Name_____
Lab Partner(s):_____
Date Performed:_____
Date Due: January 16, 2018
Physics 111 Laboratory
Experiment #1
The Coulomb Balance

Attach your ***fully labeled and captioned data tables*** *for each part along with any* ***fully labeled and captioned graphical representations of your data*** *that you may have created to the end of this handout.*

Honor Code Statement:

Force versus Distance

1. What are the main assumptions that you have to make in order to perform this experiment and subsequently analyze the data that you took?

2. We set the power supply at 6.0kV for this part. Does it matter that we set the power supply at 6.0kV or could we have set any value of the potential as long as it was constant?

3. From your plot of θ versus *r*, what is the relationship between the variables? What are the exponent of the variable *r* and the constant of proportionality? Is the relationship a power law? If not, should it be?

4. Does your result support the fact that the spheres act as point charges? What evidence do you have from your data or graphs to support or negate this fact?

5. In the experiment, you used a model of how the spheres might deviate from acting like point charges. From your plot of θ_{corr} versus r, what is the relationship between the variables? Is this relationship a power law? What are the exponent of the variable r and the constant of proportionality?

6. Does your corrected result support the fact that the spheres act as point charges? Explain.

7. The possible deviation from point-like behavior of the spheres is one example of a systematic effect in your experiment. What other systematic effects could affect the experiment and how might they make your results deviate from a power law relationship? Do you see evidence of any of these effects?

Force versus Charge

1. What are the main assumptions that you have to make in order to perform this experiment and subsequently analyze the data that you took?

2. For this part of the experiment you set a fixed value for the separation between the charges. Why do you have to keep the separation between the spheres fixed? Does it matter what value of the constant separation between the spheres you choose? Explain why or why not.

3. From your plot of θ versus V, what is the relationship between the variables? Is the relationship a power law? If not, should it be? What are the exponent of the variable V and the constant of proportionality?

4. What systematic effects might exist in this experiment and how could they cause your result to deviate from a power law relationship? Do you see evidence for any systematic effects?