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Droplet impact and the dynamics of rapidly moving contact lines

SHMUEL M. RUBINSTEIN, JOHN M. KOLINSKI, Harvard University , SHREYAS MANDRE, Brown University , LAKSHMINARAYANAN MAHADEVAN, DAVID A. WEITZ, Harvard University — When a liquid drop approaches a flat solid surface, the air beneath it is compressed, flattening the bottom of the drop and forcing initial contact to occur in a ring-shape, trapping a pocket of air in its center as two wetting fronts rapidly expand both outward and inwards to completely wet the surface. We combine total internal reflection (TIR) microscopy with a novel virtual frame technique (VFT) to directly observe the sub-micron length scales above a solid surface as the drop approaches, impacts and then spreads over it.

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