Dynamic contact angle of an impinging water droplet

Michal Remer, Tomasz Bobinski, Jacek Rokicki[1]

[1]*Institute of Aeronautics and Applied Mechanics, Warsaw University of Technology*
mremer@meil.pw.edu.pl

In this work we present experimental results on the dynamic contact angle during the impact of a water droplet. Wide range of time scales are considered thanks to employed high speed imaging (30 - 50 kfps) and various droplet size. We investigate surfaces with different wettability (smooth surfaces and with microstructure). We compare our results with the most frequently used models in the literature [1], [2].

The comparison is presented in the frame of contact angle and contact line velocity. In the spreading phase (high velocity of the triple line) contact angle follows the dependency $\Theta_{adv} \sim Ca^{1/3}$, which is comparable with literature resutls.

Large discrepancies are observed in the receding phase of motion. We highlight differences between results obtained from models such as Hoffman, Kistler or Cox used for the description of capillary flows, and our experimental results obtained for the water droplets.

References

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