



Ben-Gurion University of the Negev
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Water in the ultra-confinement of natural minerals - Evidence of a 1D structural glass transition

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Abstract

What would happen if the H-bond was removed from water, even though water was not in a gaseous state? Certainly, its delinquent anomalous behavior would be absent, but so would be the collective phenomena that make it so unique. This situation can be approached when water molecules are ultra-confined in sub-nanometer sized channels, present in natural minerals, such as cordierite. These channels are an integral part of the crystal lattice. The diameter is often of the same order of magnitude as the diameter of a water molecule, 4-5 Å. Under such conditions water entrapped in them at the time of formation, but not chemically bound, can no longer behave as “water”. But rather than conform, these extreme conditions lead to unusual behaviours. Concepts like H-bonding and clustering are now not relevant and a new class of dynamics must arise for these molecules. Most intriguingly is that this collection of water molecules can act as a structural 1-D glass; a concept discussed and theorized, but never observed. The paper offers the evidence for this by studying both dielectric relaxation and differential scanning calorimetry of these molecules in their unusual situation.

Date & Location:

Tuesday, June 19, 2018, 11:00

Lecture room, Physics Building (ground floor)

YDSEEP WEEKLY SEMINAR

