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Direct measurements of air layer profiles under impacting droplets using high-speed color interferometry ROELAND VAN DER VEEN, TUAN TRAN, DETLEF LOHSE, CHAO SUN, Physics of Fluids Group, Faculty of Science and Technology, University of Twente, 7500AE Enschede, The Netherlands
— A drop impacting on a solid surface deforms before the liquid makes contact with the surface. We directly measure the time evolution of the air layer profile under the droplet using high-speed color interferometry, obtaining the air layer thickness before and during the wetting process. Based on the time evolution of the extracted profiles, we measure the velocity of air exiting from the gap between the liquid and the solid, and account for the wetting mechanism and bubble entrapment. We determine the entrained bubble volume for varying impact velocities using the air layer profiles and compare it to theory and numerical simulations. The present work offers a tool to accurately measure the air layer profile and quantitatively study the impact dynamics at a short time scale before impact.

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