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

# Seminar

## Comparison between Magnus and Fer expansion schemes in solid-state NMR

## Kshama Sharma

### TCIS, Hyderabad

With the increasing complexity of NMR techniques, especially in solid-state, it has become necessary to revisit the underlying principles for examining the effects of complex time-dependent spin interactions on NMR observables. The time-dependence in solid-state NMR is introduced by two distinct mechanisms, magic-angle spinning (MAS), and radio-frequency (RF) pulse irradiation. In solid-state NMR under MAS, multiple time dependencies are quite common and appear in the description of many experiments. Theoretical treatments are needed to obtain time-independent Hamiltonians during the perturbations caused by radio-frequency and MAS. This becomes really important in designing pulse sequences. The two commonly used methods for obtaining time-independent effective Hamiltonian are average Hamiltonian theory based on Magnus expansion and Floquet theory based on van Vleck perturbation. Recently, Fer expansion has gained attention as it has several unique features.

Here, in this thesis, we revisit the two theoretical frameworks of average Hamiltonian theory (AHT) and Fer expansion, which are valuable tools for the analysis of spin dynamics under the effect of RF pulses. We present the results of each of these in practical cases. The differences and similarities between both the expansion schemes are highlighted.

***Wednesday, Oct 31st 2018***

***4:00 PM (Tea/Coffee at 3:30 PM)***

***Auditorium, TIFR-H***