**ATTENUATION OF THE NMR SIGNAL DUE TO BROWNIAN MOTION WITH MEMORY**

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It is shown that the known expressions for the attenuation function *S*(*t*) of the NMR signal due to stochastic motion of spins are not appropriate for the interpretation of experiments, in which the spins undergo a non-Markovian Brownian motion. We have calculated *S*(*t*) by the accumulation of the phase shifts in the rotating frame through the changes of the displacements of spin-bearing particles in a magnetic-field gradient. The found *S*(*t*) is applicable for the stationary stochastic motion of spins, including their dynamics with memory. The familiar formulas for normal diffusion are obtained as a special case within the long-time approximation. The method is applied for the description of the Hahn spin-echo experiments with steady and pulsed field gradients. The damping of the NMR signal is also evaluated providing that at long times the diffusion is anomalous and when the random motion of particles is modeled by the generalized Langevin equation with the memory kernel exponentially decaying in time.

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