

Optimal Control of Spin Dynamics in Magnetic Resonance

The ability to control the dynamics of spin and pseudo-spin systems is an important prerequisite for a wide range of practical applications, ranging from molecular spectroscopy, quantum information processing to medical imaging. In magnetic resonance, nuclear or electron spins are experimentally manipulated using complex radiofrequency and microwave pulse sequences. Based on principles of optimal control theory, fundamental open controllability questions can be addressed and robust time-optimal and relaxation-optimized pulse sequences can be designed to control the dynamics of spin and pseudo-spin systems. In this talk I will highlight experimental applications in high resolution NMR and beyond.