Testing new version of fsNMR VI and its reviewer

The new version fsNMR program and Reviewer have been tested on the cold PD since Monday. Some unfortunate (random) events caused a little setback for the room temperature tests (fortunately, it's not permanent). Here is a quick summary.

The reviewer, see in Picture 1, works well, which is easy to use and clear to understand. Detailed test will be done in the future (as time goes on).

The fsNMR VI tests with different magnetic field settings, with or without background subtraction, are shown in Picture 2 to Picture 5.

The issues with (1.) the color of phase history plot being white, and (2.) raw phase difference vs. scaled difference were fixed, and the new plot worked well.

The issues of X and Y plots showing artificial singularities still remain---mainly because my suggestions of fix in my email attachment (at the very end), on Aug 2, 2020, were unclear. We knew the singularities on X and Y plots were caused by my original request of new trace divided by the X and Y curves (they do cross zero) for rescaling data. The correct way rescaling should be divided by the Background Amplitude curve, R_{bkgd}, and multiply the Background Maximum, $R0_{bkgd}$. The phase can be corrected offline, as needed.

$$S_X = \mathrm{X}\frac{R0_{bkgd}}{R_{bkgd}} - X_{bkgd}\frac{R0_{bkgd}}{R_{bkgd}} = \frac{\mathrm{X}-X_{bkgd}}{R_{bkgd}} R0_{bkgd} COS(\Phi - \Phi 0) \qquad (1)$$

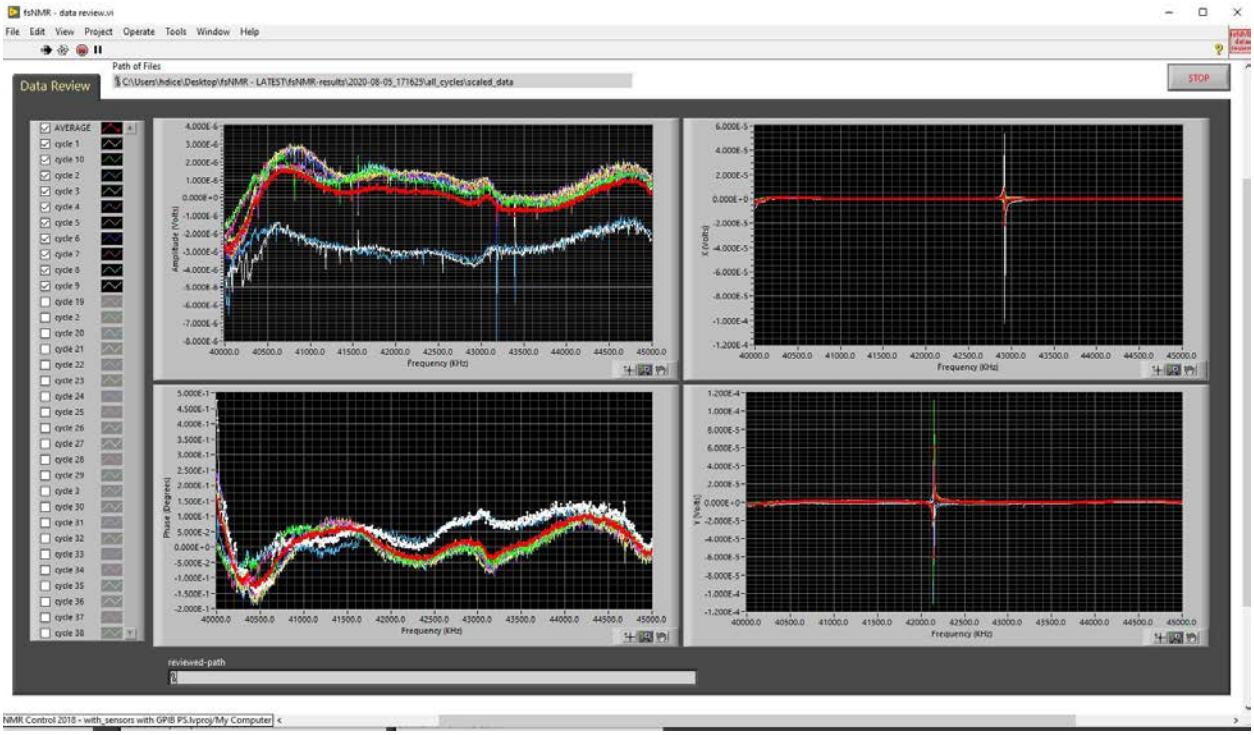
$$S_Y = \mathrm{Y}\frac{R0_{bkgd}}{R_{bkgd}} - Y_{bkgd}\frac{R0_{bkgd}}{R_{bkgd}} = \frac{\mathrm{Y}-Y_{bkgd}}{R_{bkgd}} R0_{bkgd} SIN(\Phi - \Phi 0) \qquad (2)$$

Where $R0_{bkgd}$, R_{bkgd}, Φ and $\Phi 0$ are the maximum of R, the R curve, phase, and phase at R0, respectively.

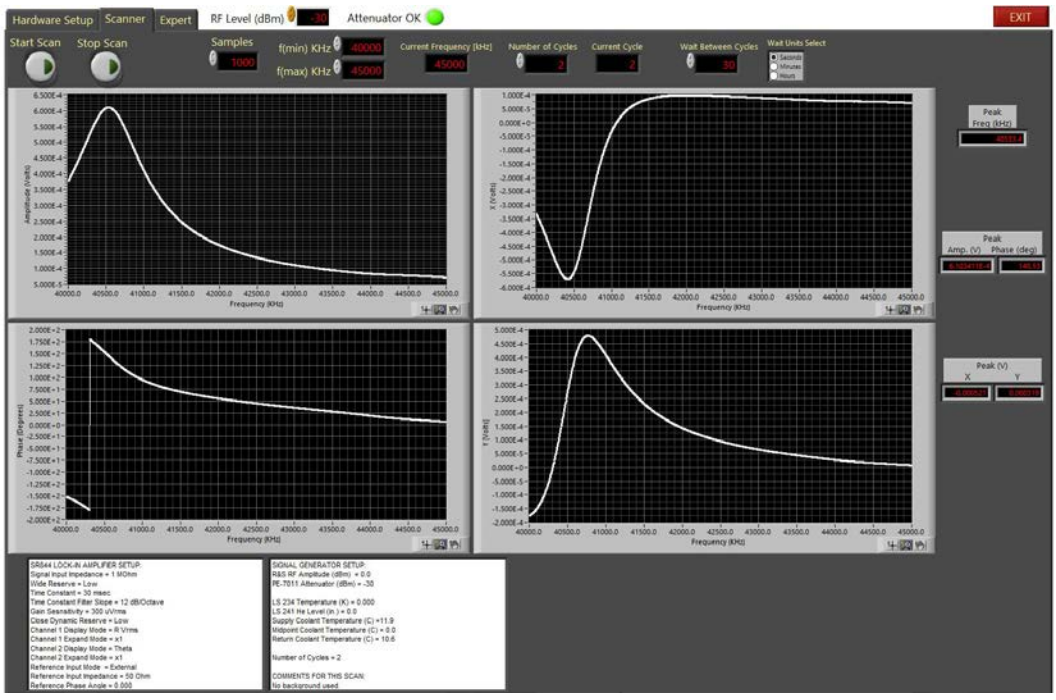
Please MODIFY the fsNMR VI by rescaling X and Y signals, S_X and S_Y, with equations (1) and (2).

The sample plots of X and Y is attached as Picture 6.

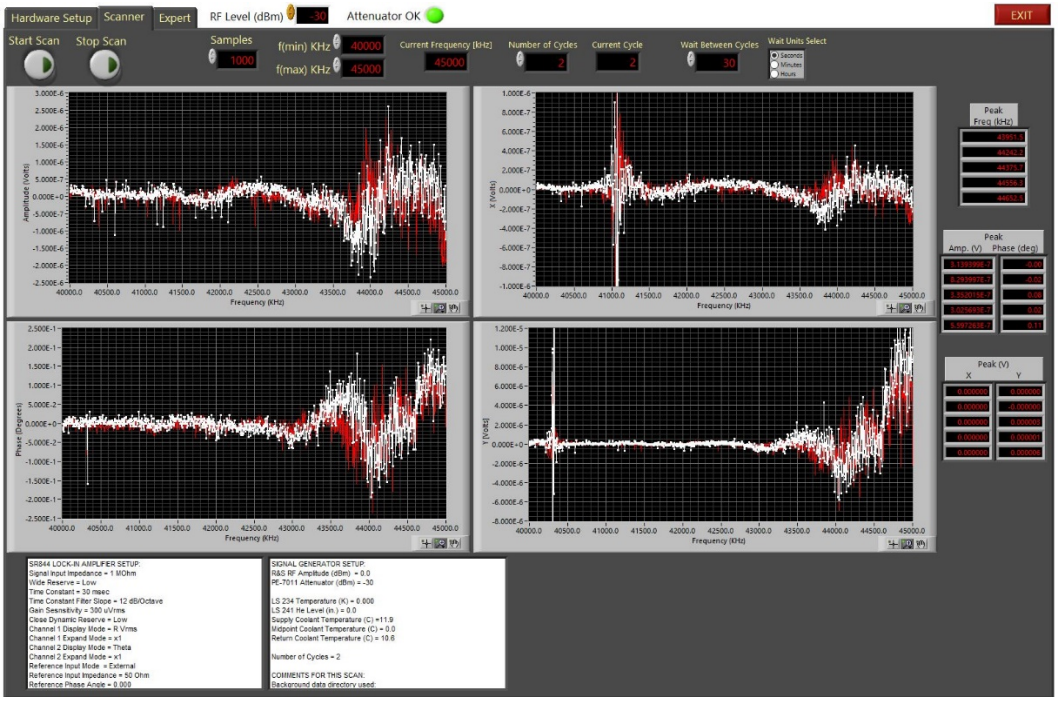
Some traces were destroyed by property personnel naively pulled out the lock-in amplifier by ~1", WHILE IT'S RUNNING, to check the property tag without consulting the HDice people. The real consequence is that the RF response curve changed permanently due to the bending of connection cables on the amplifier. So the data taken before and after the event are now UNRELATED.



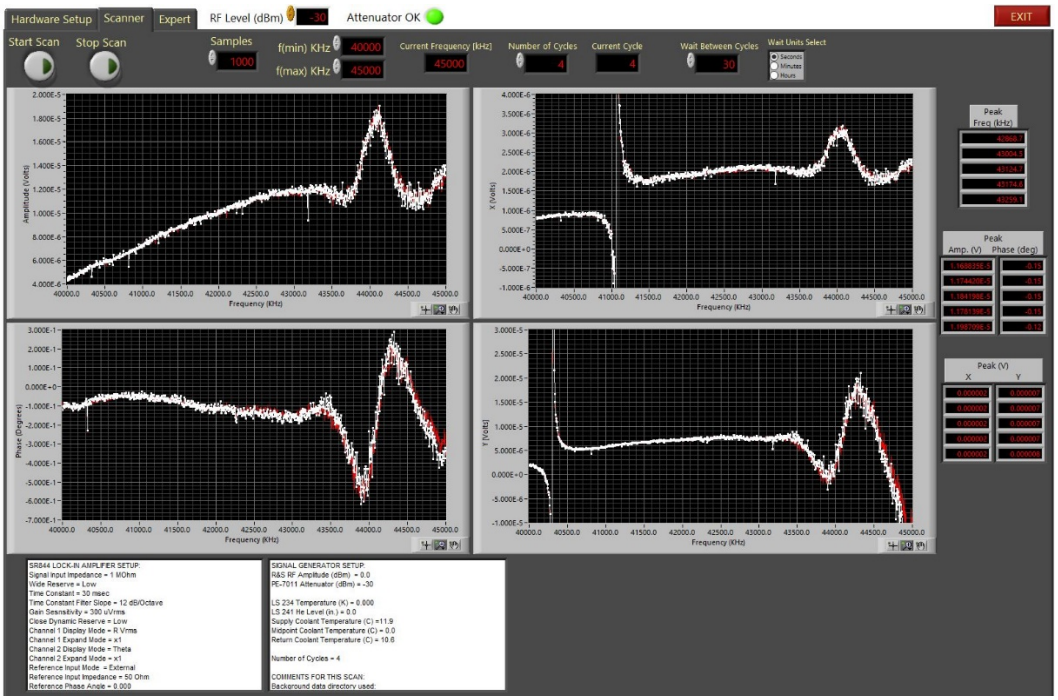
Picture 1. Reviewer test.



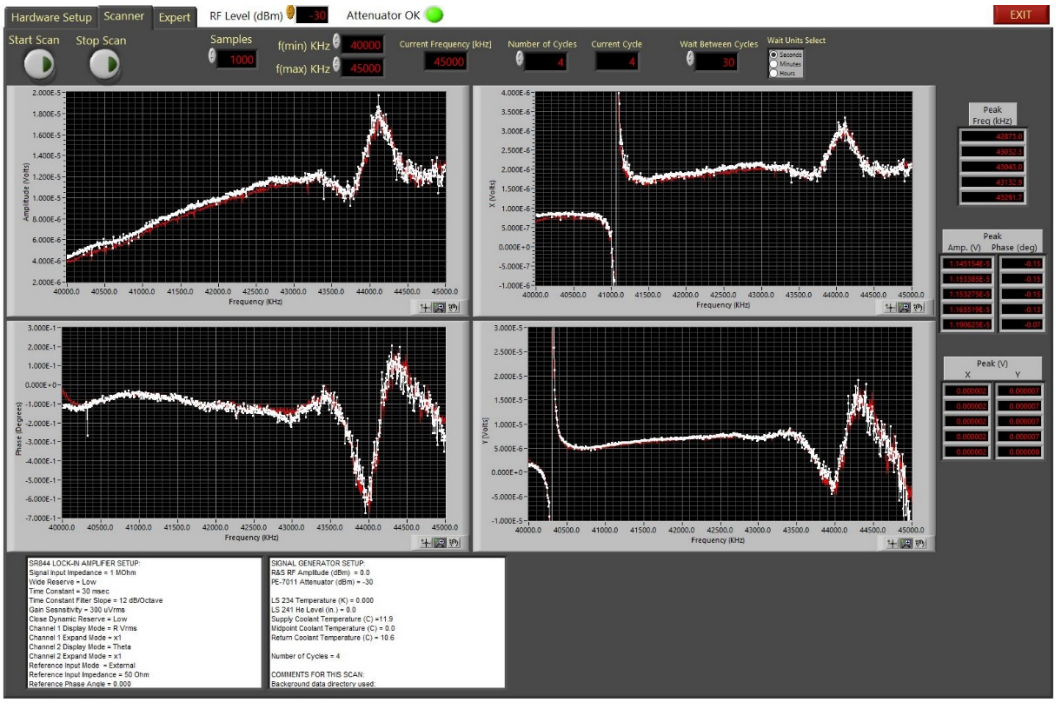
Picture 2. Background traces with cold PD at B=0.0000T.



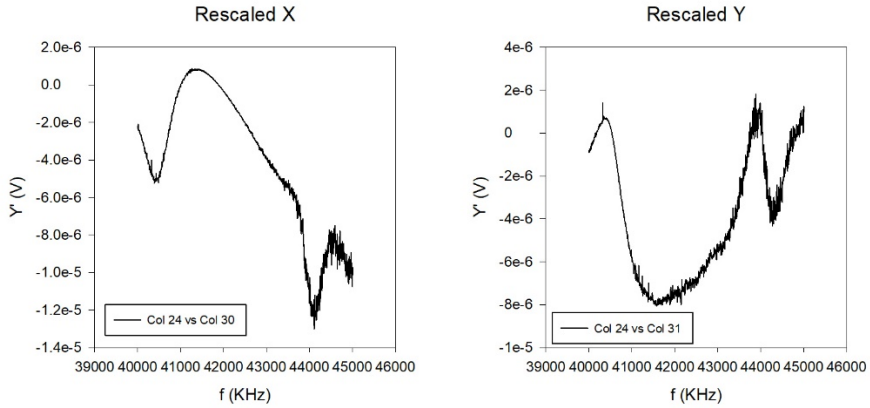
Picture 3. Background-removed traces with cold PD at B=0.0000T.



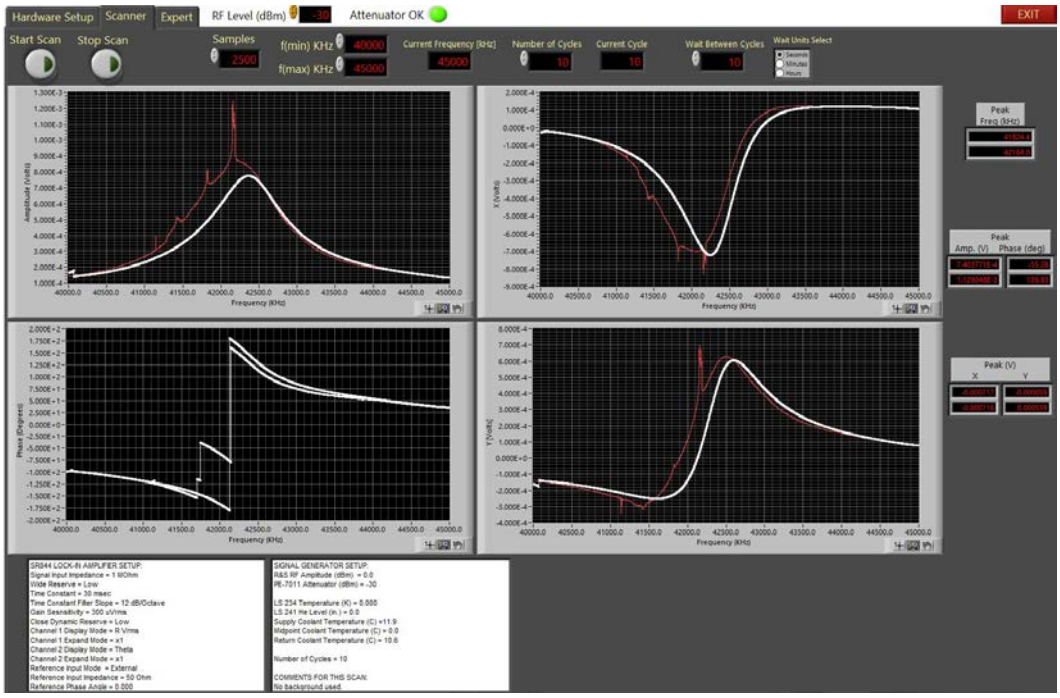
Picture 4. Background-removed traces with cold PD at B=1.0094T.



Picture 5. Background-removed traces with cold PD at B=1.0610T.



Picture 6. X and Y plots, rescaled with equation (1) and (2).



Picture 7. Partially destroyed background traces with cold PD at B=0.0000T.