Simulations of surfactant effects on the coalescence of drops and bubbles[1] DAVID MARTIN, FRANCOIS BLANCHETTE, University of California Merced — We present simulations of coalescence in the presence of surfactant. We assume axial symmetry, and consider a fluid-fluid interface on which surfactant concentration and mass are tracked as functions of arclength. Our model can account for two physically distinct setups: a soap bubble merging with a suspended soap film; and a surfactant covered liquid drop merging with a reservoir. In both cases, we describe the regime in which coalescence is only partial. Along with viscous effects, represented by the Ohnesorge number, the elasticity of the surface tension relative to the surfactant concentration is seen to play a key role, and exhibits a surprising nonmonotonic influence. Effects of gravity are also simulated, along with effects of differing initial conditions, including uneven initial surfactant concentration, as is likely to arise in physical applications.

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