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On the theory of double quantum NMR in polymer systems: The second cumulant approximation for many spin i = 1/2 systems

Fatkullin N., Mattea C., Stapf S.
Kazan Federal University, 420008, Kremlevskaya 18, Kazan, Russia

Abstract

General analytical expressions for Double Quantum Nuclear Magnetic Resonance (DQ NMR) kinetic curves of many-spin I = 1/2 systems are derived with an accuracy of the second cumulant approximation. The expressions obtained exactly describe the initial part of the kinetic curves and provide a reasonable approximation up to times of about the effective spin-relaxation time. For the case when the system contains two isolated spins, this result exactly reproduces known expressions. In the case of polymer melts, the intermolecular magnetic dipole-dipole interactions significantly influence the time dependence of the DQ NMR kinetic curves. © 2013 AIP Publishing LLC.

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