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Forces on spins in a field gradient: apparent spin relaxation

YULIN CHANG, MARK CONRADI, Washington University — A magnetic field gradient exerts opposite forces on spin magnetic moments oriented up and down. The result is to partially segregate spins by orientation, with more spins-up at one end of the sample and more spins-down at the other. This apparent relaxation, involving only sorting and no flipping of spins, may be dominant in systems of high diffusivity and long T_1 . The sorting mechanism competes with a well-known distinct, true T_1 mechanism driven by diffusion through field gradients. The results of our calculations and numerical solutions of the Bloch-Torrey equations, modified to include the force term, will be presented in detail.

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