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Drop impact on heated nanostructures[1] LIHUI LIU, University of Alberta; Beihang University, GUOBIAO CAI, Beihang University, PEICHUN AMY TSAI, University of Alberta — Drop impact on a heated surface not only displays fascinating dynamics but also plays a crucial role in many industrial processes, such as spray cooling, metallurgy, and fuel injection. We experimentally investigate the impact dynamics of water droplets on both polished and nanostructured heated silica surfaces, under a wide range of surface temperature and impact speed (i.e., Weber number). For the polished surface, at a low surface temperature (below 200°C) water drop gently spread on the surface. Whereas, at a higher temperature (above the Leidenfrost point) the droplets completely rebound, with accompanied boiling, atomizing, and eventually splash as the Weber number increases. We show that the nanostructures significantly affect the impact dynamics, compared to that on the polished surface. In particular, the nano-textures can easily prompt splashing, vapor bursting, and jetting. We also found that the surface roughness and packing fraction of the nano-structures influence the impact outcomes.

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