Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

Domain Growth Kinetics in Stratifying Foam Films YIRAN ZHANG, VIVEK SHARMA, Chemical Engineering, University of Illinois Chicago — Baking bread, brewing cappuccino, pouring beer, washing dishes, shaving, shampooing, whipping eggs and blowing bubbles all involve creation of aqueous foam films. Typical foam films consist of two surfactant-laden surfaces that are μ 5 nm – 10 micron apart. Sandwiched between these interfacial layers is a fluid that drains primarily under the influence of viscous and interfacial forces, including disjoining pressure. Interestingly, for certain low molecular weight surfactants, a layered ordering of micelles inside the foam films (thickness <100 nm) leads to a stepwise thinning phenomena called stratification. We experimentally elucidate the influence of these different driving forces, and confinement on drainage kinetics of horizontal stratifying foam films. Thinner, darker domains spontaneously grow within foam films. Quantitative characterization of domain growth visualized in a using Scheludko-type thin film cell and a theoretical model based on lubrication analysis, provide critical insights into hydrodynamics of thin foam films, and the strength and nature of surface forces, including supramolecular oscillatory structural forces.

Vivek Sharma
Chemical Engineering, University of Illinois Chicago

Date submitted: 14 Nov 2014 Electronic form version 1.4