Abstract Submitted
for the DFD19 Meeting of
The American Physical Society

Experimental and numerical study of the effect of surrounding gas on splashing at high Weber and Reynolds numbers[1] DAVID A. BURZYNSKI, STEPHAN E. BANSMER, Technische Universitt Braunschweig — We investigated the influence of the surrounding gas on a droplet impacting a smooth dry glass surface at high Weber and Reynolds numbers. We analyzed experimentally the splashing outcome by measuring the size, velocity, and angle of the secondary droplets and by calculating the total volume ejected. Numerical simulations complement our study by providing detailed information about the flow in the liquid lamella and the surrounding gas. The results show that gas entrapment is not the mechanism responsible for splashing and demonstrate that splashing is influenced first by the density, second by the viscosity, and lastly by the mean free path of the surrounding gas. The simulations are used to estimate the forces acting on the ejected lamella and to compare it with the theory of Riboux & Gordillo [Phys. Rev. Lett. 113, 024507 (2014)], who proposed that these aerodynamic forces are the responsible for splashing.

[1]This research was supported by the German Research Foundation (Deutsche Forschungsgemeinschaft, DFG) through financing of the project no. BA 4953/3.

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Date submitted: 30 Jul 2019 Electronic form version 1.4