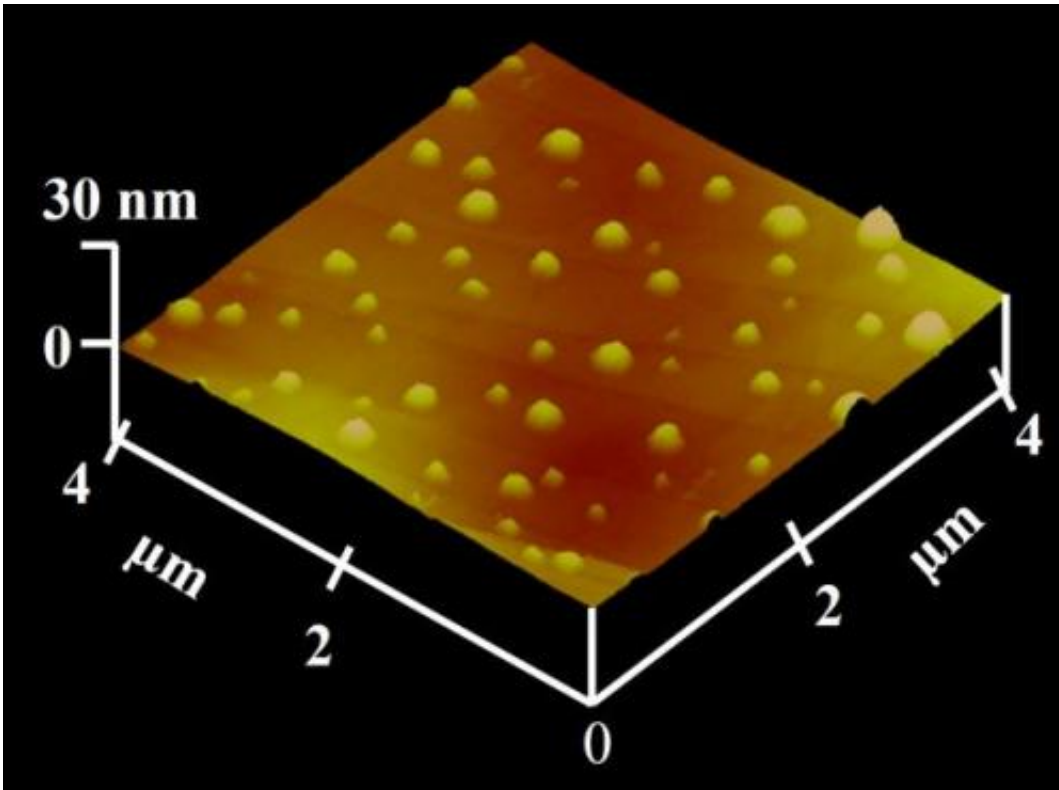


Research proves nanobubbles are superstable

April 24 2014, by Martine Van Hillegersberg



The intense research interest in surface nanobubbles arises from their potential applications in microfluidics and the scientific challenge for controlling their fundamental physical properties. One of the most pronounced features of surface nanobubbles is their very long lifetime for their tiny size. Four researchers from the University of Twente's MESA+ research institute have recently proven that the stability of

nanobubbles is so high they remain stable even at the boiling point of water, triggering microdroplet nucleation. The researchers published their unique findings on nanobubble stability in *Physical Review Letters*.

Whenever solids that do not easily dissolve in water come into contact with water, nanobubbles often form at the point the two phases come into contact with each other. Nanobubbles have a lifetime far longer than what one would expect. The MESA+ research has proven that nanobubbles are even able to withstand a temperature increase to temperatures close to the [boiling point](#) of water. When the vapour-liquid contact line passes a nanobubble, a liquid film remains around it, which, after pinch-off, results in a microdroplet in which the nanobubbles continue to exist. Finally, the microdroplet evaporates and the nanobubble consequently bursts. Professor Detlef Lohse: "Our results support that pinning the contact line plays a crucial role in nanobubble stability. We have demonstrated the unique role of nanoscale gaseous domains in boiling events for the first time."

The research by the Physics of Fluids department is a starting point for studying the impact of nanoscale fluidic domains on the motion of the receding three-phase line and for understanding the phase transition initiated by [surface](#) nanobubbles.

The article 'Surface Nanobubbles Nucleate Microdroplets' by Xuehua Zhang, Henri Lhuissier, Chao Sun and Detlef Lohse was published in *Physical Review Letters*, (April 2014).

More information: 'Surface Nanobubbles Nucleate Microdroplets' by Xuehua Zhang, Henri Lhuissier, Chao Sun and Detlef Lohse is available online: [stilton.tnw.utwente.nl/people/ ... s/2014-Zhang-prl.pdf](http://stilton.tnw.utwente.nl/people/...s/2014-Zhang-prl.pdf)

Provided by University of Twente

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