

Experiment ES2:

Electrostatic Charge Distributions

In this experiment you will accomplish the following tasks:

- 1) Make a series of measurements of charge density on an electrically neutral sphere placed close to another sphere at 3000 volts.**
- 2) Make a series of measurements of charge density on a negatively charged sphere placed close to another sphere at 3000 volts.**
- 3) Make a series of measurements of charge density on a positively charged sphere placed close to another sphere at 3000 volts.**
- 4) Make a series of measurements of charge density on a positively charged sphere without the 3000 volt sphere nearby**

You will investigate spherical charge distributions under 4 different circumstances. You will do this by using the proof plane to “spoon” some charge from pre-determined locations in the charge distribution. The amount of charge picked up by the proof plane is proportional to the amount of charge at the location on the sphere.

You will then move the proof plane to the interior of the Faraday pail and measure the induced potential between the pail and the grounded shield.

Since the potential is proportional to charge, we can see the relative amount of charge at each location on the sphere.

When reading the amount of charge carried by the proof plane, it is important to only charge the Faraday pail by induction. In other words, do not touch the proof plane to the pail

This is important because the proof plane has removed some charge from the charge distribution you are measuring. In order for subsequent measurements on this distribution to have any meaning, this charge must be returned to the charge distribution.