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Droplet Depinning under Forcing by Wind and Gravity[1] EDWARD WHITE, Texas A&M University, ALIREZA HOOSHANGINEJAD, University of Minnesota, ROGER SIMON, ELEAZAR HERRERA HERNANDEZ, Texas A&M University, SUNGYON LEE, University of Minnesota — Partially wetting drops are ubiquitous in nature and industry. In many cases such as rain drops on windows, droplets are subject to combined effects of gravity and wind forcing. Stability of water drops under forcing by wind and gravity is relevant to aircraft icing, heat exchangers, and fuel cells. Recent studies by Schmucker and White (2012) demonstrate a sharp transition in the trend of critical wind speed for droplet depinning from any inclined surface as a function of droplet size. To investigate what marks this self similar behavior, we conduct additional experiments of water drops on an inclined aluminum surface subject to forcing by wind. We find that the transition coincides with the onset of depinning for the advancing contact line. Inspired by this observation, we develop a mathematical model to rationalize the original experimental results of Schmucker and White.

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