A METHOD FOR DYNAMIC NUCLEAR POLARIZATION ENHANCEMENT OF MEMBRANE PROTEINS

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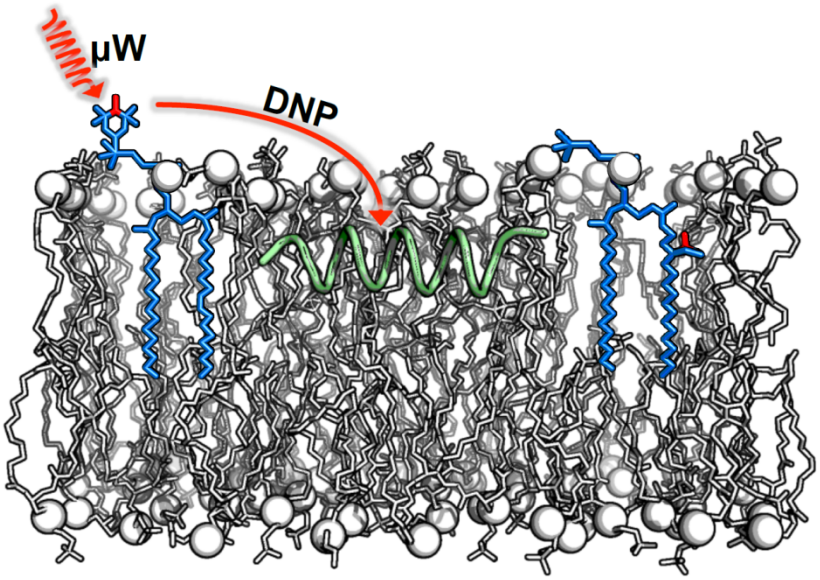
Dynamic nuclear polarization (DNP) as a means to enhance NMR sensitivity has made significant strides in the past twenty five years, in particular due to the development of hardware and sample preparation strategies which have demonstrated its promise. The advent of commercially available stable, high power microwaves and auxiliary hardware compatible with high field NMR and MRI instruments have led to the transition of DNP-based research from proof of principle experiments to applications enabling spectroscopic elucidation of samples previously beyond the reach of NMR. Nonetheless, incorporating and optimizing DNP strategies in the various arenas of nuclear magnetic resonance applications remains a significant undertaking. The NSF-funded National High Magnetic Field Laboratory (NHMFL), which serves as a resource to the NMR community through its user facility as well as its technology development initiatives, has identified the establishment of a DNP user program as a major area of focus. I will present developments to date of a DNP user facility and, in particular, a DNP-enhanced MAS ssNMR system at 14.1 T and 100 K for solids applications. I will also describe unique instrumentation developed to enable mechanistic studies of DNP. My talk will focus on our use of a quasioptical table for gating of microwaves within the MAS ssNMR experiments and various samples preparation strategies for membrane protein samples.



Acknowledgements
Funding for this work provided by the U.S. National Science Foundation and the University of Florida

References

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