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

Seminar

Development of magic-angle-spinning solid-state NMR methods for the study of protein structure and dynamics

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Nuclear magnetic resonance (NMR) spectroscopy is a unique method for studying the structure and dynamics of proteins. Solid-state NMR, in particular, provides a way to study proteins such as fibrils, membrane proteins, and large protein complexes which do not undergo fast rotational diffusion in their native state. However, low sensitivity and resolution limits its application to biomolecules. This results in long experimental times to acquire multidimensional data with improved signal-to-noise and resolution. In this talk, I will address two problems: (a) the need to speed up data acquisition for experiments and (b) adapting experiments to obtain information on protein dynamics at the magic-angle-spinning frequency of 100 kHz. In (a), it will be shown that it is possible to combine experiments used to obtain distance restraints/information on dynamics with experiments that give chemical-shift assignments, resulting in significant time savings without drawbacks usually associated with such strategies. In (b), we will show how the Rotational-echo Double Resonance (REDOR) experiment can be adapted to give information on dynamics in non-deuterated proteins at the MAS frequency of 100 kHz. This paves the way to study site-specific dynamics in such systems directly, taking advantage of the high resolution provided by these fast MAS frequencies. Application of both these strategies to study dynamics in membrane proteins and polymeric protein complexes will be anticipated.

Friday, Sep 29th 2023

9:30 AM (Tea / Coffee 9.15 AM)

Auditorium, TIFR-H