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Impact of ultra-viscous drops on a smooth solid surface KENNETH LANGLEY, E. Q. LI, S. T. THORODDSEN, King Abdullah Univ of Sci Tech (KAUST) — As an impacting drop approaches a solid surface, the gas layer between the drop and surface must be pushed aside. The lubrication pressure in this gas layer is sufficient to deform the droplet. For low-viscosity drops (˜1 cSt) a kink develops at the edge of the deformation, which results in contact being made along a ring, entraining a disc of air inside the drop. At higher viscosities, the kink is less pronounced due to the viscous stresses allowing the drop to glide on a thin layer of air (˜150 nm) for an extended time. When the thin air layer ruptures, numerous contacts are made that grow substantially faster than the predicted capillary-viscous balance. The evolution of the air layer and the subsequent growth of the contacts are investigated experimentally using two-color interferometry and high-speed imaging for a 7 orders of magnitude range of drop viscosities.

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