

Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Pinch-off and Fracture of Bubble Rafts¹ CHIN-CHANG KUO,
MICHAEL ARCINIAGA, MICHAEL DENNIN, Department of Physics and As-
tronomy, University of California, Irvine — The breaking dynamics of a bubble raft
bridge between two walls which are pulled apart is studied experimentally. Unlike
the pinch-off of liquids, various deformation types can be observed in this complex
fluid system. We find that a large ratio between the initial width and length of
the bubble raft bridge leads to a solid-like ripping of the foam layer, whereas the
deformation tends to have a liquid-like pinch-off behavior for smaller ratios. Fur-
thermore, the bubble size distribution, crystallization and the pulling velocity can
have a significant effect on the bridge breaking. In particular, for a highly ordered
and uniform bubble composition with a fast pulling velocity, the fracture occurs
in the early stage of the pinch-off, which demonstrates an intermediate state be-
tween solid-like and liquid-like breaking. We will report on critical pulling speeds
for fracture and scaling exponents for pinch-off.

¹Supported by NSF DMR-0907212 and Research Corporation.

Chin-Chang Kuo
Department of Physics and Astronomy, University of California, Irvine

Date submitted: 22 Nov 2009

Electronic form version 1.4