Abstract Submitted
for the MAR06 Meeting of
The American Physical Society

Bubble size distribution in a steady-state column of aqueous foam. KLEBERT FEITOSA, DOUGLAS J. DURIAN, University of Pennsylvania — We report on measurements of the distribution of bubble sizes in a vertical column of aqueous foam. The sample is generated and maintained in steady-state by continuous bubbling of gas (CO_2) in a surfactant solution (H_2O + AOS + NaCl) at the bottom of a tall Lucite cylinder. The constant flow of gas produces nearly identical bubbles that accumulate at the liquid/foam interface and subsequently move up with constant velocity. The distribution of bubble sizes depends on height, being monodisperse near the bottom, turning bidisperse at some intermediate height, and then becoming polydisperse further up in the column. This behavior is exclusively due to coarsening and drainage, since film-rupture and convection are not observed. The development of a bidisperse distribution cannot be explained by mean-field theories of coarsening, in which bubbles of a given size grow or shrink at a rate that depends only on their size in comparison with a mean size.

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Date submitted: 11 Jan 2006 Electronic form version 1.4