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NMR ARTIFACTS CAUSED BY DECOUPLING OF MULTIPLE-SPIN COHERENCES: APPLICATION TO SLAP EXPERIMENT

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The original SLAP experiment [1] detects signed values of small carbon-carbon couplings in natural abundance samples. To improve suppression of parent signals in the SLAP spectrum or to shorten the phase cycle a modified phase cycling schemes were proposed [2-4]. Most of these phase cycles do not incorporate carbon-carbon double-quantum filter for sensitivity reasons.

When we tried to apply the SLAP experiment without carbon-carbon double-quantum filter we frequently got parent signals so strong that the measured signals were more or less obscured. This was strange because due to a better phase performance on modern NMR spectrometers a better parent signal suppression was expected.

Search for the source of this effect revealed that contrary to the common expectations almost any coherence containing C_x or C_y component could give noticeable NMR signal during acquisition under broadband decoupling conditions. Examples of such coherences are, e.g., $H_x C_x$, $H_y C_x$, $H_z C_x$ or any multiple products of proton operators multiplied by C_x or C_y . These findings lead to new design of SLAP pulse sequence which considerably improves suppression of parent peaks. The new experiment results will be presented.

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References

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