Tata Institute of Fundamental Research
Survey No. 36/P, Gopanpally Village, Serilingampally, Ranga Reddy Dist., Hyderabad - 500107

Seminar

Ideal Pulses - Perfect Results?

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NMR spectroscopy relies heavily on pulses to rotate spins. These rotations are defined by an axis and a nutation frequency that are defined by the phase and the amplitude of the pulses. Pulse sequences are usually designed assuming such ideal rotations but in reality the finite bandwidth of the resonance circuit and other experimental imperfections lead to a deviation of the real rotation that the spins experience. These deviations can manifest in a changed effective rotation axis as well as the amplitude of the nutation. While this is a well-known phenomenon that was first described in the 1970s, there has been little work how complex modern pulse sequences are affected by such imperfections of the rotations and how one can counteract their effects on modern spectrometers.

We have looked into the transient behavior of pulses and implemented ways to compensate such pulse transients in a number of pulse sequences. The effects of the pulse transients can be understood using advanced theoretical methods and implementing transient-compensated pulses requires sometimes modifications of pulse sequences that were unexpected. We showed that there are classes of pulse sequences that can be made much more reliable using transient compensation while other pulse sequences are largely unaffected due to a built-in compensation scheme.

Thursday, Jan 31st 2019

2:00 PM (Tea/Coffee at 1:30 PM)

Auditorium, TIFR-H