Abstract Submitted
for the DFD05 Meeting of
The American Physical Society

Drop coalescence and film rupture with van der Waals forces ASHLEY J. JAMES, XUELI JIANG, University of Minnesota — During the collision of two drops the thin film that forms between the drops as they approach each other plays an important role. Viscous forces limit the rate at which the film thins, so the film pressure rises, which tends to cause the drops to rebound. For coalescence to occur the film must become thin enough for the small-scale, attractive van der Waals forces to overcome the high pressure. Two methods to compute van der Waals forces during drop coalescence have been developed. In one method the van der Waals potential between the two drops is computed directly to obtain the force. In the other method a disjoining pressure is applied to the film between the drops. A comparison of the results using the two methods is presented. For validation numerical simulations of the rupture of a fluid film using the disjoining pressure method are compared to the lubrication theory of Vaynblat *et al.* (*Phys. Fluids*, 2001). The effect of van der Waals forces on drop collision and film rupture is described.

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Date submitted: 05 Aug 2005 Electronic form version 1.4