Interface motion in heat flow with evaporation and condensation

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Two-phase fluid motion is very surprising in the presence of evaporation and condensation. In one-component fluids, if heat flow is applied to liquid suspending a gas droplet at zero gravity, a convective flow occurs such that the temperature gradient within the droplet nearly vanishes. As the heat flux is increased, the droplet becomes attached to the heated wall that is wetted by liquid in equilibrium. In one case corresponding to partial wetting by gas, an apparent contact angle can be defined. In the other case with larger heat flux, the droplet completely wets the heated wall expelling liquid. In two-component fluids, on the other hand, there can be a temperature gradient along the interface and the Marangoni effect comes into play. I will discuss these aspects using a new theoretical scheme of dynamic van der Waals theory.