Abstract Submitted
for the DFD16 Meeting of
The American Physical Society

Investigating short-time dynamics of spreading bubbles[1]

MATTHIEU LAURENT, MARK MENESSES, JAMES BIRD, Boston University

— When a bubble comes into contact with a partially wetting surface, the film between the bubble and solid surface rapidly dewets to minimize the free energy of the system. The dynamics of this dewetting is assumed to be dominated by capillary and viscous effects. Yet, when drops rather than bubbles spread, the short-time dynamics are dominated by a balance of capillarity and inertia. Here we revisit spreading bubbles to investigate whether the short-time dynamics is better captured by a viscous or inertial scaling. Counter-intuitively, neither viscous nor inertial effects alone can account for short-time spreading dynamics. Through an experimental approach, we develop a dimensionless scaling relation — incorporating both viscosity and inertia — that successfully collapses the data.

[1]Chaire X-ESPCI-Saint Gobain

Matthieu Laurent
Boston University

Date submitted: 31 Jul 2016

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