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Model-dependence of Marangoni forces for volatile sessile drops

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— The problem of volatile sessile drops, although apparently simple, involves a complex interplay of several physical mechanisms – the conduction of heat through the solid and the liquid, the phase transition with associated cooling of the evaporating interface, and the diffusion of the vapor through the surrounding gas phase. In this work we discuss the predictions of two commonly used evaporation models regarding Marangoni forces along the interface of evaporating drops. The material parameters required for careful modeling are extracted from our own experimental data. We find striking differences between the two models – in particular, the qualitatively different temperature profiles at the evaporating interface. These predicted temperature profiles remain to be measured experimentally.

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