

Abstract Submitted  
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**From Large to Small Spin Systems: Exploring Many-body Effects in NMR** YANQUN DONG, Department of Physics, Yale University, DALE LI, Department of Physics, Yale University, RONA RAMOS, Department of Physics, Yale University, SEAN BARRETT, Department of Physics, Yale University — NMR multi-pulse spin echo measurements on different nuclei and different samples show a dramatic Pulse Sequence Sensitivity (PSS): the multiple pi-pulse echo trains may either freeze out or accelerate the dipolar decay of the signal depending upon pi pulse phase. Finite-pulse spin simulations on small spin systems (7 spins) also show a tiny PSS. We propose that the dramatic PSS in experiments may be due to many-body effects during the finite pi pulses. If this is the case, the PSS should be less in small spin systems. This idea can be tested by performing spin echo experiments on small spin systems. The liquid crystal 5CB has a nematic phase, which enables the molecules to act like isolated spins systems in NMR. Since each molecule has 19  $^1\text{H}$  spins, this is an attractive system for our test. I will present experimental results on 5CB, and discuss their implication on our model.

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