Heat transfer and Marangoni convection in droplets on super-hydrophobic surfaces DANIEL TAM, MIT, VOLKMAR VON ARNIM, ITV Denkendorf, GARETH MCKINLEY, ANETTE HOSOI, MIT — We study heat transfer properties of a small droplet of water sitting on top of a heated super-hydrophobic surface. Water is observed to be driven upwards on the surface of the spherical droplet and to accelerate downwards inside the droplet towards the contact point with the surface. The internal dynamics of the droplet is due to a temperature gradient which results in a gradient of surface tension. The surface tension gradient, in turn, drives water on the free surface away from the contact point. A solution to this thermocapillary driven Marangoni convection problem has been fully developed analytically in terms of streamfunctions. Analytical and experimental results are in excellent agreement.

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