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Numerical study of viscous dissipation during single drop impact on wetted surfaces[1] YI AN, SHIHAO YANG, Chinese Academy of Sciences, QINGQUAN LIU, Beijing Institute of Technology — The splashing crown by the impact of a drop on a liquid film has been studied extensively since Yarin and Weiss (JFM 1995). The motion of the crown base is believed to be kinematic which results in the equation $R=(2/3H)^{1/4}(T-T0)^{1/2}$. This equation is believed to overestimate the crown size by about 15%. While Trojillo and Lee (PoF 2001) find the influence of the Re not notable. Considering the dissipation in the initial stage of the impact, Gao and Li (PRE, 2015) obtained a well-validated equation. However, how to estimate the dissipation is still worth some detailed discussion. We carried out a series of VOF simulations with special focusing on the influence of viscosity. The simulation is based on the Basilisk code to utilize adaptive mesh refinement. We found that the role of dissipation could be divided into three stages. When $T<H$, relatively small influence of viscosity is expected. When $T>>1$, the commonly used shallow water equation provides a good approximation while the initial condition should be considered properly. Between this two stages, the viscous dissipation is the governing factor and thus causes inaccurate estimation of the crown base motion in the third stage.

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