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"Photochemical Pathways from X-ray Spectroscopy"

Prof. Dr. Alexander Föhlisch

University of Potsdam and Helmholtz Center Berlin, Germany

Date: 17th December 2019 (Tuesday)
Time: 05:30 p.m.
Venue: Research Building Department „Life, Light & Matter"
of the Interdisciplinary Faculty of the University of Rostock,
seminar room 110, A.- Einstein-Str. 25, 18059 Rostock

Abstract

What governs rate and selectivity in chemical processes down to the atomic level is the bearing point of high resolution resonant inelastic X-ray scattering on molecular systems. Here both active moieties and the interacting fluctuating network of the solvent, most notably liquid water, are the constituting entities. Still today, diverging views exist on liquid water, dating back to Wilhelm Conrad Röntgen, postulating distinct phases to coexist in liquid water even under ambient conditions – competing with a single-phase liquid in a fluctuating hydrogen bonding network – the continuous distribution model. Over time, X-ray spectroscopic methods have repeatedly been interpreted in support of Röntgen's postulate. However, quantitative X-ray spectroscopic analyses show that this is not the case. At room temperature and normal pressure, the X-ray spectroscopic observables can be fully and consistently described with continuous distribution models of near-tetrahedral liquid water at ambient conditions: The water molecules form a fluctuating network with an average of 1.74 ±2.1% donor and acceptor hydrogen bridge bonds per molecule each, allowing tetrahedral coordination to neighbours. Can these X-ray spectroscopic conclusions on water at ambient conditions now also resolve the heavily debated question of the existence of a second critical point in the so-called "no man's land" of supercooled water? Our argument it, that even if the purported second critical point at -45°C and ambient pressure existed, the ambient conditions of liquid water in equilibrium would be by any means far away in temperature. Thus, the fluctuating continuous distribution model of near-tetrahedral liquid water at ambient conditions holds true independent of whether the second critical point of water in the supercooled region exists or not.

Short CV

Present Position

2009 –	Faculty Position, Professor (W3) tenured, Faculty for Mathematics and Natural Sciences, Institute of Physics and Astronomy, Potsdam University, Potsdam, Germany and Director of Institute of Methods and Instrumentation for Research with Synchrotron Radiation, Helmholtz-Zentrum Berlin für Materialien und Energie GmbH, Berlin, Germany

Education

2007 – 2009	Privatdozent University of Hamburg, Institute of Experimental Physics, Germany
2006	Habilitation, University of Hamburg, Institute of Experimental Physics, (Assistant in W. Wurth group)
2003	Lehrbefähigung, Venia Legendi Experimentalphysik Universität Hamburg
1997 – 1999	PhD in Physics, Uppsala University, Sweden. (Supervisor Prof. N. Mårtensson, Doc. Dr. A. Nilsson, Opponent: Prof. D. A. Shirley
1996 – 1997	Research Scholar Lawrence Berkeley National Laboratory, ALS, AFD, USA
1995 – 1996	Postgraduate Studies: Europa-Kolleg Hamburg: "European Union and international economic relations"
1994 – 1995	Physik Diplom, Uni Hamburg /DESY, Germany, Supervisor Prof. C. Kunz
1992 – 1993	Master of Arts in Physics, SUNY at Stony Brook, USA
1990 – 1992	Physik, Vordiplom, Eberhard-Karls-Universität Tübingen, Germany

*****All interested are welcome*****

Link to presentation: https://webconf.vc.dfn.de/r3z433gsc0ua/

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