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Experimental studies of volatile binary fluids subject to a horizontal temperature gradient[1] MINAMI YODA, YAOFA LI, BENJAMIN CHAN, Georgia Institute of Technology — Convection in a binary fluid with a free surface in the presence of evaporation and condensation is a complex and poorly understood problem. In a two-component fluid where one component is more volatile and has a lower surface tension σ than the other, the surface tension of the mixture increases as temperature increases due to solutocapillary effects. In contrast, σ decreases as temperature increases in a simple fluid due to thermocapillary effects. The dynamics of the flow in $O(1$ mm) layers of dilute water-methanol mixtures driven by a temperature difference of about $10\,^{\circ}$C over a horizontal distance of $\sim$5 cm was studied using 2D-2C particle-image velocimetry (PIV). The liquid layers, which are confined in a 1 cm deep rectangular test cell, are studied under both ambient air and in equilibrium with their vapor(s). The experimental data for these binary fluids are compared with numerical simulations.

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