

WEBINAR SERIES ON

## NMR RELAXOMETRY THEORY AND APPLICATIONS

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PROF.  
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**NMR spin relaxation  
in viscous liquids.**

### Abstract

#### NMR spin relaxation in viscous liquids

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Starting with the seminal work of Bloembergen, Purcell and Pounds in 1948, NMR relaxometry - among many other issues - attempted to access the spectral density of viscous liquids, systems which undergo a glass transition. This extraordinary phenomenon attracted the research activities of many other spectroscopic methods which provided insight into the evolution of the spectral density upon supercooling a liquid, in particular, demonstrating that the spectral density is highly non-Debye. In other words, the correlation function is highly stretched. Yet, understanding is still incomplete. In my talk I will give an overview of the role NMR relaxometry can play in this context. Starting with the classic 1H dispersion measurements by Noack and co-workers to the studies of 2H relaxation and back to recent dispersion measurements applying the field cycling technique I will demonstrate the potential of NMR relaxometry. Studying both, T1(T) and T2(T) is an important ingredient. Up to what extent can NMR contribute to address the important question whether there exists a universal relaxation stretching in molecular liquids? An issue which recently has been raised once again. And how far are we to simulate those NMR relaxations?

### Author Biography

Ernst Rössler studied for a chemistry diploma from 1971 at Johannes Gutenberg-Universität, Mainz, Germany and followed with a PhD in physical chemistry at the same institution from 1979 to 1984. He moved to the Freie Universität Berlin for a postdoctoral position in the physics department in 1985 and consequently obtained "habilitation" in 1992. He became Associated Professor (C3), in Experimental Physics at Universität Bayreuth in 1993 and has also been a visiting Professor at Roskilde University, Denmark since 2003. Ernst holds the position of Senior Scientist at the North Bavarian NMR Center and Inorganic Chemistry III, University Bayreuth since 2018. His main research interests include dynamics of supercooled liquids, glasses, polymers, polymer-plasticizer systems, and plastically crystalline phases as well as the spectroscopic techniques of nuclear magnetic resonance (solid state NMR and relaxometry), dielectric spectroscopy and light scattering for which he has numerous publications. Ernst is also a member of the advisory board of "Macromolecules" and a member and Work Group Leader of the National Management committee of the COST-Program "European Network on NMR Relaxometry".