Fritz-Haber-Institut der Max-Planck-Gesellschaft

Physikalische Chemie — Direktor: Prof. Dr. Martin Wolf

MAX-PLANCK-GESELLSCHAFT

Department Seminar:

Monday, January 15, 2018, at **11:00** a.m.;
— all are invited to meet at around 10:40 for a chat and coffee —

Dr. Catalin Gainaru Spektroskopie dynamisch ungeordneter Festkörper,
Experimentelle Physik III, Fakultät Physik,
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Relaxation processes in water and related hydrogen bonded liquids

PC Seminar Room G2.06, Building G, Faradayweg 4 M. Sajadi

Abstract:

Hydrogen bonds play an important role for many fascinating properties of relatively simple liquids such as water but also for the functionality of complex biomolecules sustaining life. Situated at an intermediate level of complexity, monohydroxy alcohols form relatively simple supramolecular structures and can be used as model systems for the investigations of H–bonding materials in general [1]. Currently, a widespread agreement emerged that for these alcohols the H–bonded networks are quasilinear, however their associated dynamics still remains highly debated. At variance with the situation for water [2], mono–alcohols have the ability to avoid crystallization. This opens the venue for investigations with a broad array of techniques and in wide temperature, pressure, and concentration ranges.

In his presentation, Dr. Catalin Gainaru will discuss recent results obtained for H-bonded liquids with various techniques in an extremely broad dynamic range. A microscopic model (i.e., Transient Chain Model, [3]) which is able to describe many, if not all the experimental observations accumulated so far, will be discussed in relation to structure and dynamics of associating liquids including water, mono–alcohols, secondary amides, and protic ionic liquids [4]..

[1] R. Böhmer, C. Gainaru, and R. Richert, Structure and dynamics of monohydroxy alcohols - milestones towards their microscopic understanding, 100 years after Debye, Phys. Rep. 545, 125 (2014).
[2] J. S. Hansen, A. Kisliuk, A. P. Sokolov, and C. Gainaru, Identification of Structural Relaxation in the Dielectric Response of Water, Phys. Rev. Lett. 116, 237601 (2016).
[3] C. Gainaru, R. Figuli, T. Hecksher, B. Jakobsen, J. C. Dyre, M. Wilhelm, and R. Böhmer, Shear-Modulus Investigations of Monohydroxy Alcohols: Evidence for a Short-Chain-Polymer Rheological Response, Phys. Rev. Lett. 112, 098301 (2014).
[4] C. Gainaru, R. Meier, S. Schildmann, C. Lederle, W. Hiller, E.A. Rössler, R. Böhmer, Nuclear magnetic resonance measurements reveal the origin of the Debye process in monohydroxy alcohols, Phys. Rev. Lett. 105, 258303 (2010).