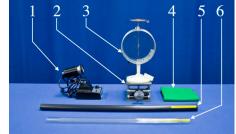
Electricity and Magnetism

Electrostatics

Producing Static Charge







## Concept:

This demonstration utilizes friction (rubbing) between two sources of 1. Spotlight different polarizability to remove or add electrons from one material and 2. Lab Jack then transfer this excess charge onto the electroscope. The rubbing process typically scrapes off about  $10^{10}$  surface electrons per mole of material, which may seem large, but in fact is only a tiny fraction of the total number of electrons, which is  $\sim 10^{24}$  or  $10^{25}$  per mole. Although the polarities of the 5. PVC Rod polycarbonate or PVC rod that result from rubbing are opposite to one another, the transfer of this charge to the electroscope produces, for both rods, the repulsion of the electroscope needle from the similarly charged main stem of the electroscope.

## **Equipment:**

- 3. Electroscope
- 4. Polyester Felt
- 6. Polycarbonate Rod

## Procedure:

- 1. Verify that the electroscope needle is unlatched and free to move.
- Vigorously rub the polycarbonate rod with the felt to give the rod a positive charge.
- 3. Hold the rod over (but not touching) the electroscope plate and notice that needle registers the charge strength.
- 4. Repeat steps 1-3 using the PVC rod (the PVC rod will obtain a negative charge).

## **Notes and Extras:**

- If the electroscope becomes charged, discharge it by touching the metal hook on the plate and the metal housing at the same time with your hand.
- Discharge the rods by rubbing them with your hand (this works best if you have sweaty hands).
- Use the spotlight to project a large image of the electroscope for easier visibility.