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Liquid dynamics and surface wettability in splashing ANDRZEJ LATKA, ARNOUT BOELENS, JUAN DE PABLO, SIDNEY NAGEL, University of Chicago — The impact of a drop results in a beautiful splash that depends on the properties of the liquid, the substrate, and the surrounding air. The interactions of the three phases, particularly those of the ambient gas, have proven difficult to understand. Here, we focus on two aspects of splashing that make it exceptionally challenging: the surprising role of substrate wetting and the complicated hydrodynamics of drop impact. Splashing theories, by analogy to forced wetting, have predicted a strong dependence on wetting properties. By using high-speed interference imaging and simulations, we find that the dynamics of the air-liquid interface at the contact line are independent of substrate wetting properties. We also investigate the effect of the drops evolving shape. When the drop first contacts the surface, it initially exhibits a region of high negative curvature that later disappears after the drop has spread sufficiently. We find that the effect of air on splashing is significantly stronger in the initial regime and demonstrate that this difference leads to a high and low impact velocity regime.

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