

## **Seminar**

### **Fast methods for biomolecular NMR spectroscopy at increasingly faster magic-angle spinning frequencies**

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In spite of the potential to address many challenging questions in biophysical sciences, solid-state NMR spectroscopy is often limited by the long time it takes to record the relevant experiments. These problems are exacerbated for membrane proteins, a primary focus of my lab, due to their inherent poor resolution and sensitivity. Techniques based on fast magic-angle spinning (MAS) frequencies are promising against some of these problems, but often come with challenges of their own. In this talk I will discuss two aspects of our work that will further the application of fast MAS, especially in the case of challenging biomolecular studies. The first of these is the development of techniques based on multiple sequential acquisition of NMR experiments that will result in time savings of as much as 70% without compromising on resolution or changing the type of the experiment that is acquired. These strategies hold immense promise, especially at fast MAS frequencies as the number and the type of experiments that can be combined under these conditions is exponentially higher than those at slow-moderate MAS frequencies. I will show a strategy where as many as eight experiments can be combined into one, and this single experiment can be used to obtain assignments. The second aspect of our work deals with the development of techniques that will allow us to determine dynamics in proteins under these conditions. This, in general, requires the use of pulse sequences which recouple anisotropic interactions that contain information on structure and dynamics. The most robust of these sequences are challenging to apply at fast MAS frequencies due to their requirement of high radiofrequency amplitudes. I will discuss strategies that have allowed us to adapt sequences based on rotational echoes - REDOR, DIPSHIFT and TEDOR to fast MAS frequencies. Together, these two strategies will enable a fast acquisition of a multitude of experiments for biomolecular applications.

***Thursday, Apr 18<sup>th</sup> 2019***

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

***Seminar Hall, TIFR-H***