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Drop Impact on Heated Nanotextures[1] LIHUI LIU, Univ of Alberta; Beihang University, GUOBIAO CAI, Beihang University, PEICHUN AMY TSAI, Univ of Alberta — Drop impact on a heated surface is a ubiquitous phenomenon and plays a vital role in various applications, such as coating, cooling and combustion. We experimentally study and unravel the phase diagrams of different impact outcomes on heated (nearly regular) nano-pillars for the first time, under wide ranges of impact velocity (V) and surface temperature (T_s). Water drops can deposit, spread, rebound, or break-up with atomizing on the heated nanostructures as V and T_s are increased. We find a significant influence of nanostructures on the impact dynamics by generating particular events in specific parameter ranges. For example, events of splashing, gentle central jetting, and violent central jetting are observed on and thus triggered by the heated nanostructures. The maximum spreading factor, β, displays two separate trends on heated surfaces for the low-We and high-We ranges. Furthermore, a model is proposed by balancing the droplet dynamic and vapor pressure to predict the dynamic Leidenfrost temperature (T_L^D). Compared with the flat surface, the T_L^D for $We \approx 10$ is decreased by the high-roughness nanotextures.

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