Lab 6 – Determining the Electron g-Factor via Electron Spin Resonance

Celine Ramirez

Example oscilloscope trace:

Figure 1 depicts an example oscilloscope trace of the Helmholtz current (orange) from channel one and the ESR peaks from channel 2 (blue line). The orange graph depicts the voltage through the Helmholtz coils that the probe is situated within. The ESR peaks occur when

$$\Delta U = g\mu_B B$$

We analyze the following graph by scaling it up, and placing two cursors at two ESR peaks, then finding the average voltage. There is a 1-1 relationship between the voltage and current. So, the same value but in Amperes can be used for our calculation of g.

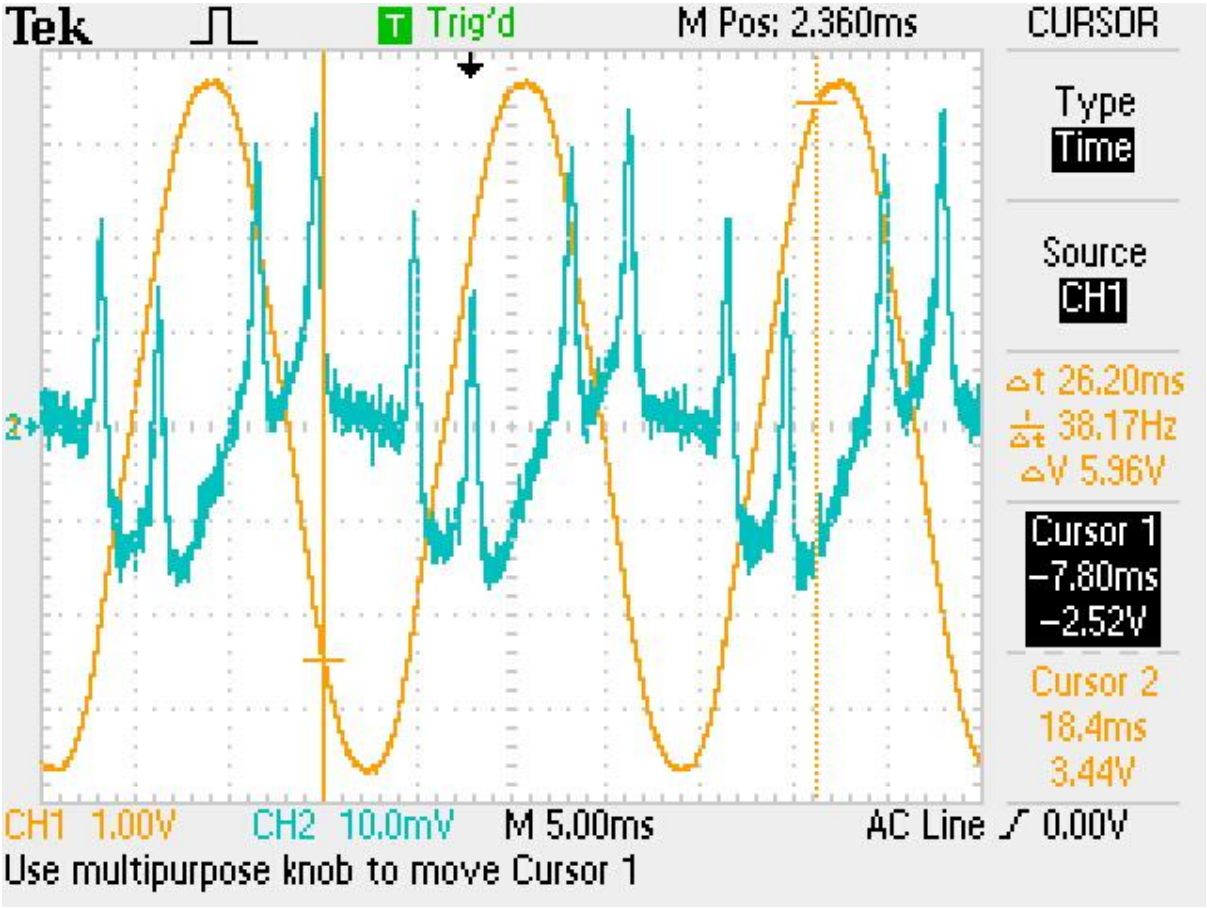

Figure 1: Oscilloscope trace of Helmholtz current and ESR peaks

Average current and calculated g-value data:

Average Current (Amps)	g-values
1.7	**2.00**
1.86	**1.88**

1.88	**1.97**
1.9	**2.00**
2.02	**1.95**
2.06	**1.95**

Table 1: Average current and g-value data

Average g-value = 1.95796

Accepted g-value = 2.0036

Standard error of g = 0.0182508

The average g-value is in close agreement with the accepted g-value.