

1) PHORUM

Make a narrow water stream. Charge a plastic rod and bring it close to the stream.

- Water is neutral. How come? Explain it to me. I only understand Coulomb's Law. [Solved!]
- To show our theory is correct, give me an estimation of the charge on the rod. Model the rod as a point charge and each water molecule as a dipole. What information do you need? What measurements you need to do?

2) PHORUM

Consider 2 hollow spherical shells made with conducting material. These spheres are concentric. The inner and outer radii of these shells are r_1, R_1 and r_2, R_2 , respectively ($R_1 < r_2$). See fig. 1. The inner shell has a charge q_1 and the outer shell has a charge q_2 . We put a charge q_0 at the center.

- Find the surface charge on each one of the surfaces; there are four of them.
- Find the electric field everywhere; there are five regions.

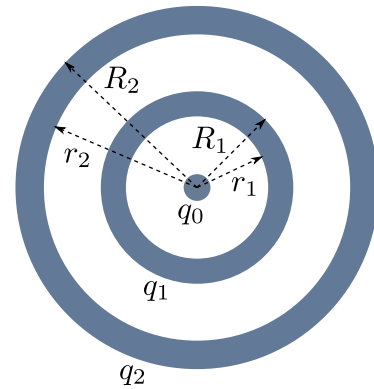


Figure 1: Two concentric conductor spheres.

3) PHORUM

Prove Gauss's law for point charges, using Coulomb's law for electric field. Your proof must be valid for any Gaussian surface and any system of point charges. Let me elaborate on this. Consider you have quite a few charges sitting at arbitrary points. Now you choose an arbitrary closed surface and enclose few of those charges. Prove that electric field flux passing through this closed surface equals to the charge inside this surface divided by ϵ_0 . The proof needs a simple geometrical observation for an infinitesimal cone coming out of a point charge.