SOP: Hall effect setup V1

Switch on:

* Switch box (switch in the back of box)
* Keithley 2182A
* Keithley 8221

Boot PC.

* User: Lab Admin
* Password: diamond

The Hall effect setup is controlled by LabView. There are 2 pieces of LabView SW to do this: One controls the switchbox and therefore the contact permutations. The other one controls the Keithleys and the experimental parameters of the experiment.

Double Click in:

* Hall Main program V2.1
* Configuration select V1

When asked about activation rubbish just close it and wait. SW will pop up.

In “Configuration select v1” you have 2 types of configurations: VDP (van der Paw) and Hall. VDP is used to measure resistivity and Hall for the Hall effect.

1. To do van der PauW experiments

In “Configuration select v1” VDP\_A configuration, choose parameters in Data tab and activate “Save data” in Settings tab.

+DATA tab

* No of current steps: Number of different current values for the experiments.
* Current step number: Display for when experiment is running.
* Current step: Display for when experiment is running.
* Current source: Display for when experiment is running.
* Mean: Display for when experiment is running.
* Standard deviation: Display for when experiment is running.
* “Bidirectional Current” Switch ON/OFF: When ON will switch current polarity for each step (1:+,2:\_, and so on…). When OFF all current steps are either all positive or all negative.
* Initial datapoint: Number of datapoints to discard due to stabilisation issues.
* Data length: Number of datapoints to keep.
* Total datapoints = Initial datapoint + Data length

Save data.

Change contacts to VDP\_B and repeat.

Once you have done it repeat for VDP\_C and VDP\_D.

With the data obtained you obtain resistance of the sample (Rs)

With t (sample thickness) and Rs you can obtain resistivity (ρ).

1. To do Hall effect experiment there are the following options:

In “Configuration select v1” HALL\_A configuration, choose parameters in Data tab and activate “Save data” in Settings tab.

+DATA tab

* No of current steps: Number of different current values for the experiments.
* Current step number: Display for when experiment is running.
* Current step: Display for when experiment is running.
* Current source: Display for when experiment is running.
* Mean: Display for when experiment is running.
* Standard deviation: Display for when experiment is running.
* “Bidirectional Current” Switch ON/OFF: When ON will switch current polarity for each step (1:+,2:\_, and so on…). When OFF all current steps are either all positive or all negative.
* Initial datapoint: Number of datapoints to discard due to stabilisation issues.
* Data length: Number of datapoints to keep.
* Total datapoints = Initial datapoint + Data length

Set values above (when applicable), select Contact configuration: Start with Hall\_A. Run the experiment.

If “Compliance” = Red => Decrease current.

If big spikes => Increase Initial Datapoint.

If suspecting that sample has low resistivity => Increase Current. And viceversa.

Save data.

Change contacts to HALL\_B and repeat.

Once you have done it repeat for HALL\_C and HALL\_D.

Review the following

With the data obtained you obtain resistance of the slope, s = (μHall \* B\*ρ)/t

From that you obtain the μHall as the other parameters are known.