

Abstract Submitted
for the DFD19 Meeting of
The American Physical Society

Droplet condensation patterns: universality or non-universality?

LAURA STRICKER, ETH Zurich, JUERGEN VOLLMER, University of Leipzig,
ROBERT STYLE, ERIC DUFRESNE, ETH Zurich — When a flux of supersaturated vapour gets into contact with a solid substrate, a condensation process can originate, leading to the formation of droplets patterns on the substrate (“breath figures”). The interest for breath figures is both practical and theoretical. We present here an experimental study of three-dimensional breath figures forming on a two-dimensional substrate. By making use of scaling concepts, we indentify a series of characteristic exponents, such as the so-called polydispersity exponent, characterizing the droplet size distribution. We proof the internal consistency of the results and we compare them to the predictions of the classical theory. According to such a theory, the polydispersity exponent should be a universal number, depending only on the dimensionality of the system. However, more recent theoretical studies claimed that the polydispersity exponent should heavily depend on the micrometric details of the condensation process (e.g. contact angle and critical nucleation radius of the droplets). We investigate the issue and we try to provide an answer, based on the experimental data.

Laura Stricker
ETH Zurich

Date submitted: 29 Jul 2019

Electronic form version 1.4