Abstract Submitted
for the DFD05 Meeting of
The American Physical Society

Important Parameters in Drop Coalescence at Planar Surfaces
PIROUZ KAVEHPOUR, Mech & Aero Eng, UCLA — An experimental study has been performed to establish the principal elements that govern drop coalescence. The study consisted of placing drops of various sizes and physical properties on a planar interface with the aid of a high speed digital camera. The experimental portion of the project was aimed at capturing the time of coalescence and the size of the secondary drop that formed after coalescence had finished. Results of the experiments showed clear patterns with respect to inertial and viscous terms. Dimensional analysis indicated that *Oh* had a strong influence on the behavior of drop coalescence. The ratio of secondary drop radius to primary drop radius was calculated to be approximately constant when Oh was much smaller than unity. However, as Oh approached unity from the lower bound, the value of r_i decayed. No secondary drop was observed when Oh was greater than unity. Normalized coalescence times confirmed this trend by being properly scaled with inertial time scales for small Oh and preferring viscous time scales when Oh was greater than unity. During the coalescence of a drop with a planar interface, a hole is generated in a microscopic film that separates the drop from the interface. The experiment captured two separate processes, film rupture and the closing of the hole. During the film rupture, the hole radius demonstrated a power law time dependence. The dimensionless drop rupture radii and times fit onto a single master curve and were independent of their physical properties during the opening.

Pirouz Kavehpour
Mech & Aero Eng, UCLA

Date submitted: 15 Aug 2005 Electronic form version 1.4