



Organic Chemistry/NMR Spectroscopy

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Optimal Control of NMR Experiments

A general goal of our research is the development of novel techniques to control the dynamics of spin systems. Methods of optimal control theory are used to push the performance limits of NMR spectroscopy and of magnetic resonance imaging. In collaboration with colleagues from chemistry, physics, medicine, computer science and mathematics, the resulting pulse sequences are applied in diverse fields, ranging from biomolecular NMR spectroscopy and medical imaging to the emerging field of quantum technologies, including quantum computing, quantum simulation and quantum sensing.

In addition to the design of quantum control schemes, we are also developing concepts and tools (SpinDrops) for teaching and research to visualize the complex dynamics of quantum systems in NMR experiments and quantum algorithms.

