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Heterogeneous crystal nucleation on curved surfaces observed by real-space imaging URS GASSER, ANDREA SCOTTI, Paul Scherrer Institut, FLORIAN ZIESE, GEORG MARET, University of Konstanz — Crystal nucleation in a supercooled liquid, i.e. the formation of critical crystal nuclei, is not well understood for both homogenous and heterogeneous nucleation. The structural transformation from the liquid to crystal precursors and finally to the structure of bulk crystal and its connection with the free energy barrier for nucleation are not well understood. The large differences between measured and calculated nucleation density rates obtained for many materials reflect this lack of understanding. We use confocal microscopy with single-particle resolution to observe heterogeneous nucleation of colloidal crystals on curved seed surfaces. The radius of curvature ranges from 4 to 40 particle diameters, allowing to observe the transition from the strong suppression of heterogeneous nucleation at small radii of curvature - an effect not captured by classical nucleation theory - to fast heterogeneous nucleation as expected from classical nucleation theory. We determine the critical nucleus size, estimate the surface tension of crystal precursors and critical nuclei, characterize their structure, and compare with expectations from classical nucleation theory. While the smallest crystal precursors are found to be almost unaffected by the curvature, the effect is significant for nucl

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