

## Vibrations of sessile drops

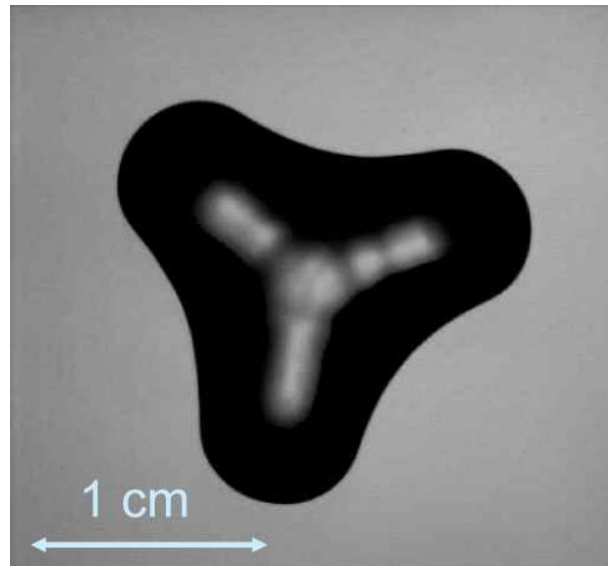
X. Noblin<sup>1,\*</sup>, A. Buguin<sup>2</sup> and F. Brochard-Wyart<sup>2</sup>

*1 Laboratoire de Physique de la Matière Condensée, CNRS UMR 6622, Université de Nice Sophia-Antipolis, Parc Valrose 06108 Nice Cedex 2, France*

*2 Institut Curie, CNRS UMR 168, 26 rue d'Ulm, 75248 Paris, France*

We study the effects of vertical vibrations on sessile drops deposited on hydrophobic substrates. Depending on the forcing amplitude and frequency, the drop presents different modes of oscillation. At low amplitudes the contact line is pinned by the contact angle hysteresis and drop surface modes are present. At higher amplitudes a transition occurs: the contact line start to move, the vibrations overcoming hysteresis effects around characteristic frequencies which depend on drop size. A drop can then be displaced easily on the substrate; the contact line dynamics has a stick-slip behavior such as a solid friction oscillator. At even higher amplitude, around frequencies for which the drop present large radius oscillations, non-axisymmetric contour modes show up with  $m=2, 3, 4...$  lobes. We study the phase diagram and the growth dynamics of these subharmonic modes that are parametrically excited and compare our results with an oscillator model. We discuss the applications of these results in terms of contact angle measurements, contact line dynamics and drop manipulations.

*Figure: Top view of a water drop vibrated at  $f=10\text{Hz}$  on a hydrophobic substrate.*



\*To whom correspondence should be addressed. Phone: 33 (0) 4 92 07 67 83, Fax: 33 (0) 4 92 07 67 54, e-mail: xavier.noblin@unice.fr.