Tata Institute of Fundamental Research
Survey No. 36/P, Gopanpally Village, Serilingampally, Ranga Reddy Dist., Hyderabad – 500 046

Students' Annual Seminar

Optimisation of homonuclear decoupling at fast MAS to increase proton coherence lifetimes

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Observation of protons is very important in NMR because of the high sensitivity of ^{1}H-detected experiments. ^{1}H-^{1}H dipolar couplings are very strong and difficult to average out just by magic-angle-spinning (MAS). It causes broad peaks and short coherence lifetimes, even under very fast MAS frequencies (>60 kHz). A combination of fast MAS and pulsed homonuclear decoupling sequences can extend ^{1}H coherence times to values higher than those possible with only one of these techniques. However, it is unclear if these two techniques can be combined to give an additive effect, especially at these fast MAS frequencies. I will discuss Phase Modulated Lee-Goldburg (PMLG) and Tilted Magic-Echo Sandwich with zero degree sandwich pulse (TIMES0) schemes for ^{1}H-^{1}H homonuclear decoupling which we have used to enhance the coherence lifetimes of protons in a uniformly labelled model peptide using both windowed and non-windowed schemes. We will suggest regimes in which these sequences can be applied to extend ^{1}H coherence times by a factor of 2-3 over MAS alone. We will discuss increased INEPT transfer efficiency in the presence of homonuclear decoupling sequence. We will also present the direct dimension linewidth using decoupling sequences and discuss the RF inhomogeneity affecting the linewidth.

Friday, Apr 26th 2024

14:30 Hrs (Tea / Coffee 14:15 Hrs)

Seminar Hall, TIFR-H