"Proton-Detected Solid-State NMR Studies of the ABC-Transporter ArtMP"

The activity of membrane proteins is strongly dependent on the makeup of the lipid membrane they reside in, making it important to study them in their native setting. Solid state NMR has demonstrated over the last decade the ability to investigate, at atomic resolution, the interactions and effects of a lipid bilayer on membrane proteins. One reason for these successes is proton detection, due to the increased sensitivity the higher gyromagnetic ratio of \(^1\)H relative to \(^{13}\)C and \(^{15}\)N provides. However, this higher gyromagnetic ratio also leads to strong \(^1\)H-\(^1\)H couplings in solid samples, resulting in broad lines. To combat this, a combination of labeling techniques featuring protein deuteration followed by reexchange at labile sites and advances in fast magic-angle spinning were needed. Proton detected results on triply labeled samples of the ABC transporter ArtMP in native lipids will be presented. These experiments provided insight into the transport cycle in the active protein complex. Optimal conditions for proton detection will also be discussed, as well as the relative benefits and tradeoffs of 40 and 60 kHz MAS.