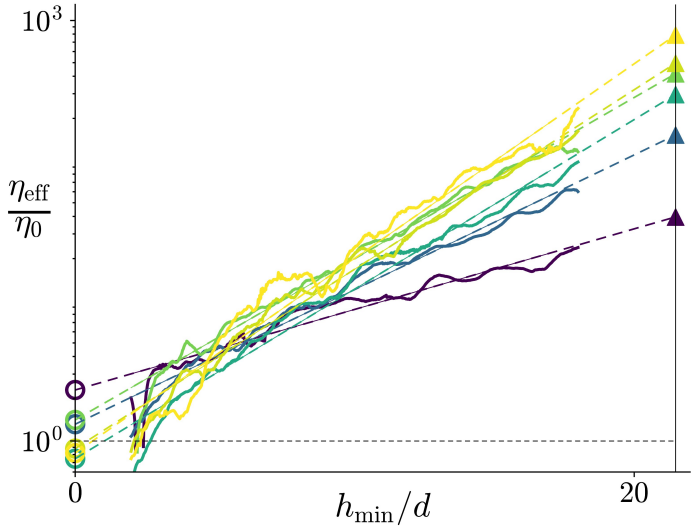
What happens in the accelerated regime?

- Focus $\phi \approx \phi_C$
- Monitor stresses

Results



$$\frac{\eta_{\text{eff}}}{\eta_0} = -\frac{4}{3\pi}\frac{M(g-\ddot{Z})}{\eta_0 \dot{h}_{\min}^2}$$

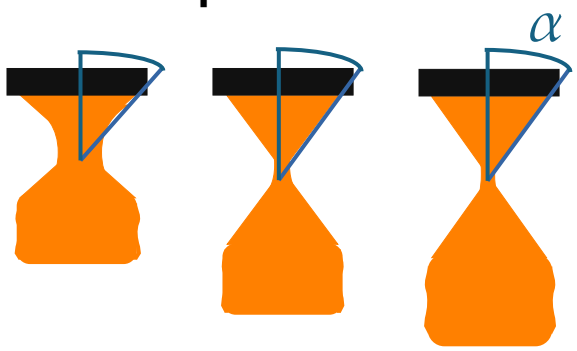


Model

- **Effective viscosity**

$$\eta_{\text{eff}} = \eta_0 \left(\frac{\eta_i}{\eta_0}\right)^{\frac{h_{\min}}{h_0}}$$

- **Conical shape**



$$\dot{Z} = -\left(\frac{\tan\alpha}{2}\right)\dot{h}$$

$$\Rightarrow \begin{cases} A\tau^2 \frac{\ddot{h}_{\min}}{h_0} = -1 - \frac{\eta_{\text{eff}}}{\eta}\tau\frac{\dot{h}_{\min}^2}{h_0^2} \\ A = \frac{\tan\alpha h_0}{2g\tau^2}, \quad \tau = \frac{3\pi\eta_0 h_0^2}{4Mg} \end{cases}$$