

Abstract Submitted
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Effect of neighboring particles on drop coalescence at an interface¹ ANKUR BORDOLOI, DEEPAK ADHIKARI, ELLEN LONGMIRE, Dept of Aerospace Engineering and Mechanics, University of Minnesota — The coalescence of a liquid drop in the presence of an adjacent solid particle or liquid drop is studied using high-speed visualization and Tomographic PIV. A drop of water/glycerin (W/G), surrounded by silicone oil of matched refractive index, is released onto an underlying W/G interface. A nylon sphere, neutrally buoyant with respect to the drop liquid, is placed adjacent to the drop. Three initial conditions are considered: the particle is wetted in W/G so that the interface maintains an angle of contact with the particle, the particle is wetted in oil so that it rests above the interface, and the particle is placed so that it maintains an angle of contact with the drop already resting above the interface. These cases are compared with that of two neighboring W/G drops. Off-axis rupture near the solid particle was found to be dominant in cases where the particle was wetted with W/G. However, when the particle was wetted with oil, the point of rupture occurred closer to the drop-axis. The film rupture in the drop is followed by retraction of the film and finally collapse of the drop. Both visualization and PIV results show that the trajectory of the collapsing drop depends on the initial contact condition as well as the rupture location.

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