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**Group 8**

**NPHY 121**

**Experiment 4: Wheatstone Bridge**

**Aim:**

To measure the resistance of a conducting wire using the wheatstone bridge circuit and find the variation of resistance with length for the wire and determine it’s resistivity.

**Theory:**

The wheatstone bridge is a circuit that consist of four resistors, . The wheatstone bridge can be used to determine the resistance of a conducting wire. The two other ends of the bridge include the unknown resistance of the conducting wire () and a variable resistor of known resistance ().

If the resistance are configured in such a way that no current flows through the galvanometer, then the voltage source coming from both ends of the galvanometer is the same potential.

In terms of Ohm’s law:

(1)

Therefore:

(2)

Hence can be determined if and the ratio of and are known.

**Procedure:**

We ensured that the circuit was connect correctly. We measured a distance of 20cm across the wire and connected it to the circuit.

We then found a position of balance D indicated by no deflection of the galvanometer and recorded the lengths and

Afterwards, we reversed the direction of the current by reversing the connections to the power supply and found a second balance point and record new length and .

We then interchanged resistors , making sure the same length of is used and then found 2 balance points and corresponding , following the steps mentioned above.

We decreased the connection of the wire by 5cm until we reached 5cm of the wire, whilst repeating the above mentioned procedure five times and found the mean of and the mean of .

We then calculate from

()

We measured the diameter of the wire and calculated the resistivity of the material using equation ().

**Result:**

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