Physik-Kolloquium

Dienstag, den 04.02.2020, 17.00 Uhr

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Molecular Sensing in NMR/MRI Applications with Hyperpolarized Xenon in Host-Guest Complexes

Nuclear Magnetic Resonance (NMR) suffers from low sensitivity for inductive detection of thermally polarized spin ensembles. On the other hand, the high molecular specificity of NMR makes the method an important tool in biophysics, chemistry, and biomedical imaging. The sensitivity issue can be solved by means of hyperpolarized noble gases. In particular, hyperpolarized $^{129}$Xe (spin $\frac{1}{2}$) systems can be detected by saturation transfer techniques for further sensitivity enhancement. This requires the identification of host structures with suitable spin exchange rates. This talk will give an overview of the processes that first generate hyperpolarized xenon and then induce a controlled depolarization for sensitive detection of Xe–loaded host structures and their applications in different molecular environments.

Reversibly bound, hyperpolarized Xe for ultra-sensitive NMR applications