Some results from testing fsNMR program V2

The fsNMR_V2 was tested last week. A 50-sweep run was used for checking the results. To simulating the NMR signal, sweep #50 and sweep #1 (taken 10 hours apart) were used as "Signal" and "Background", respectively.

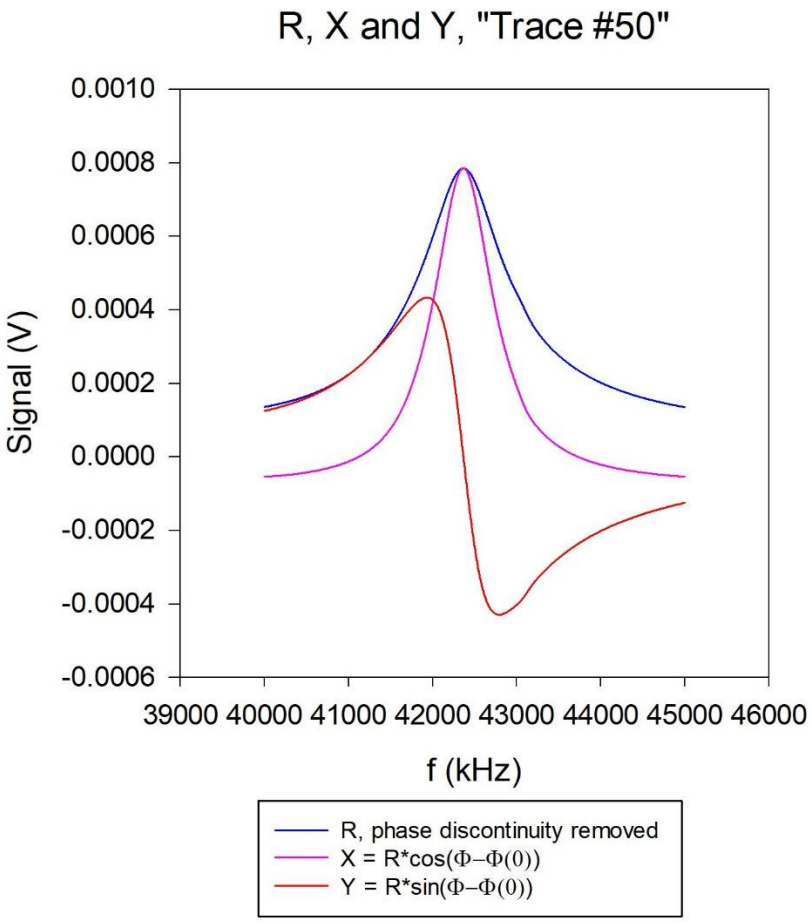

Figure 1. The Row amplitude of R channel and phase corrected X and Y channels of "trace #50" were plotted as the background. The phase offset, $\Phi(0)$, was determined from fitting the Q-curve.

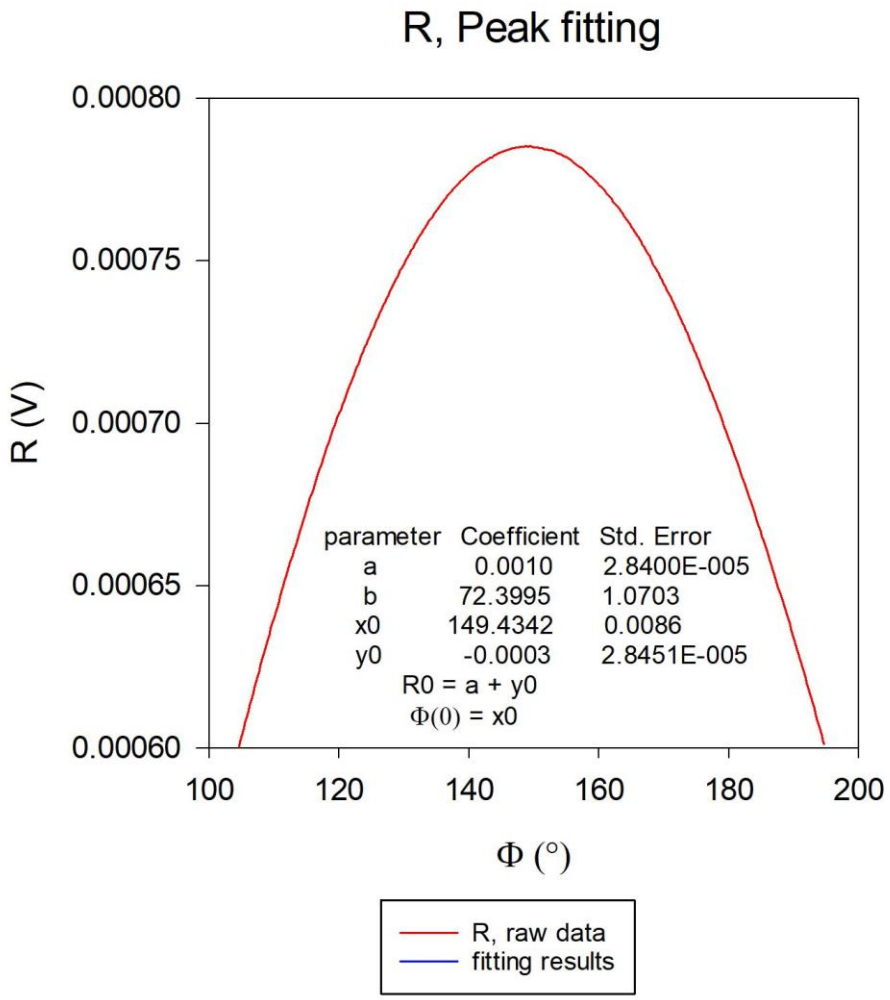

Figure 2. Curve fitting results. Using the data near the peak to obtain the resonance amplitude R0 and $\Phi(0)$. $R0 = a + y0, \Phi(0) = x0$

(For the online analysis, one can use either peak values (RMAX, Φ(0)) or, if the curve is monotonic, just R_{MAX} and Φ(at R_{MAX}), to normalize the NMR signal.)

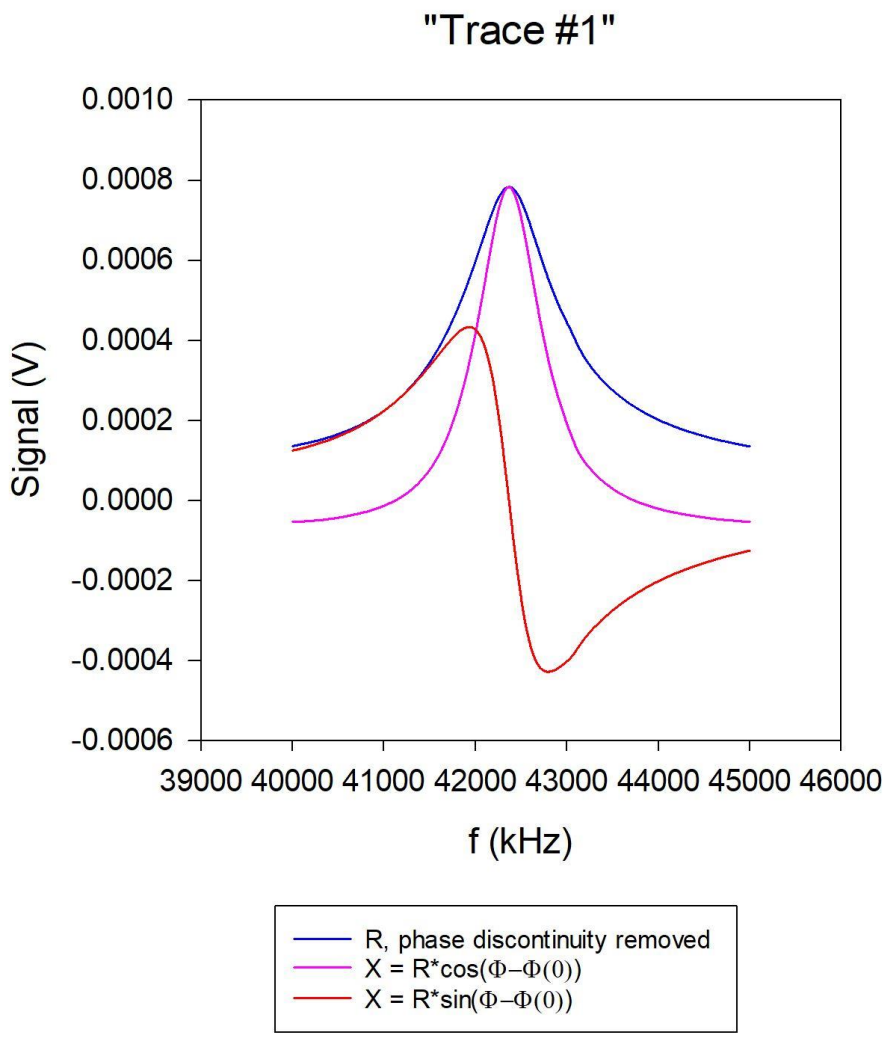

Figure 3. The “trace #1”, taken 10 hours earlier, was used to simulate the NMR signal. The room temperature changed enough to cause the change of coil-cable system impendence. The change of peak position and amplitude between the two sweeps was used as “the NMR signal”.

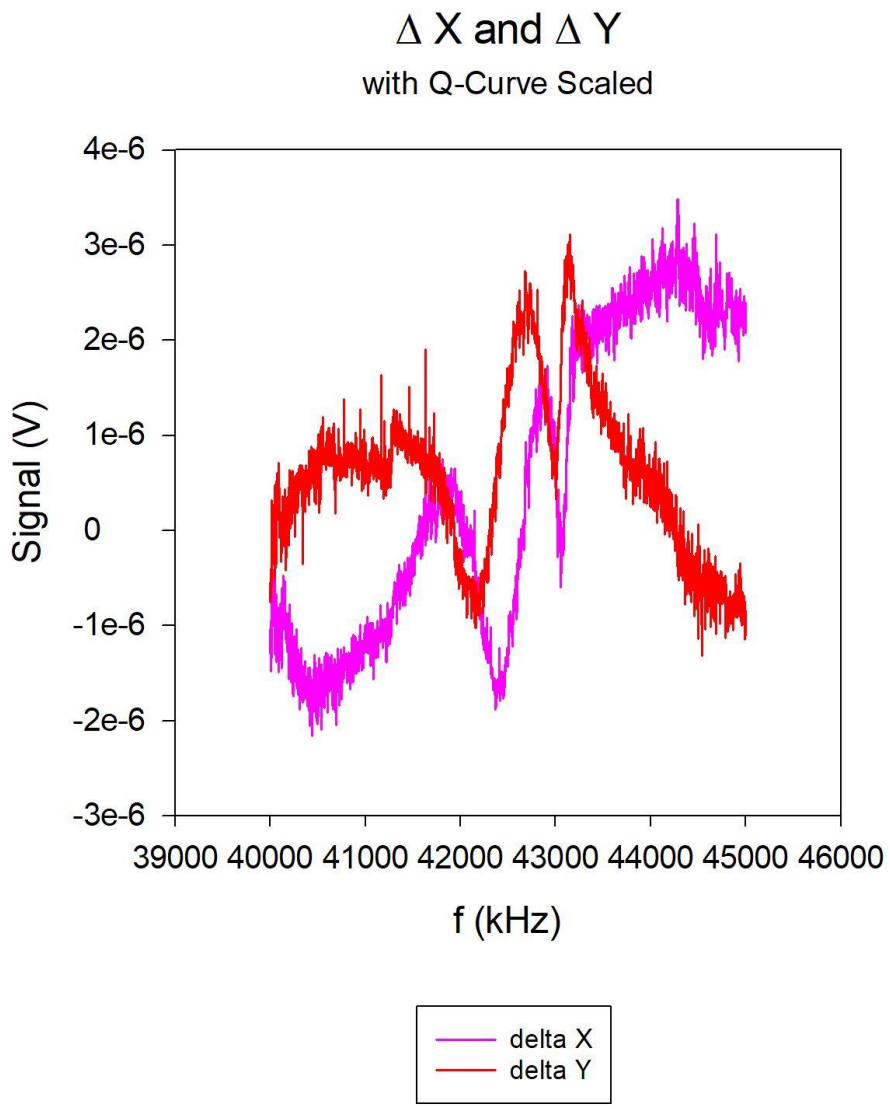

Figure 4. The X and Y "signals" were generated by comparing trace #1 and #50, then normalized to the background signal (trace #50).

$$S_X = \frac{X_1 - X_{bkgd}}{R_{bkgd}} R0_{bkgd}, \qquad S_Y = \frac{Y_1 - Y_{bkgd}}{R_{bkgd}} R0_{bkgd}.$$

The offline analysis will involve a lot of calibrations (RF cables, target temperatures and field, injection process, equipment conditions, dewar to dewar, ...) and lineshape analysis, etc. Many of them have to be done before and after the electron beams bombardment.