Abstract Submitted
for the DFD15 Meeting of
The American Physical Society

Drop impact on thin liquid films using TIRM MIN PACK, Drexel University, YING SUN TEAM — Drop impact on thin liquid films is relevant to a number of industrial processes such as pesticide spraying and repellent surface research such as self-cleaning applications. In this study, we systematically investigate the drop impact dynamics on thin liquid films on plain glass substrates by varying the film thickness, viscosity and impact velocity. High speed imaging is used to track the droplet morphology and trajectory over time as well as observing instability developments at high Weber number impacts. Moreover, the air layer between the drop and thin film upon drop impact is probed by total internal reflection microscopy (TIRM) where the grayscale intensity is used to measure the air layer thickness and spreading radius over time. For low We impact on thick films (We $\sim$ 10), the effect of the air entrainment is pronounced where the adhesion of the droplet to the wall is delayed by the air depletion and liquid film drainage, whereas for high We impact (We >100) the air layer is no longer formed and instead, the drop contact with the wall is limited only to the film drainage for all film thicknesses. In addition, the maximum spreading radius of the droplet is analyzed for varying thin film thickness and viscosity.

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Date submitted: 30 Jul 2015 Electronic form version 1.4