Cross Polarization at 111kHz MAS in a 1 GHz Magnet

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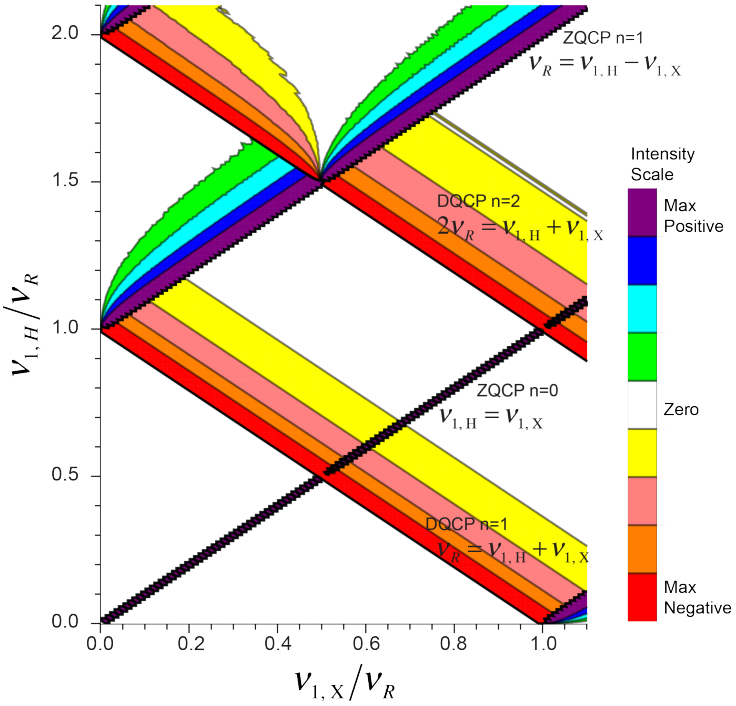
Cross Polarization (CP) is critical for acquiring spectra of low γ nuclei in the solid state.[1] Ultra-fast Magic Angle Spinning (UFMAS, MAS spinning frequencies > 60 kHz) has been shown not to significantly interfere with CP, and allow the use of Double Quantum Cross Polarization (DQCP) as well as the more typical Zero Quantum CP (ZQCP) available at lower spinning frequencies.[2,3] In this poster, we examine the efficiency of CP at even greater spinning frequencies (111 kHz) and stronger magnetic field strengths (1 GHz ^{1}H Larmor frequency). We map the conditions for ^{1}H ^{13}C, ^{1}H ^{15}N, and ^{13}C ^{15}N CP, and examine the effects of rf inhomogeneity and effective fields. We show that CPMAS is still effective at these high field strength and ultrafast MAS frequencies, but the effects of rf-inhomogeneity are significant.



Experimental ^{1}H ^{13}C cross polarization map at 1 GHz 1H Larmor frequency and 111 kHz MAS.

[1]A. Pines, M. G. Gibby, J. S. Waugh. "Proton-enhanced NMR of dilute spins in solids." **J. Chem. Phys. 59** (1973) 569-590.

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[3]S. Laage, J. R. Sachleben, S. Steuernagel, R. Pierattelli, G. Pintacuda, L. Emsley. "Fast acquisition of multi-dimensional spectra in solid-state NMR enabled by ultra-fast MAS." **J. Magn. Reson.** 196 (2009) 133-141.