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How a drop splashes upon impact onto a moving surface. HAMED ALMOHAMMADI, ALIDAD AMIRFAZLI, Department of Mechanical Engineering, York University, Toronto, ON, Canada — Understanding whether drop spreads or splashes upon impact onto a moving surface is important due to its applications in printing, spraying, and icing. A systematic study was performed to understand how drop splashes upon impact onto moving hydrophilic and hydrophobic surfaces. High speed imaging from top and side views was used to capture the impact of drops (D_0 =2.5 mm) of liquids with three different viscosities (μ =1-4.1 mPa.s). Wide range of normal drop velocity (V_n =0.5-3.4 m/s) and surface velocity (V_s =0-17 m/s) were studied; such normal and tangential velocity ranges are not available in systems where a drop impacts at an angle relative to a surface. It was found that the splashing behavior of the drop upon impact onto a moving surface, unlike the understanding in the literature, is azimuthally different along the lamella contact line. Splashing probability decreases along the lamella contact line as velocity difference between the surface and the lamella decreases. A new model was developed to describe such azimuthally different behavior for splashing which is function of normal Reynolds and Weber numbers, V_s, and surface wettability. It is also found that the increase of the viscosity decreases the splashing threshold.

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