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Contact angle effect on the drop impact onto a solid substrate

ZHEN JIAN¹, International Center for Applied Mechanics, School of Aerospace, Xi'an Jiaotong University, Xi'an 710049, P.R.China, CHRISTOPHE JOSSERAND, STEPHANE ZALESKI, PASCAL RAY, Sorbonne Universite, CNRS, UMR 7190, Institut Jean Le Rond d'Alembert, F-75005 Paris, France — As drop impacts onto a solid substrate, abundant outcomes such as splashing, bouncing can be observed under different conditions including gas, liquid and solid properties. We study the contact angle effect on the splashing of drop impact by direct numerical simulation with open source codes Gerris and Basilisk. For a typical partial wetting substrate with a contact angle of 90° , we obtain a phase diagram of splashing or not by varying the density and viscosity ratio between gas and liquid. Splashing can be either created by changing the contact angle to smaller than 90° , or eliminated with a contact angle larger than 90° with all the other properties constant. The wettability plays a role in the formation of splashing during drop impact on solid.

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