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Pattern-Formation in Moist Turbulent Rayleigh-Benard Convection PRASANTH PRABHAKARAN, STEPHAN WEISS, ALEXEI KREKHOV, HOLGER NOBACH, EBERHARD BODENSCHATZ, Max Planck Institute for Dynamics and Self Organization — We report experiments on droplet-condensation patterns in turbulent Rayleigh-Benard convection, where a horizontal fluid layer is heated from below and cooled from above. We use compressed Sulphur Hexafluoride (SF6) as the working fluid for pressures and temperatures in the liquid/vapor coexistence region. The vapor evaporating from the liquid pool above the heated bottom-plate undergoes film condensation on the cooled top-plate. We observe a finite wavelength instability of the condensed liquid film, which is in stark contrast to the well-known long-wavelength Rayleigh Taylor instability. In the non-linear stationary state, droplets periodically fall into the liquid pool below. Under appropriate conditions, we observe hexagonal patterns with a well-defined wavelength. By varying the pressure and temperature, and with it the evaporation/condensation rates we investigate the influence of these parameters on the observed patterns.

Prasanth Prabhakaran
Max Planck Institute for Dynamics and Self Organization

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