

The scenario

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| Subject | Electrostatic / Charge distribution on a sphere |
| Length | 2:17 |
| Main goals | To show that electric charge on a conductive material is not spread arbitrarily |
| Detailed goals | to show that the charge given to a conductor resides on its outer surface entirely |
| Structure and description of experiments: | |
| 1. Introduction | Conductive materials can be easily charged by touch with a charged body but there is a special way that the charge given is distributed all over the conductive material. |
| 2. Main subject | Charge distribution on a sphere |
| Experiments | <p>1. We will try to charge a conducting sphere, giving it a charge from a rod to its outer surface. Now we check if the charge resides inside or outside the sphere. Neutral probe is put inside the can in contact with it and then it is brought to touch the electroscope - there is no charge on the probe, so there is no charge on the inner surface of the sphere. Now we touch the outside surface of the sphere and find out that the charge resides there.</p> <p>2. Now we remove charges from electroscope, probe and sphere and do the same experiment, but charging inner surface of the sphere. We check if the charge is inside the sphere and find out that there is still no charge, even if the sphere was charged there. Now we check if the charge is on the outer surface of the sphere - it is there, it has not disappeared.</p> |
| 3. Summary, evaluation and remarks | <p>Conclusion: charge given to a hollow and empty conductor always resides on its outer surface</p> <p>Application: if we want to transfer all charge of a probe to an electroscope, we should use a small Faraday cap mounted on the top of it and put the probe inside. All the charge from the probe will escape towards the most outer surface.</p> <p>Level: primary school and secondary school</p> |