

Lab 3: Resistivity

1 Assignment

At your lab station is a board with three wires stretched across. Based on your knowledge of resistance and resistivity, your team has been tasked to determine the composition of each of these three wires.

2 Deliverables

For your lab report, 10% of the grade will be for following the guidelines in the lab report template. Another 10% will be allocated for the Abstract and Introduction of your report. The remaining percentage will be based on your inclusion of:

1. [10%] a plot of voltage drop across the entire wire (ΔV) as a function of current (I) through the wire, for each wire. This should demonstrate that each wire is an Ohmic material (i.e., it behaves Ohm's law)
2. [10%] a plot of voltage drop across a section of wire (ΔV) as a function of the length of that section of wire (l), for each wire
3. [20%] a description of the process your team used to measure the resistivity of the wires
4. [20%] the resistivity (ρ) of each of the wires and the uncertainty associated with this measurement
5. [20%] your team's assessment of each wire's composition based on your resistivity values

3 Technical Information

3.1 Reading from the DAQ

Your team will again be using the DAQ to take data during this lab. As a reminder, you can perform the following in a Python session:

```
from lab.daq import DAQ
daq = DAQ()
daq.readChannel(0)
```

You may also make use of any of the scripts in the `examples/daq` directory.

3.2 Power supply

You will again be using the power supply in this lab. For this experiment, it is important to understand the difference between the constant current (CC) and constant voltage (CV) modes. Given Ohm's law ($V = IR$) for a fixed resistance R , you can either choose a specific V and let I vary freely (CV mode) or you can choose a specific I and let V vary (CC mode). You cannot, however, choose a specific V and a specific I for a set R ; Ohm's law does not give you that many degrees of freedom.

4 Hazard Assessment

- Your team will be using a DC power supply in this lab. Always ensure the supply is **off** when plugging into or unplugging from the supply. The current output from the supply should not be over **0.1 A** during this lab.