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Wettability effects on droplet coalescence[1] PERCIVAL GRAHAM, DENNIS DE PAUW, ALI DOLATABADI, Concordia University — Droplet impingement has been studied since 1895, with the works of A.M. Worthington. Throughout the past century, a variety of interesting phenomena have been uncovered. These include the bouncing of droplets off of each other or liquid pools, intricate droplet splashing mechanics, and droplets bouncing off of superhydrophobic surfaces; to name a few. In addition to intricate phenomena, droplet dynamics are relevant to many engineering applications, such as painting, spray coating inkjet printing, and ice accumulation. These fields all involve interactions between droplets; therefore, studying droplet coalescence would benefit them greatly. The works presented include the coalescence of droplets with different impact conditions, various offsets, and at different wettabilities. Surface wettabilities studied are hydrophilic, hydrophobic and superhydrophobic. Fascinating phenomena observed include, bouncing of the impinging droplet off of the sessile droplet, sliding of the impinging droplet along the sessile droplet, and induced detachment on the sessile droplet on superhydrophobic surfaces. In order to capture the maximum spreading of the merged droplets, models related to coalescence of droplets in air and maximum spreading of a single droplet are combined to yield a new model to predict the maximum spreading of head-on droplet impact. Based on the free surface, and accuracy of the analytical model, droplet impact could be viewed as a mix of droplet coalescence in a gaseous media and droplet impact on a dry surface.

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