

Liquid Droplet Deformation in Non-wetted and Wetted Surface during Impingement

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Abstract

Analytical study of water droplet deformation when the droplet impinged onto wetted and non-wetted solid surface is calculated. This analytical work is performed by the Moving Particle Semi-implicit(MPS) method which solves the unsteady Navier-Stokes equations for the liquid droplets. Accurate analysis of the liquid droplet interacting with a solid surface will provide an essential input to understand the dynamic process of droplet impingement which encounters in spray cooling process in many industrial processes. One of important application is also in the analysis of reflooding process of LOCA in nuclear reactor. The present work is, however, limited to an adiabatic process, i.e., no heat transfer between the liquid droplet and solid surface. However, hydrodynamic aspects of the liquid droplet deformation during the impingement are still essential to investigate the subsequent heat transfer during the process.