

MONDAY

COLLOQUIUM

Understanding conformational dynamics in biomolecules using solid-state NMR

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15 Jun 2026 (Monday) | 16:00 Hrs (Tea / Coffee 15:45 Hrs) | Venue: TIFRH Auditorium

Solid-state NMR has matured over the past two decades into a technique that can decipher the structure and dynamics at the atomic level in molecules in their native state. This is especially important for the study of biomolecules that form large, extended structures, such as membrane proteins and filaments, which cannot be studied using solution NMR, the other technique that can access similar information. The development of fast (>60 kHz) magic-angle-spinning (MAS) techniques has in particular expanded the scope of biomolecules that can be tackled using NMR by allowing high-resolution experiments to be done on significantly smaller amounts of samples than was previously possible. Nevertheless, there are several challenges in adapting experiments designed for slow-moderate MAS frequencies (20 kHz and lower) to these fast spinning conditions. In this colloquium, I will discuss approaches we have developed over the past few years to address these problems. Two major themes will be discussed: (a) the development of experiments that allow the determination of large amplitude dynamics, and (b) experimental approaches that enable one to achieve site-specific resolution beyond what MAS can achieve by itself. These developments are demonstrated using experiments on microcrystalline as well as filamentous proteins, anticipating a wider application of these methods to complex biomolecular assemblies.