Coherent Response Signals of Dipolar-coupled Spin Systems

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Recently, it has been demonstrated that long pulses of a weak radio-frequency field can generate long-lived coherent NMR signals in bulk liquid crystals, which are systems of dipolar-coupled spins with unresolved conventional spectra. Here we describe this phenomenon in more detail and present results of new experimental investigations and computer simulations. It is shown that such response signals can also be excited when the initial spin state of a system corresponds to dipolar ordering. In addition, results of the application of weak pulses on liquid crystalline systems with heteronuclear dipolar couplings are presented, and the role of overlapping peaks is explored.

Key words: Spin System; NMR; Coherent Response; Dipolar Coupling.