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Sonderforschungsbereich 595
Elektrische Ermüdung in Funktionswerkstoffen

TECHNISCHE UNIVERSITÄT DARMSTADT

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Modern Solid State NMR Spectroscopic Strategies for the Investigation of Structure and Dynamics in Disordered Materials

Disordered materials, such as defective crystals, glasses, and nanocomposites are of great importance in materials science and technology, as key functional properties are directly linked to the lack of translational symmetry. Designing the physical properties of materials to technological demands requires detailed knowledge of their structural and dynamic properties. For the investigation of the solid state, nuclear magnetic resonance (NMR) is an ideal complement to the various diffraction (x-ray, synchrotron, neutron) techniques, by its specific property of being ***element-selective***, inherently ***quantitative*** as well as ***selective*** to the local environment. An additional strength of the solid state NMR approach lies in the opportunity of tailoring the effective Hamiltonian by manipulations in physical space (magic angle sample spinning) or spin space (multi-dimensional NMR), offering a toolbox of complementary ***selective averaging*** experiments.

A particularly powerful NMR approach towards structural elucidation is based on the site-resolved measurement and quantitative analysis of internuclear magnetic dipole-dipole interactions, which can be translated into distance information in a straightforward manner. This approach can give detailed insights into internuclear connectivities, spatial distributions, and intermolecular interactions in disordered states of matter, such as inorganic frameworks, glasses, ceramics and nanocomposites. Applications of this principle will be presented in the area of crystalline, glassy, and glass-ceramic solid electrolytes, where NMR has contributed significantly towards a fundamental understanding of ion transport in solids.

Der Vortrag findet um **16:15 Uhr** im Gebäude der Materialwissenschaften, Lichtwiese, Alarich-Weiss-Str. 2, **Raum 77,** statt.