The Life and Death of the Air Film Beneath an Impacting Drop

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Here I present recent experimental work, wherein Total Internal Reflection (TIR) microscopy is used to directly observe the thin air films that develop above the impact surface. We find that the formation of the thin air film is insensitive to liquid viscosity over a range of impact velocities, confirming prior theoretical predictions of thin air film formation. Going beyond this, the viscous response of the drop is also found to be important - high viscosity liquids maintain a steep front that progresses outward as the breadth of the air film increases, whereas lower viscosity liquids broaden without a steep front, suggesting a transition in the kinematics of the air liquid interface.

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