ABSTRACTS

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DIPOLAR ECHOES IN SOLIDS AND MOLECULAR MOBILITY

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The "solid-echo" technique $90^0_Y - \tau - 90^0_X - Acq(t)$, proposed by Powles, Mansfield and Strange [1,2] is a powerful NMR method for studying molecular structure and dynamics in solid state. In this communicate we consider the general "solid-echo" technique: $\alpha^0_Y - \tau - 90^0_X - Acq(t)$. The first RF pulse is the hard pulse α^0_Y, for which rotational angle of the RF pulse $\alpha = (2n+1)\cdot(\pi/2)$ $(n = 1,2,3,\ldots)$. The RF field of this pulse lies along the OY -axis in the rotating frame. The second RF pulse is the hard 90^0_X pulse. It has been shown that at $M_2\tau_c^2 >> 1$ (the case of rigid lattice) and at $M_2\tau_c^2 << 1$ (the case of motional narrowed NMR line) the maximum of echo signal is observed at $t_e = 2\tau + t_2 - t_1/2$ (Fig.1). Here t_i ($i = 1,2$) are the widths of the RF pulses. The times t_e and τ are measured from the beginning of the first pulse.

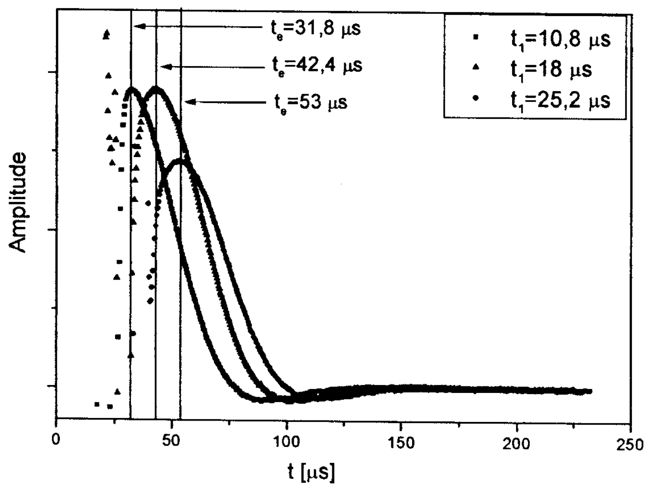

Fig.1. The dipolar echoes in NH_4Cl at the room temperature for the pulse sequences: $270^0_Y - \tau - 90^0_X - Acq(t)$, $450^0_Y - \tau - 90^0_X - Acq(t)$, $630^0_Y - \tau - 90^0_X - Acq(t)$. $t_2 = 3.6\mu s$; $\tau - t_1 = 5.8\mu s$.

It has been shown that in the slow-motion region ($M_2\tau_c^2 \approx 1$) the amplitude of echo signal is reduced and the maximum of echo is shifted to the end of the second pulse. A comparison of the developed theory with experimental results demonstrates a good agreement between them.

[1] J.G.Powles, P.Masfield, *Phys.Rev.Lett.* **2**, 58 (1962).
[2] J.G.Powles, J.H.Strange, *Proc.Phys.Soc.* **82**, 7 (1963).