Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Nanoconfined water under varying ionic and compressive conditions SHAH KHAN, University of Peshawar, Peshawar, Pakistan, PETER HOFFMANN, Wayne State University, Detroit, USA — The nano-mechanics and dynamics of molecularly thin layers of water are not well understood. While researchers agree at some of the characteristics such as ordering of water molecules along atomically smooth surfaces, some other properties, such as the viscoelastic response of a nanoconfined water film, remain highly controversial. Using atomic force microscope, we have shown in the past (Phys. Rev. Lett. 2010) that the viscoelastic properties of nanoconfined ultrapure water film depend upon the squeeze rate, changing from a liquid-like to a solid-like, at very low compression rate (0.8 nm/s), as observed from an order of magnitude increase in the relaxation time. Recently, we have shown that the introduction of NaCl in nanoconfined water significantly increases the range of ordered layers of water as well as the Maxwell's relaxation time at even lower compression rates, 0.2 nm/s (Langmuir 2016). Here we will discuss a collective picture of nanoconfined water film based on these findings as well as our new results about CsCl in nanoconfined water resulting in bulk-like relaxation time thereby suppressing the dynamic solidification trend.

Shah Khan
University of Peshawar, Peshawar, Pakistan

Date submitted: 23 Oct 2016 Electronic form version 1.4