

Seminar

Deciphering Protein-Adjuvant Interactions in Vaccines: Insights from DNP-Enhanced Solid-State NMR

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Dynamic Nuclear Polarisation (DNP) enhanced solid-state NMR can probe the structure of biomolecules and the interface between ABAs and adsorbed antigens, offering molecular-level insights. Aluminum-based adjuvants (ABAs) are widely used in vaccines and play a critical role to enhance immune response. However the physicochemical interactions of adsorbed antigens are not fully understood, their nature and strength directly influences antigen release and vaccine immunogenicity. In this study, DNP enhanced correlation experiments are used to probe the adsorption of antigen onto the ABAs. To further boost the sensitivity in biomolecules, we demonstrate that proton-detected DNP experiments can be performed at cryogenic temperatures. Using extensive deuteration, selective $^{13}\text{CHD}_2$ methyl labelling, and 0.7 mm rotors spinning at 60 kHz, we obtain resolved DNP-enhanced two-dimensional ^1H - ^1H methyl correlation spectra of SH3. [1]

Reference:

[1] J. Tolchard $\pm$, T. L. Marchand $\pm$, N. E. Mammeri $\pm$, **K. Sharma $\pm$** , A. K. Bishoyi, M. Berbon, K. Jaudzems, D. Wisser, A. Daskalov, S. J. Saupe, J. Stanek, Z. Sun, O. Ouari, B. Habenstein, A. Lesage, G. Pintacuda, A. Loquet, Preserving proton resolution under cryogenic Dynamic Nuclear Polarisation for biomolecular solid-state NMR, *Angew. Chem. Int. Ed.* 2026, e3761769 $\pm$: Equal Contribution

Thursday, Sep 24th 2026

16:00 Hrs (Tea / Coffee 15:45 Hrs)

Seminar Hall, TIFRH