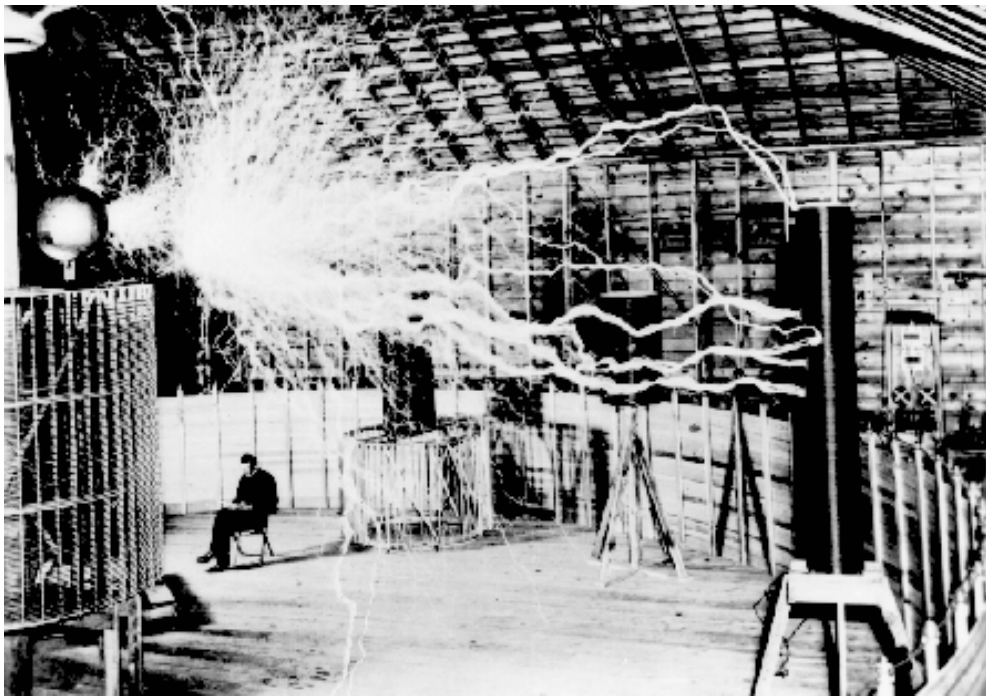


IDGAF

-Equipment Validation-

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Abstract:

We hope to measure altitudes effect on earth's magnetic field, and observe magnetic induction in a coil due to earth's natural magnetic field, compared to the theory of magnetic flux

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-Balloon Fest Validation-

Description of Experiment:

A coil passing through a magnetic field will generate current. Can we harness the earth's natural magnetic field to create a measurable current? Using an accurate measurement of Teslas we will then compare our data to the accepted value.

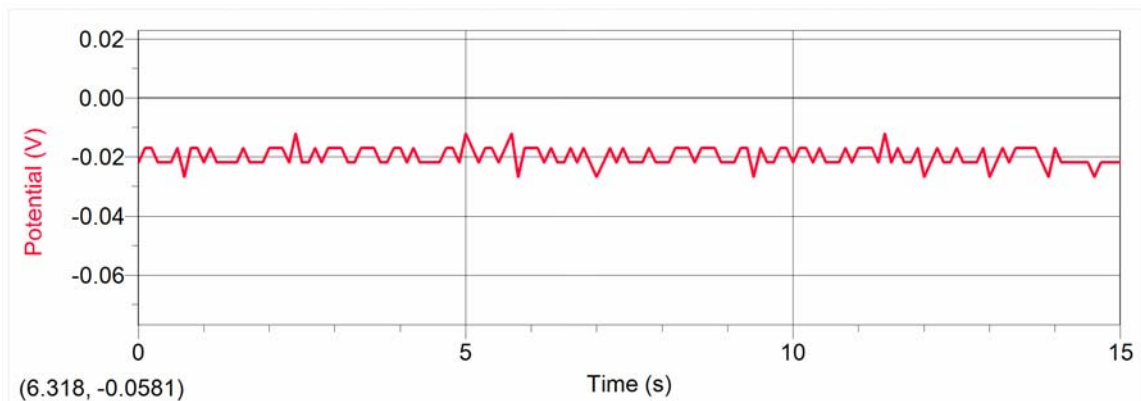
Equipment to be Tested:

We will use a many wind coil in conjunction with the logger pro portable data collector to make the measurements. The data will then be inputted into the computer for data analysis.

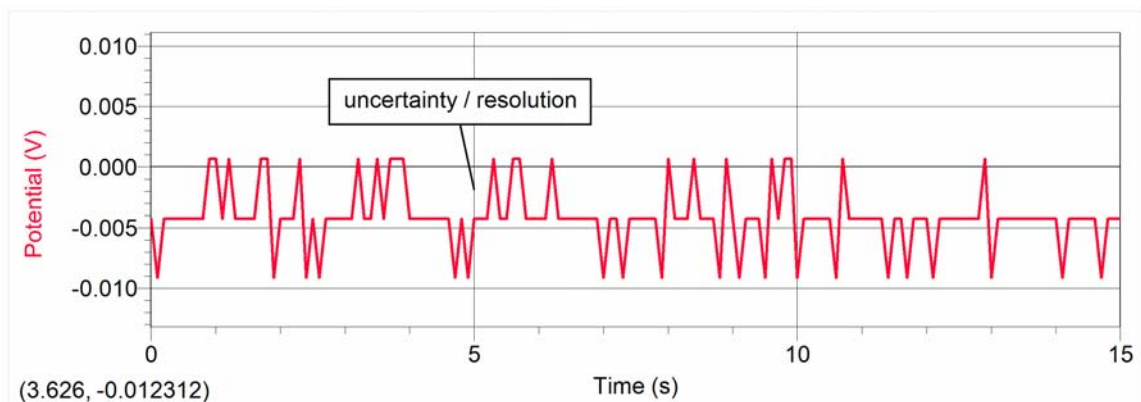
Research:

Using the logger pro software we were able to achieve a tolerance of $\pm .002$ volts. The given values in our calculations suggested that we would be able to reach .01 volts maximum. Thus the .002 resolution should be sufficient for our purposes.

Raw data-



After zero (zoomed in)-



Calculations-

$V = Blv$ given the length of wire and the velocity at which it passes through a magnetic field we can calculate the voltage generated.

Test Plan:

In our test we will be measuring the current through the loops of wire to see if it is in fact possible to induce a measurable current.

The resistance in the large length of wire may keep us from generating a measurable current. Also the earth's magnetic field is very weak ($5.0 \times 10^{-5}T$)

Analysis:

Given the parameters of a balloon moving at 4 m/s through earth's magnetic field of 5.0×10^{-5} Teslas with 200 feet of wire, we calculate that 12.19 mV will be induced.

Conclusion:

This means that we should be able to use logger pro to measure voltage induced by the earth's magnetic field to an uncertainty of +/- .002 volts and thus current to an uncertainty of proportional value.