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Drop propulsion in tapered tubes

To cite this article: P. Renvoisé *et al* 2009 *EPL* **87** 39901

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A Letters Journal Exploring the Frontiers of Physics

August 2009

EPL, **87** (2009) 39901 www.epljournal.org
doi: 10.1209/0295-5075/87/39901

Erratum

Drop propulsion in tapered tubes

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Original article: *Europhysics Letters (EPL)*, **86** (2009) 64003.

PACS 99.10.Cd – Errata

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Due to a technical problem occurred in production, figs. 6 and 7 were displayed in an incomplete and erroneous form. We publish here again the correct figures sincerely apologizing to the authors for the unpleasant inconvenience.

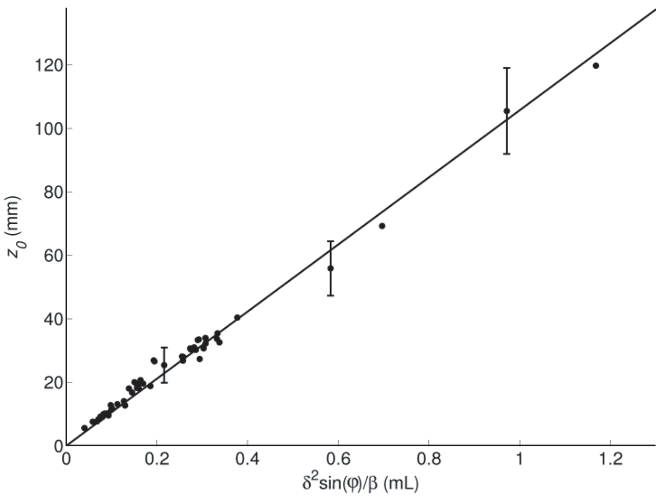

Fig. 6

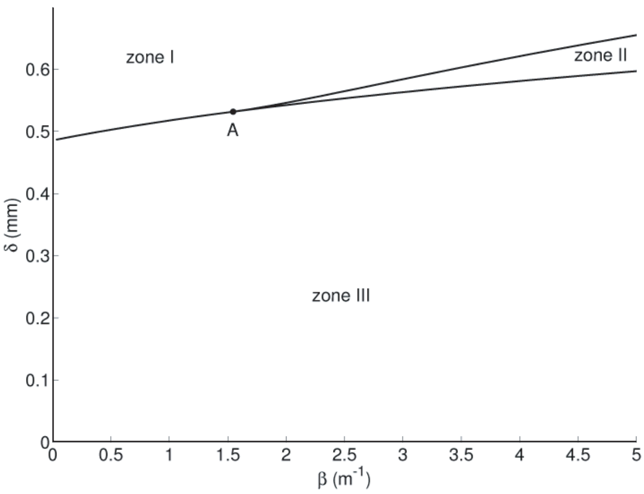

Fig. 7

Fig. 6: Equilibrium position z_o of drops of silicone oil inside inclined capillary trumpets of inner radius $a(z) = \delta + z^2$, as a function of the quantity $\delta^2 \sin\varphi/\beta$ which depends on the tube splay β, the tip width δ and the tilt angle φ. As expected from eq. (4), the data collapse onto a single line, whose slope, $0.106 \pm 0.010\,\text{mm}^{-2}$, is close to the anticipated value $\kappa^2/4 = 0.111\,\text{mm}^{-2}$. The data were obtained by varying δ between 0.1 and 0.6 mm, φ between 1 and 50° and β between 0.1 and $5\,\text{m}^{-1}$.

Fig. 7: Calculated stability diagram of wetting drops of volume $\Omega = 3\,\text{mm}^3$ in a trumpet-shaped tube of inner radius $a(z) = \delta + \alpha z + \beta z^2$, with $\alpha = 1.5°$, and inclined at 30° relative to the horizontal. In zone III, the drop climbs. In zone I, it slides downwards. A stable-equilibrium position only arises in zone II. Note that the zone of stability is diminished relative to that evident in fig. 5 (obtained for $\alpha = 0$): to the left of point A, no stable-equilibrium height exists.