

## **Magnetic Levitation Lab Notes**

### **DC Nail and DC magnet**

#### **Tare the scale at zero current.**

Demagnetize the nail before each experiment.  
(do not demagnetize the magnet).

The magnet should be arranged so that a positive current results in a negative weight, do not record data after the magnet (or nail) has been lifted.

The current scale is 10A for the MX55 voltmeters.

Power supply connections of red lead in red plug, black lead in black plug. I believe (2016) that I have fixed the problem with the first run of data needing to be discarded. So the following sentence should not be necessary:  
It is quite likely that you should take one data point and then terminate and discard data for each experiment, once for each experiment.

The program ought to switch the meter from DC to AC automatically.

### **AC Nail**

#### **Tare the scale at Zero current.**

(Demagnetize the nail before the experiment).

Connect leads to the two green leads on the power supply.

Switch the MX55 connection to  $\mu\text{A}$ . Turn the knob on the MX 55 to  $\mu\text{A}$ -mA.

Take a data point and discard (have the current on for this).

The program ought to switch the meter from DC to AC automatically.

About 180 mA is the maximum current for this experiment. If your power supply starts loudly humming, I think you have gone high enough.

You may hear one or two beeps from your voltmeter as it changes internally scales.

### **DC Nail Hysteresis**

#### **Tare the scale at Zero current.**

**(Demagnetize the nail before the experiment).**

**The current scale is 10A for the MX55 voltmeters.**

**Make sure to set the voltmeters on the 10A scale.**

Power supply connections of red lead in red plug, black lead in black plug.

Start taking measurements from zero current. Increase the current to almost the lifting point of the nail. (do not lift the nail).

Continue taking measurements while decreasing the current to zero.

On the power supply switch the black and red leads.

Increase the current while taking measurements to almost the lifting point of the nail. (do not lift the nail).

Continue taking measurements while decreasing the current back to zero.

Put the red lead back on the red plug and the black lead back on the black plug. Plot your data in the spreadsheet helper. No fit is required for this part of the lab, only observations of the hysteresis.