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Imaging the structure of water near hydrophobic solutes GERARD C. L. WONG, ROBERT H. CORIDAN, GHEE HWEE LAI, NATHAN S. SCHMIDT, Dept. of Physics, Dept. of Materials Science & Engineering, F. Seitz Materials Research Laboratory, University of Illinois, Urbana-Champaign, MICHAEL KRISCH, European Synchrotron Radiation Facility, Grenoble, France, PETER ABBAMONTE, Dept. of Physics, F. Seitz Materials Research Laboratory, University of Illinois, Urbana-Champaign — Theoretical studies of the structure of interfacial water on the surface of hydrophobic solutes show a strong dependence on the radius of the solute itself. At small radii, a hydrogen-bond network is still capable of forming around the solute, generally forbidding association between the solute molecules. At large radii water can no longer form a hydrogen-bond network around the solute molecule, resulting in the "drying" of the surface and a strong attraction between solute molecules. The crossover length between the two regimes is on the order of a nanometer. We will show that it is possible to make movies of water around hydrophobic solutes of varying size by extracting the density propagator from the dynamical structure factor measured via high-resolution inelastic x-ray scattering spectra at 3rd generation synchrotron sources.

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