Abstract Submitted
for the DFD09 Meeting of
The American Physical Society

Characteristics of Unequal Size Drop Collisions[1] JUNGYONG KIM, Samsung Engineering Co. Ltd., ELLEN LONGMIRE, University of Minnesota, MAN SIK KIM, Samsung Engineering Co. Ltd. — Pairs of water/glycerin drops were injected into silicone oil and traveled on downward trajectories before colliding. Unequal size drop collisions with drop size ratios (D_s/D_L) of 0.7 and 0.5 were investigated. Simultaneous dual-field PIV measurements were obtained to characterize coalescence and rebounding behavior. The initial injection angle and tube height were adjusted to access appropriate impact parameters. In the current study, the collision angle of the large drop was, in general, shallower than that of the small drop, and a range of velocity ratios and impact parameters was examined. Coalescence occurs above $We^* = 11$ similar to collision outcomes for equal size drops. As drop size ratio decreases, the intervening film deforms more. If the velocity ratio $u_L/u_s < 1$, the interface remains deformed at coalescence, but if $u_L/u_s > 1$, the interface flattens before coalescence. The rupture location varies due to the asymmetry of the drops. As collision offset increases (B > 0), the film rupture time is shortened and mixing of the fluid within the drops is enhanced after coalescence. These results will be compared with the behavior observed previously for equal size drop collisions.

[1]Supported by Petroleum Research Fund (42939-AC9), NSF (CTS-0320327), and Samsung Engineering, Co. Ltd.

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Date submitted: 12 Aug 2009 Electronic form version 1.4