

## **Noble gas medical NMR imaging: Spying on tiny cavities in proteins**

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Chemical exchange processes play an important role for various molecular systems with cavities. Insights into the underlying thermodynamics, kinetics, and structure parameters are important for the design of synthetic molecules employed for example for binding of greenhouse gases or for the characterization of hydrophobic pockets in naturally occurring proteins. This talk will give an overview how  $^{129}\text{Xe}$  is an ideal “spy” to explore such cavities. The nuclear spin of this inert gas reveals hidden states of different molecular symmetry that affect exchange kinetics. It also enables “spin counting” to quantify the attoliter volume in hollow protein structures. Such structures, normally used by bacteria to adjust their buoyancy in water, may also expand the diagnostic capabilities provided by medical magnetic resonance imaging.