Abstract Submitted
for the DFD10 Meeting of
The American Physical Society

Beneath a splash: interference imaging of the air below a spreading drop MICHELLE DRISCOLL, SIDNEY NAGEL, The James Franck Institute, University of Chicago — Viscous splashing produces a distinct morphology: an impacting drop spreads as a thick lamella, which at late times ejects a thin liquid sheet that subsequently breaks into drops. We describe an interference technique to measure the air layer beneath the spreading drop using high-speed, high-resolution video imaging. We use this technique to visualize the dynamics of the entrapped central air bubble. In addition, we measure the air gap between the thin sheet and the substrate, and find that, within experimental resolution, there is no air gap beneath the spreading lamella. At the lamella/thin sheet interface we find a surprising feature: small regions of the expanding thin sheet, approximately 1 μm above the substrate, frequently touch down and wet the surface. Pockets of air become trapped among these contacts, and form air bubbles. Air entrainment occurs only when the thin sheet is present; when it is suppressed the lamella spreads as a smooth wetting front.

Michelle Driscoll
The James Franck Institute, University of Chicago

Date submitted: 05 Aug 2010 Electronic form version 1.4