Abstract Submitted
for the DFD12 Meeting of
The American Physical Society

Coalescence driven coarsening in surfactant-free foams[1] PETER S. STEWART, The University of Oxford, STEPHEN H. DAVIS, Northwestern University — We consider the stability of a planar gas-liquid foam with low liquid fraction, in the absence of surfactants and stabilising particles, as a model for molten metal foams produced as a precursor to forming high-porosity metallic solids. We adopt a network modelling approach, treating the bubbles as polygons, the accumulation of liquid at the bubble vertices as dynamic nodes and the liquid bridges separating the bubbles as uniformly thinning free films. We further incorporate an explicit rupture criterion for the films once they become sufficiently thin, due to van-der-Waals intermolecular attractions. We initialise the foam as a mono-disperse array of regular hexagonal bubbles, and examine the rate of coarsening as the films break and the bubbles rapidly coalesce.

[1]National Science Foundation Grant No. CMMI-0826703

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Date submitted: 02 Aug 2012 Electronic form version 1.4