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Effect of Collision Angle on Binary Droplet Coalescence JUNGYONG KIM, ELLEN LONGMIRE, University of Minnesota — Drop pairs of water/glycerin solution were injected into silicone oil of lower density through opposing tubes at varying initial angles with the goal of controlling the eventual collision angles. Simultaneous dual-field PIV measurements were obtained in index-matched fluids to characterize coalescence and rebounding behavior. The larger field captured trajectories, and the smaller field captured the thin film region. Experiments were performed for Weber numbers [We] in the range of 1-50 and collision angles of 15-80 degrees below the horizontal. Above $We \sim 10$, drops coalesced, with the rebounding/coalescence boundary shifting to higher We with increasing collision angle. Also, the collision angle affected the eventual location of film rupture. The rupture location moved higher in the thin film region as the collision angle increased. Interactions of vortex rings within drops and strong deformation associated with shallow collision angles and sufficient We encouraged coalescence. Details of these interactions will be discussed in the presentation. Supported by Petroleum Research Fund (42939-AC9) and NSF (CTS-0320327).

Jungyong Kim
University of Minnesota

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