PHYS1120

Summer 2025

1. Goal(s)

- Sketch the electric field and equipotential lines from:

(a) Opposite point charges

(b) Parallel plates

2. Materials

- Power Supply
- Separated probes
- Point charges poorly conducting paper (PCP)
- Graph paper
- Multimeter
- Attached probes
- Parallel plates PCP
- Attached probes

3. Equation(s)

$$V = k\frac{Q}{r^2}$$

$$E = k\frac{q_1 q_2}{r^2}$$

4. Methodology

1. Place the opposite point charges PCP paper into the holder.

2. Connect the alligator clips from the power supply to the electrodes on the holder.

3. Turn on the power supply.

4. Insert the separated probes into the ports on the multimeter. Plug the black probe into the port marked "COM" and the red probe into the port with the symbols "Ω, V."

5. Turn the dial on the multimeter to the point marked "$\overline{V}$." Measure the potential difference between the two electrodes by placing the black probe near the black output of the power supply (anode) and the red probe near the red output (cathode). This is the voltage delivered by the power supply. Break this measurement into reasonable intervals (e.g. 12 V — 3, 6, 9 V).

6. Keeping the black probe fixed at the anode, move the red probe until you reach within 0.05 V of the first target (9 V in our example from before). Record this position on the graph paper.

7. Trace the path of constant voltage, and sketch this path on the graph paper. Repeat this process for every voltage decrement.

8. Once the equipotential lines are complete, replace the separated probes with the connected probes on the multimeter.

9. Beginning at a random point, fix the black end and rotate the probe until the multimeter reads maximum voltage. Record the path between the red and black probe on your paper and repeat to fill in the $\vec{E}$ field.

10. Repeat the previous procedure for the parallel plate PCP setup.

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5. Results

Draw the resultant maps on the provided graph paper

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6. Conclusions

Do these maps agree with what we learned in class?