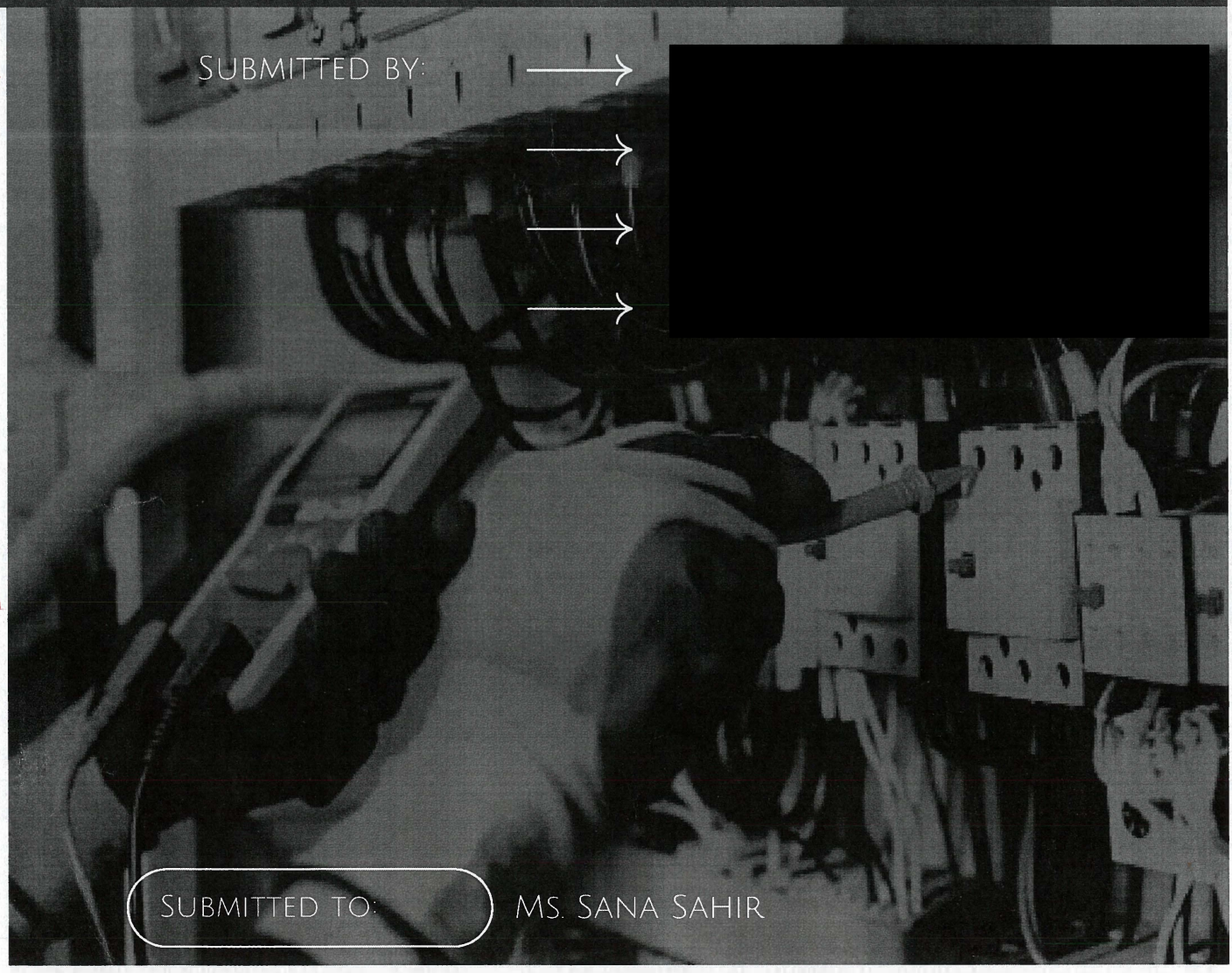
11 January 2024

Winter 2024

experiment 1

Electric Field Mapping

University of Wollongong in Dubai



SUBMITTED BY:

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SUBMITTED TO: MS. SANA SAHIR

PHYS143
Physics for Engineers

Data

How can there be 0 current? V = IR

Voltage supplied by the DC Power Supply: **10.0 V** Current: **0 A** ?

Distance (cm)	Potential Difference (V)
0.5	9.9
1.0	9.74
1.5	8.55
2.0	7.36
2.5	7.39
3.0	7.41
3.5	7.41
4.0	7.38
4.5	7.38
5.0	7.38
5.5	7.38
6.0	7.38
6.5	7.38
7.0	7.39
7.5	7.39
8.0	7.39
8.5	7.39
9.0	7.37
9.5	7.36
10.0	7.36
10.5	7.36
11.0	7.36

Table 1: Potential difference for various distances along the positive electrode

along x or y axis? Or @ an angle?

Distance (cm)	Potential Difference (mV)
0.5	10.9
1.0	11.8
1.5	12.6
2.0	13.6
2.5	13.9
3.0	14.6
3.5	14.7
4.0	14.8
4.5	14.9
5.0	15.1
5.5	15.3
6.0	15.6
6.5	15.7
7.0	16.0
7.5	16.3
8.0	16.6
8.5	16.8
9.0	16.7
9.5	16.9
10.0	17.0
10.5	17.2
11.0	17.3

Table 2: Potential difference for various distances along the negative electrode

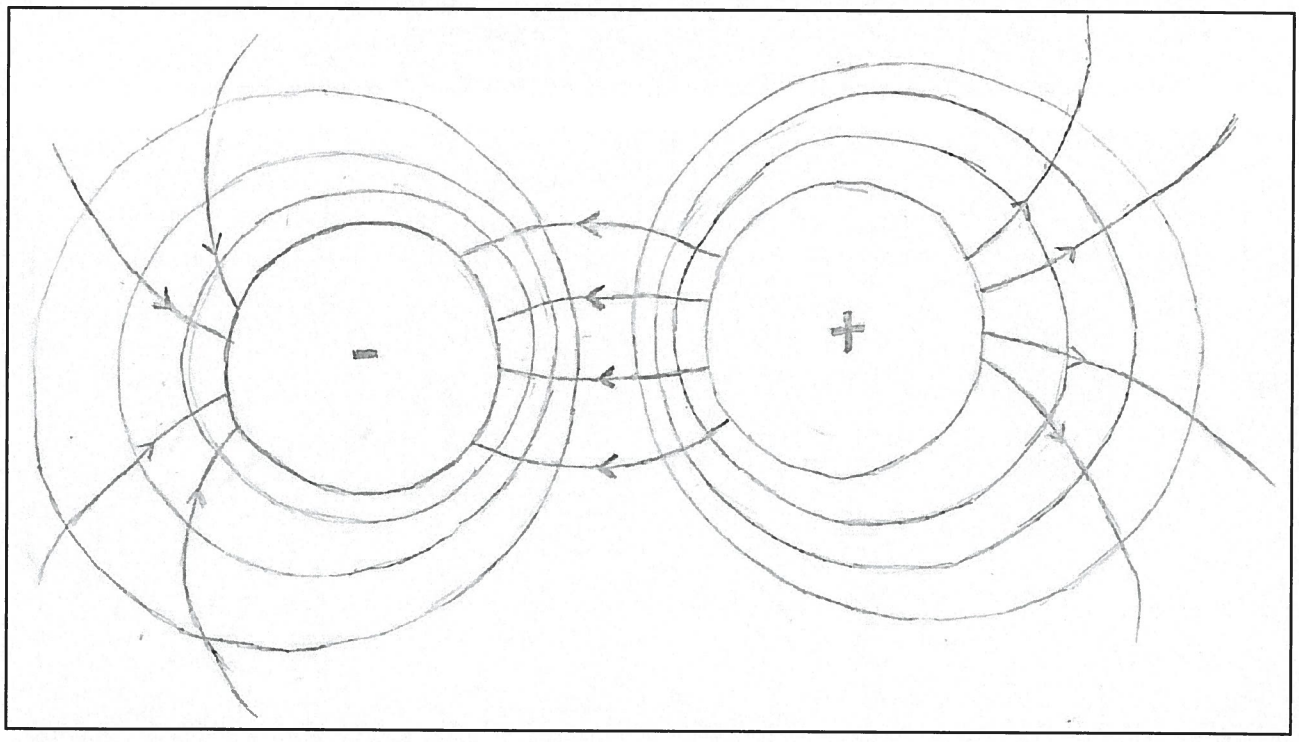

Figure 2: Electric Field Lines & Equipotential Curves for Electric Dipole

Conclusion

1. What was the purpose of the lab?

The lab's purpose was to study the electric fields produced by various two-dimensional electrostatic charge distributions.

2. How does the lab we performed relate to what we are studying in class?

The experiment is a direct link to the concepts taught in the lecture related to electric potential and fields.

3. Give a brief recap of the procedure used.

The conductive paper was mounted using pins. The electrodes were connected to the DC power supply. A thin line was drawn from one plate to another. One of the voltmeter leads was placed on one of the electrodes at one end of the line. The potential difference was then measured for every 0.5 cm along the line.

4. What problems did you have during the lab? Did you have to modify your procedure?

The problems encountered in this experiment are that of inaccuracy with the voltmeter which provided fluctuating and inaccurate readings. Yes, we modified our procedure slightly by taking a range of the readings rather than one of the fluctuated readings.

5. Do your results make sense? What are the sources of error?

The equipotential lines are perpendicular to the electric field lines and parallel to the plates. When sketching the electric field lines, the lines end up crossing the equipotential lines mapped out by the experiment. This is consistent with the previously known knowledge of equipotential curves. Possible sources of error include power supply error, tip of the probe not being fine, measurement errors, etc.

6. What did you learn from this lab?

We learnt that the potentials, equipotential curves and electric fields generated are the same as the electrostatic charge configurations. The equipotential curves also align parallel with the two plates and the electric field lines are mapped from positive to negative charge.

7. If you were to repeat this lab in the future, how would you modify or improve the procedure?

To improve the procedure of this experiment, our team suggests making sure that the tip of the probe used is finer, which would help to provide more accuracy to the voltmeter readings. Also, the quality of the connecting wires could be improved considering poor quality of connecting wires can introduce resistance.