Abstract Submitted
for the DFD19 Meeting of
The American Physical Society

Study on a vertically falling droplet toward a liquid pool with an inclined bottom wall[1] YEAWAN LEE, Department of Mechanical Engineering, KAIST, YOUNGDO KIM, Mueunjae School of Undergraduate Studies, POSTECH, HYOUNGSOO KIM, Department of Mechanical Engineering, KAIST — We investigate the evolution of liquid interface deformation after a vertically falling droplet impacts to a liquid pool with an inclined bottom wall. We observed that initially an almost hemispherical cavity was formed, and then asymmetric cavity reversal was observed. Eventually, a tilting jet was measured. For the systematic experiments, substrate angle, depth, droplet diameter, impact velocity, surface tension, and viscosity were varied. We found out that the hemispheric cavity development, which is driven by inertia, is analogous to the impact problems in a deep bath. Next, when the cavity retracts, it shows an oblique conical shape, which is due to the different wave propagation mechanism depending on the bath depth, i.e. a relatively shallow and deep bath. This purely geometry-induced effect causes the tilting jet. Finally, we provided a theoretic model to predict the jet inclination angle by assuming that two different wave propagation competed. Furthermore, we controlled the jet direction by changing the boundary condition of the inclined substrate.

[1]This work was supported by Basic Science Research Program through the National Research Foundation of Korea funded by the Ministry of Science (NRF-2018R1C1B6004190) and BK21 Plus program. We also thank that this paper is based on research which has been conducted as part of the KAIST-funded Global Singularity Research Program for 2019.

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Date submitted: 25 Jul 2019 Electronic form version 1.4