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Capillary rise of the interface between coexisting isotropic and nematic phases

We present an approximate theory for the shape of the interface between co-existing isotropic and nematic phases in contact with a solid vertical wall. In the weak-anchoring limit, the director field is rigid and uniform in the capillary rise region and we find that the capillary rise height depends non-trivially on the orientation of the director field relative to the solid-fluid interface. For strong surface anchoring the director field adjusts to the preferred homeotropic or planar anchoring at the solid-liquid and liquid-liquid interfaces. The shape of the interfacial profile is now a function of the balance between the surface energy and the splay and bend elastic deformation energies. Interestingly, for both weak and strong anchoring the profile decays non-monotonically albeit only very weakly so. We compare our theory with recent capillary rise experiments on co-existing isotropic and nematic phases of colloidal platelets [D. van der Beek *et al.*, *Phys. Rev. Lett*. 2006, **97**, 087801] and are able to extract from the experimental data the surface tension and the anchoring strength.