The drying transition is *critical* for (models of) liquids at solvophobic *and* hydrophobic substrates.

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All physical scientists would agree that for water (liquid) at a flat substrate a contact angle $\theta > 90^{\circ}$ defines the substrate as hydrophobic (solvophobic): it prefers gas to liquid. Often discussed is whether there is an effective indicator of local ordering of the liquid, manifest at *microscopic* distances from the substrate, that correlates with the *macroscopic* (thermodynamic) contact angle. A natural indicator is the local compressibility which measures fluctuations in the local density of the adsorbed liquid. Calculating this quantity using classical Density Functional Theory and GCE Monte Carlo simulations, we find strong evidence for a critical drying transition in i) the SPC/E model of water and ii) the LJ liquid, as the substrate-liquid attraction is reduced. The shape of the density probability function $p(\rho)$ provides a powerful means (in simulation) of identifying and locating critical drying (and wetting) transitions. We argue that almost all the models used currently in the physical chemistry community should exhibit critical drying and that this is the origin of the many reports of ‘enhanced density fluctuations’ at hydrophobic substrates.

Work with M. C. Stewart and N. B. Wilding.