Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Femtosecond movies of water near interfaces at sub-Angstrom resolution ROBERT CORIDAN, Department of Materials Science and Engineering, University of Illinois, Urbana-Champaign, GHEE HWEE LAI, NATHAN SCHMIDT, Department of Physics, University of Illinois, Urbana-Champaign, PETER ABBAMONTE, Department of Physics and Seitz Materials Research Lab, University of Illinois, Urbana-Champaign, GERARD C.L. WONG, Department of Materials Science and Engineering, University of Illinois, Urbana-Champaign and Department of Bioengineering, UCLA — The behavior of liquid water near interfaces with nanoscopic variations in chemistry influences a broad range of phenomena in biology. Using inelastic x-ray scattering (IXS) data from 3rd-generation synchrotron x-ray sources, we reconstruct the Greens function of liquid water, which describes the Å-scale spatial and femtosecond-scale temporal evolution of density fluctuations. We extend this response function formalism to reconstruct the evolution of hydration structures near dynamic surfaces with different charge distributions, in order to define more precisely the molecular signature of hydrophilicity and hydrophobicity. Moreover, we investigate modifications to surface hydration structures and dynamics as the size of hydrophilic and hydrophobic patches are varied.

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Date submitted: 01 Dec 2009 Electronic form version 1.4