Abstract Submitted
for the DFD05 Meeting of
The American Physical Society

Gas Bubble Pinch-off in Viscous and Inviscid Liquids P. TABOREK, J.C. BURTON, R. WALDREP, University of California, Irvine — We have used high-speed video to analyze pinch-off of nitrogen gas bubbles in fluids with a wide range of viscosity. If the external fluid is highly viscous (η_{ext} >100 cP), the radius is proportional to the time before break, τ, and decreases smoothly to zero. If the external fluid has low viscosity (η_{ext} <10 cP), the neck radius scales as $\tau^{1/2}$ until an instability develops in the gas bubble which causes the neck to rupture and tear apart. Finally, if the viscosity of the external fluid is in an intermediate range, an elongated thread is formed which breaks apart into micron-sized bubbles. 100,000 frame-per-second videos will be presented which illustrate each of these flow regimes.

Peter Taborek
University of California, Irvine

Date submitted: 05 Aug 2005 Electronic form version 1.4