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How Water Meets a Hydrophobic Surface – Reluctantly and with Fluctuations ADELE POYNOR, LIANG HONG, STEVE GRANICK, University of Illinois at Urbana-Champaign — The details of how water meets a hydrophobic surface are still hotly debated. Here we use two independent methods, ellipsometry in the time-resolved phase-modulated mode, and surface plasmon resonance, to investigate the view that thermodynamics causes a nanometer-sized low-density layer to form adjacent to the hydrophobic solid. Strong evidence in favor of the hypothesis is found. This zone of depleted density shows large fluctuations even within the spatial (over a beam size of $10\ \mu\text{m}$) and temporal (with a time constant of 30 ms) averaging inherent in ellipsometry measurement. Statistical analysis of these noise spectra reveal a remarkable scaling with the area over which the measurements are averaged.

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