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High speed droplet interactions with heated microtextured surfaces MICAH BERGMAN, TAE JIN KIM, CARLOS HIDROVO, University of Texas at Austin — Liquid sprays are commonly used for cooling of heated surfaces. However, one issue associated with this method is the phase the liquid is in at the incident surface. At very high temperatures the liquid boils and a vapor layer is formed between the solid surface and the liquid droplet, thus significantly reducing the heat removal rate. In order to increase the cooling efficiency, a direct contact of the liquid droplets and the solid surface is desired. We study the liquid droplet interaction on surfaces with different roughness configurations, ranging from a flat surface to a very rough surface. Very rough surfaces may induce the Cassie state, which is known to be a superhydrophobic state with a very low surface energy. Conversely, and depending on surface properties, surface texturing can also lead to a superhydrophilic state, which would be a beneficial condition for heat removal. The rough surfaces are heated and droplets are sprayed at high velocities using a droplet generator assembly. Visual inspections of droplet interactions with the different surfaces are carried out using a goniometer and a high speed camera.

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