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Flow reversing in the gas layer in droplet impact ZHEN JIAN, PASCAL RAY, CHRISTOPHE JOSSERAND, STEPHANE ZALESKI, Univ Pierre et Marie Curie — Recent numerical and experimental studies demonstrated the crucial role of surrounding gas in droplet impact. Whereas, the mechanism of gas effect in droplet splashing is still far from a crystal clear comprehension. Complicated dynamics occur in a small temporal and spatial scale before direct contact with the target surface, which are related to the origin of the splashing. Direct numerical simulations were executed with a code called Gerris for both droplet impact on a liquid surface and on a solid subtract. New dynamics in the gas layer between the droplet and the target surface were discovered. Unexpectedly, a"reversing" gas flow (towards the center) is observed as the droplet approaches the target surface. With further descending of the droplet, the flow is reversed and evacuates towards the outside. The reversing of the flow motion direction is followed by the pressure jump and the dimple formation which have been reported as some crucial gas dynamics in droplet splashing mechanism in our previous work. An aerodynamic mechanism is proposed for the flow reversing dynamics.

Zhen Jian
Univ Pierre et Marie Curie

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