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Numerical studies of a volatile simple fluid subject to a horizontal temperature gradient[1] TONGRAN QIN, ROMAN GRIGORIEV, Georgia Institute of Technology — Rayleigh-Bénard and Marangoni convection in a layer of a homogeneous fluid with a free surface in the absence of phase change is a classic–and extensively studied–problem of fluid mechanics. The balance between the buoyancy and thermocapilly forces, however, depends, in a rather delicate manner, on the conditions of the experiment. Phase change, in particular, has a major effect on convection. Significant latent heat absorbed or released at the free surface as a result of evaporation or condensation can dramatically alter the interfacial temperature, and hence, thermocapillary stresses. This talk will use numerical simulations to illustrate how the phase change rates and the interfacial temperature distribution depend on two key factors: the accommodation coefficient of the working fluid and the presence of non-condensable gases, such as air. We will also compare numerical results with experiments.

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