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Quantitative visualization of droplet hot-surface interaction NEJDET ERKAN, KOJI OKAMOTO, The University of Tokyo — Up to this date liquid droplet impingement phenomenon onto hot surfaces has drawn massive attention from a broad spectrum of research fields, since its hydrodynamic and thermodynamic characteristics has profound importance for various industrial applications Although tremendous experimental and computational work exist in the literature, thermal-hydraulic mechanism of droplet impingement boiling on hot surfaces received several contradictory approaches due to the parametric sensitivity of the problem. To understand and to predict the physical mechanism, an experimental database including large amount of spatio-temporal data, which is formed by the tests performed under well-controlled BCs and high sensitive devices, is still a necessity. This study investigates the parametric variation of droplet boiling regimes due to the experimental BCs (e.g surface roughness, ambient pressure) by performing separate effect tests employing high-speed visualization system. Differences in the impingement boiling characteristics of water droplets on solid (with surface roughness) and liquid metal (without surface roughness) in film boiling regime are investigated. A unique quantitative velocity data inside the droplet at several surface temperatures including (Leidenfrost temperatures) captured by Particle Tracking Velocimetry (PTV). This data is a unique component for the validation of CFD simulations which are performed to resolve the phenomena.

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