

Cumulative NMR stimulated echo in magnetic materials

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The results of the cumulative NMR stimulated echo phenomena study in lithium ferrite are presented. These echo signals are generated by the joint action of a train of weak writing radio-frequency pulses and exhibit the growth of intensity at increasing the number of exciting radio-frequency pulses rather than decay.

Similar effect was earlier observed for the case of cumulative stimulated photon echo.

Cumulative stimulated echo phenomenon was earlier observed for the photon echoes generated by a repeating two RF pulse sequence [1] and called as the cumulative two-pulse photon echoes. In this case also a train of echoes, generated by a repeating two-pulse sequence, exhibits a growth rather than damping. This method was further developed in [2] where it was realized other mode of cumulative long-lived optical echo generation—cumulative stimulated photon echo (CSPE). This method could be useful also in NMR and NQR allowing one to improve sensitivity of these techniques and, in particular, it could be used to improve sensitivity for the remote detection of explosives using NQR [3].

For experimental observation of three-pulse NMR cumulative stimulated echo (CSE) signals we used lithium ferrite due to its long spin-lattice relaxation times as compared with other magnets [4].

In work [5] we reported other type of cumulative spin-echo phenomenon a so-called cumulative NMR single-pulse echo effect in cobalt. The aim of this work is to study two types of cumulative stimulated NMR echo signals which are generated following the action of a train of RF pulses in lithium ferrite.

References

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