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Heat transfer and phase change in an impinging droplet AYSAN RANGCHIAN, University of California, Los Angeles, NIKKI L. SHIRAZI, Oakwood School, H. PIROUZ KAVEHPOUR, University of California, Los Angeles — Non isothermal droplet impact on solid surfaces has several industrial applications such as spray cooling and 3D printing. Impinging of a droplet on a surface involves an initial phase of spreading followed by a subsequent return to the equilibrium shape. Thermal energy exchanged within the droplet fluid as well as between liquid/solid during the impact has been studied using an ultra high speed infrared camera. Variable parameters in the experiment include droplet temperature and kinetic energy of the droplet during the impact. The evolution of droplet shape viewed by IR camera is similar to what previously observed by high speed photography. The thermal map of droplet over time in these experiments agrees with previously reported numerical simulation. In addition, spacial and temporal temperature variations of liquid droplets on a surface as they solidify are presented. IR camera provides an accurate temperature diagram as the phase change occurs, which is essential for understanding the physics of 3D printing.

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