Abstract Submitted
for the DFD15 Meeting of
The American Physical Society

Numerical modelling of microdroplet self-propelled jumping on micro-textured surface[1] S. M. REZA ATTARZADEH, ALI DOLATABADI, Concordia Univ, KYUNG CHUN KIM, Pusan National University — Understanding various stages of single and multiple droplet impact on a super-hydrophobic surface is of interest for many industrial applications such as aerospace industry. In this study, the phenomenon of coalescence induced droplets self-propelled jumping on a micro-textured super-hydrophobic surface is numerically simulated using Volume of Fluid (VOF) method. This model mimics the scenario of coalescing cloud-sized particles over the surface structure of an aircraft. The VOF coupled with a dynamic contact angle model is used to simulate the coalescence of two equal size droplets, that are initially placed very closed to each other with their interface overlapping with each other's which triggers the incipience of their coalescence. The textured surface is modeled as a series of equally spaced squared pillars, with 111° as the intrinsic contact angle all over the solid contact area. It is shown that the radial velocity of coalescing liquid bridge is reverted to upward direction due to the counter action of the surface to the basal area of droplet in contact. The presence of air beneath the droplet inside micro grooves which aimed at repelling water droplet is also captured in this model. The simulated results are found in good agreement with experimental observations.

[1]The authors gratefully acknowledge the financial support from Natural Sciences and Engineering Research Council of Canada (NSERC), Consortium de Recherche et d'innovation en Aerospatiale au Quebec (CRIAQ), Bombardier Aerospace, Pratt Whitney Canada.

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Date submitted: 06 Oct 2015 Electronic form version 1.4