

E-field direction

Aim: To show the direction of the E-field around the sphere of a Van de Graaff generator.

Subjects: 5B10 (Electric Fields)

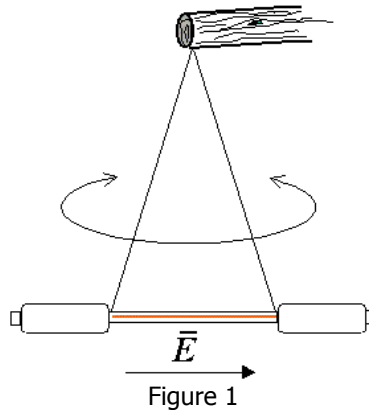
Diagram:



- Equipment:
- Van de Graaff generator.
 - Neon discharge tube
 - Long rod and wire to suspend the neon-tube.

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Presentation: First the students are told that a discharge tube lights when the E-field is strong enough. Then the Van de Graaff generator is switched on. While handling the rod, the neon discharge tube is brought closer and closer to the sphere (see Diagram). The discharge tube is suspended in such a way that it rotates easily (see Figure1).



When the discharge tube is close enough to the sphere it lights up. And it lights up only when the tube is standing radially to the sphere.

Explanation: This demonstration shows that:

- the E-field is stronger the closer you are to the sphere;
- the E-field is directed radially.

Remarks:

- We use a spectral discharge tube in our demonstration. In stead also a small discharge bulb as used in voltage test screwdrivers can be used (see Figure2).

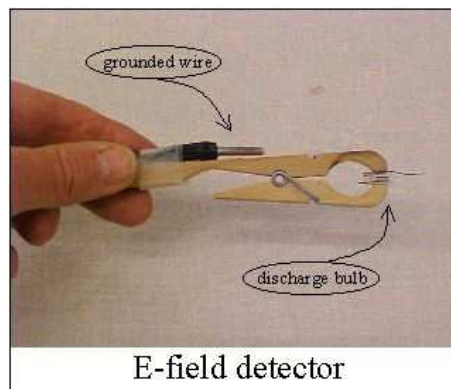


Figure 2

The advantage of such a small discharge bulb is that the field needed to make it light up is much lower. Already at a distance of 1 meter from the sphere it will light. But showing the direction of the E-field is not possible with such a bulb.

Sources:

- [Giancoli, D.G., Physics for scientists and engineers with modern physics](#), pag. 581

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