

Abstract Submitted
for the DFD10 Meeting of
The American Physical Society

Stability of surface nanobubbles DETLEF LOHSE, JOOST WEIJS, HANNEKE GELDERBLOM, JACCO SNOEIJER, University of Twente — Surface nanobubbles are spherical-cap-shaped gas bubbles of typical diameter of 100 nm and with typical thickness of 10 nm that can form in water at hydrophobic surfaces. Their stability is a mystery as due to Laplace pressure they should dissolve in microseconds. Brenner and Lohse (Phys. Rev. Lett. 101, 214505 (2008)) had suggested that the nanobubbles are stabilized by a gas influx at the contact line, which compensates for the diffusive gas outflux. Here we give numerical support for this dynamic equilibrium stabilization mechanism from Molecular Dynamics (MD) simulations with Lennard-Jones particles: Indeed, in these MD simulations we find a strong gas influx at the contact line. We also present analytical considerations on the diffusive gas fluxes around the bubble.

Detlef Lohse
University of Twente

Date submitted: 21 Jul 2010

Electronic form version 1.4