Jul 30, 2025 Version 2

DEPTH V.2

In 1 collection

DOI
https://dx.doi.org/10.17504/protocols.io.bp2l62xb1gqe/v2

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DOI: https://dx.doi.org/10.17504/protocols.io.bp2l62xb1gqe/v2

Protocol Citation: Alexander L. Paterson 2025. DEPTH. **protocols.io** https://dx.doi.org/10.17504/protocols.io.bp2l62xb1gqe/v2Version created by **NMRFAM Facility**

Protocol status: Working
We use this protocol and it's working

Created: May 30, 2025

Last Modified: July 30, 2025

Protocol Integer ID: 219200

Keywords: Background Suppression via Depth Pulses, direct polarization experiments on nuclei, background signals via the depth composite pulse, direct polarization experiment, depth composite pulse, quadrupolar nuclei, b1 field of the probe, nuclei, utilities for quadrupolar nuclei, spectrum, probe, significant background signal, probe material, intensities of the peak, peak, depth purpose, suppressing background signal

Funders Acknowledgements:
National Science Foundation
Grant ID: 1946970

Abstract

Purpose
To acquire a spectrum while suppressing background signals via the depth composite pulse.

Scope
This sequence is intended for direct polarization experiments on nuclei with significant background signals arising from probe materials, e.g., ^{1}H, ^{19}F, ^{13}C, ^{29}Si, ^{11}B, among others. It will be most effective in spin-1/2 systems, and may have limited utilities for quadrupolar nuclei such as ^{11}B. If the B_1 field of the probe is not sufficiently homogeneous, this sequence can have an effect on the relative integrated intensities of the peaks in the spectrum.

Guidelines

Depth pulses will typically result in reduced sensitivity as compared to a conventional Bloch decay experiment. The exact reduction will depend on the B_1 homogeneity of the probe being used.

Materials

Definitions:

1. B_1: Applied magnetic field
2. T_1: Spin-lattice relaxation time constant

Before start

The user should be familiar with optimizing 90° pulses, power limits, and the probe duty cycle.

Expected amount of time SOP will use: 1 hour or less

Procedure

1 Set the 90° pulse length, **p1**, and pulse power, **plw1**, to previously optimized values.

2 Set the recycle delay, **d1**, to either 1.3 × T_1 for optimal sensitivity or 5 × T_1 for accurate relative quantitation.

3 If heteronuclear decoupling is required:

3.1 Set **zgoptns** to -Ddec.

3.2 Set the decoupling program, **cpdprg2**, and pulse length, **pcpd2**, to previously optimized values.

4 If presaturation is required:

4.1 Set **zgoptns** to -Dpresat.

4.2 Set the presaturation comb delay, **d20**, to a previously optimized value. This value will depend on the system and nucleus under investigation. For ^{1}H, 1 ms may be reasonable.

4.3 Set the number of presaturation pulses, **l20**, to a previously optimized value. A reasonable default value is 20.

5 Set the number of scans, **ns**, to a multiple of 16; this should be high enough to achieve adequate signal-to-noise ratio.

6 Acquire the spectrum.

Protocol references

Cory, D. G.; Ritchey, W. M. Suppression of signals from the probe in Bloch decay spectra. Journal of Magnetic Resonance (1969) 1988, 80 (1), 128-132. DOI: 10.1016/0022-2364(88)90064-9.

Protocol

NAME

Saturation Recovery with Half-Echo Acquisition

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Preview

Example Data at 1.1 GHz: usnan.org/ark:/83454/e1579bc8d0-2578-4bab-823b-af67ed790fc5
Example Data at 900 MHz: usnan.org/ark:/83454/e121391eba-856d-4f55-9c57-d12bf20acd09
Example Data at 600 MHz: usnan.org/ark:/83454/e1e3628846-54b8-42d7-901e-cade3f72a037