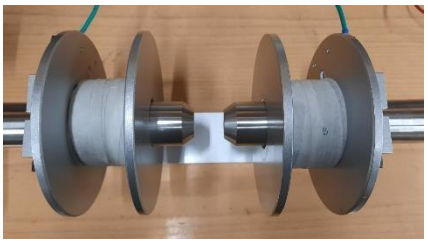
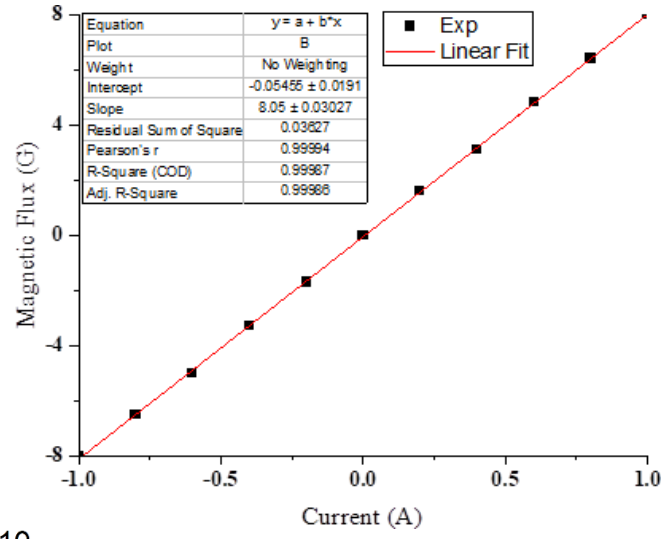
Calibration of electromagnets in optics lab

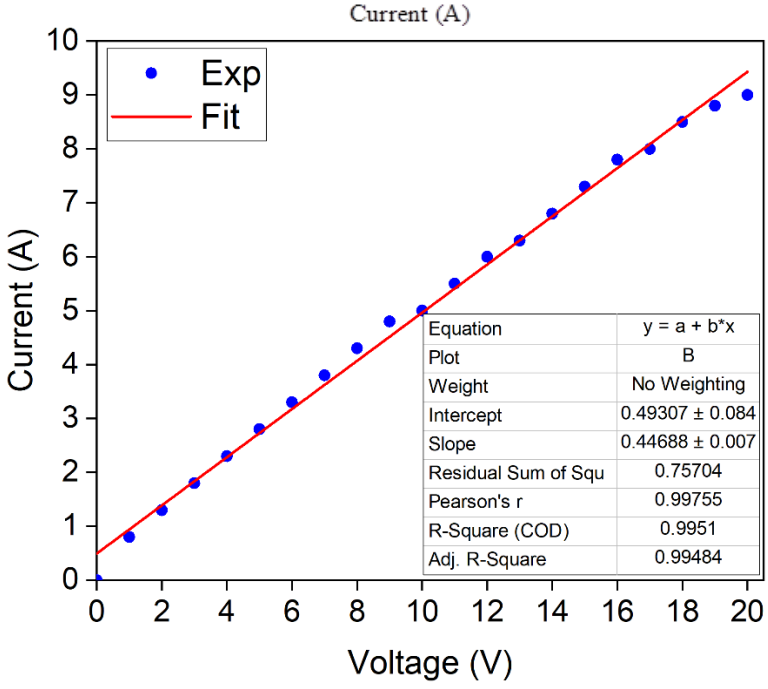
Compiled by Muddasir and Wardah on 06-02-2025

Electromagnet A:

- Wire diameter = 1.3 mm
- Number of layers = 11
- Turn in each layer = 38
- Total number of turns on each side = 418
- Spacing between two poles = 2.2 cm

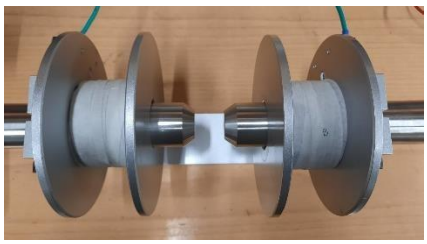


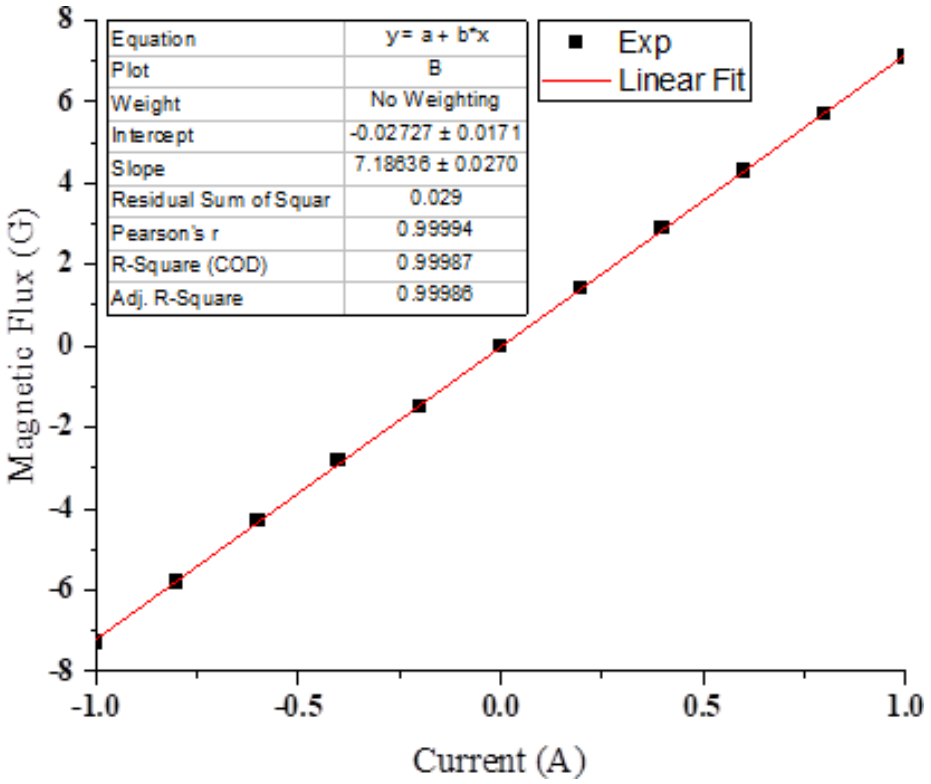




Electromagnet B:

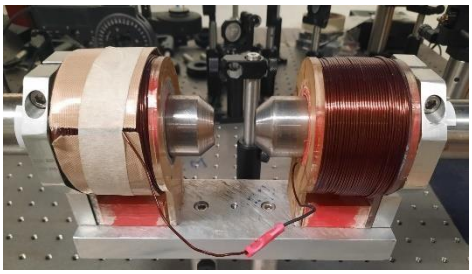
- Wire diameter = 1.3 mm
- Number of layers = 11
- Turn in each layer = 38
- Total number of turns on each side = 418
- Spacing between two poles = 2.5 cm

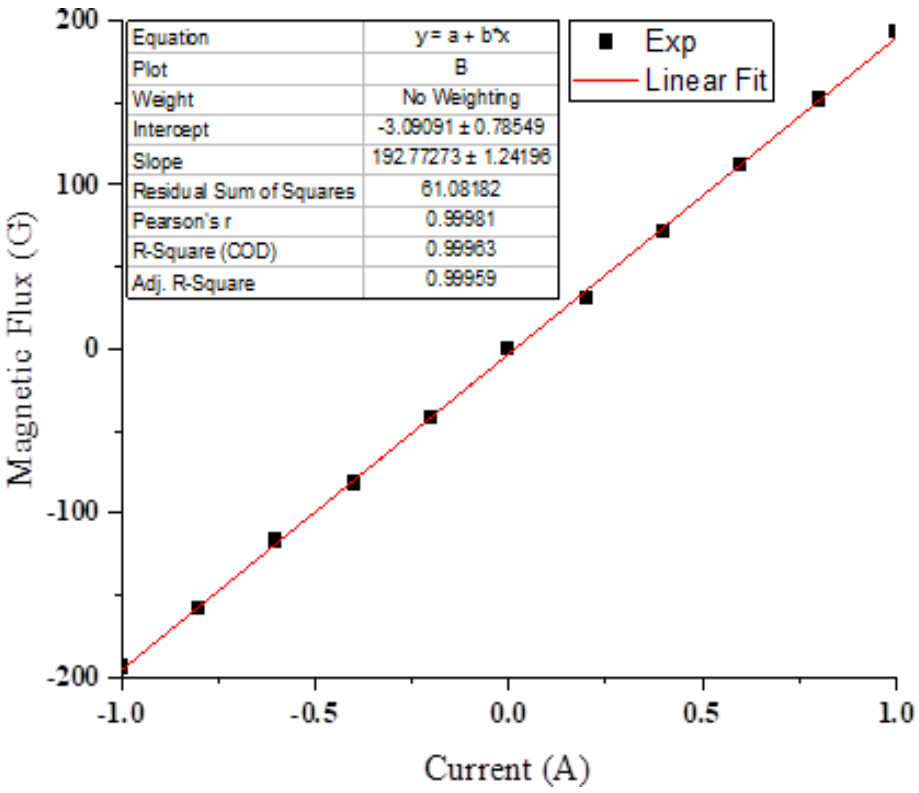


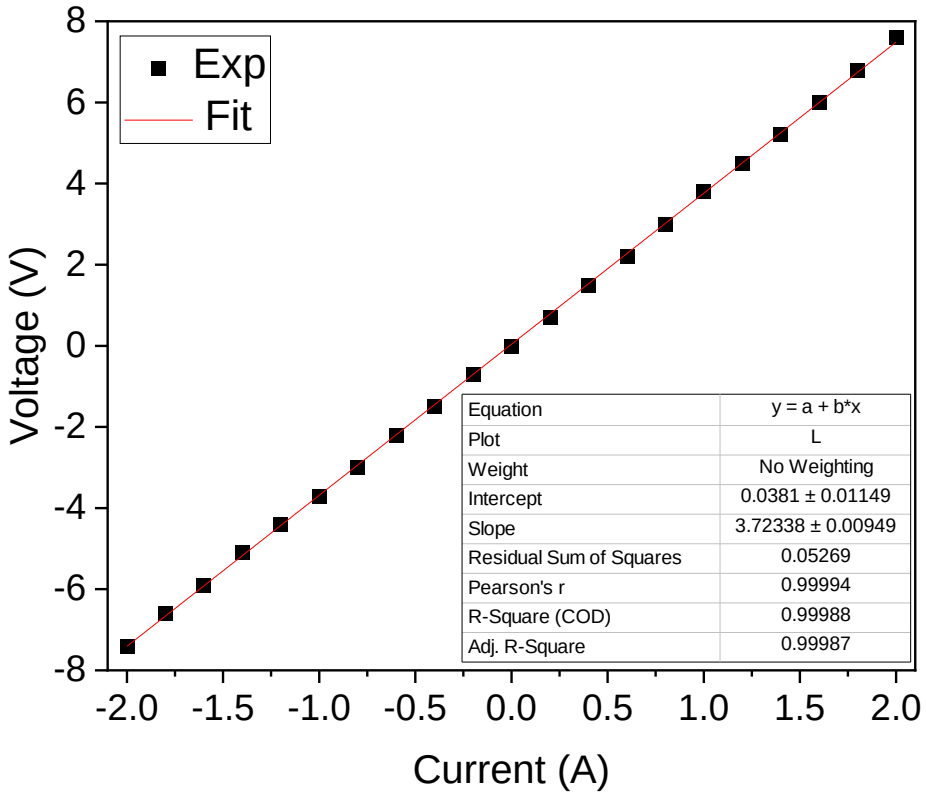


Optics Lab 1 electromagnet:

- Wire diameter = 1.3 mm
- Maximum current = 3.7 A
- Total number of turns on each side = 408
- Spacing between two poles = 2.5 cm

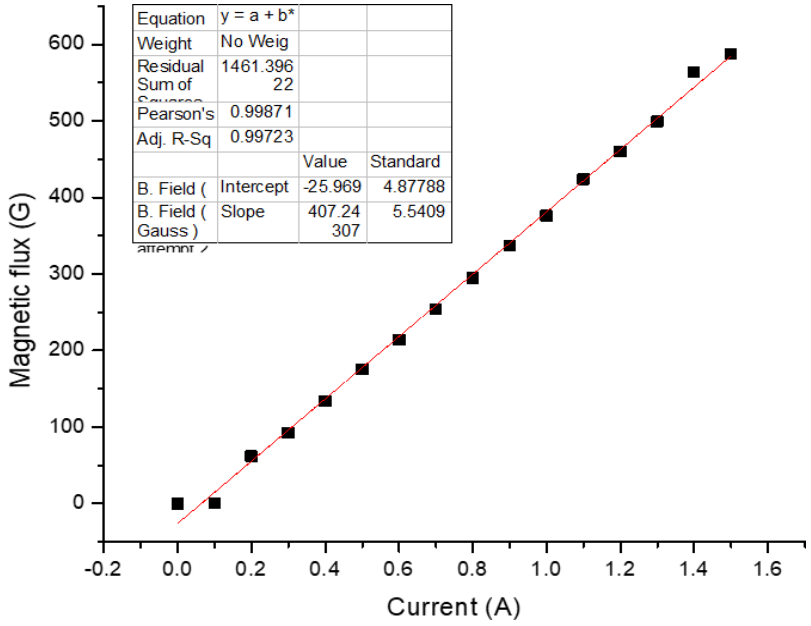


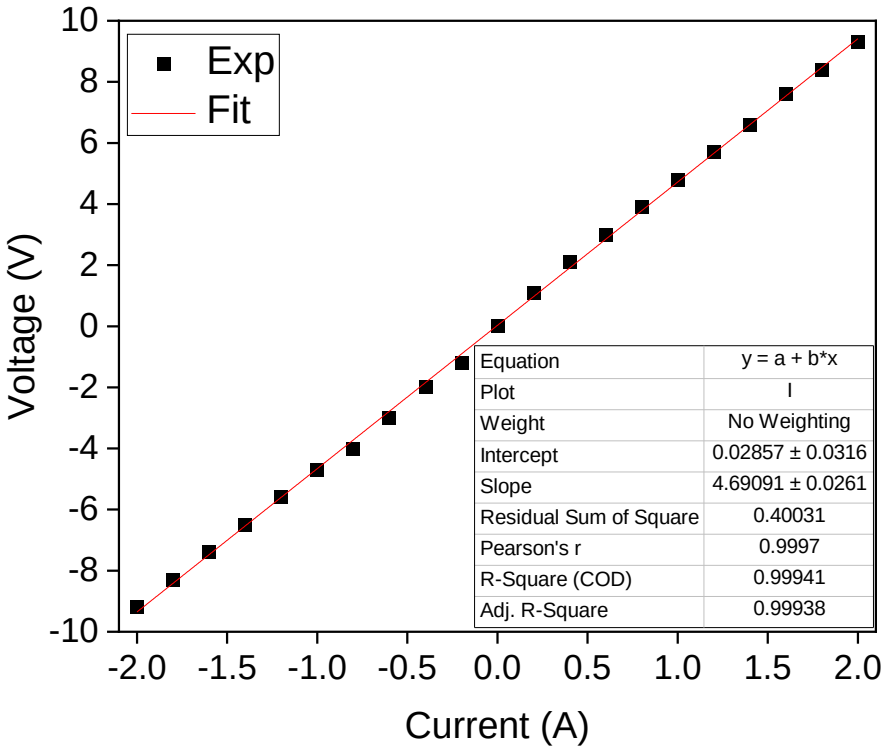

Equation y= a + b*x
Plot B
Weight No Weighting
Intercept -3.09091 ± 0.78549
Slope 192.77273 ± 1.24196
Residual Sum of Squares 61.08182
Pearson's r 0.99981
R-Square (COD) 0.99963
Adj. R-Square 0.99959
Exp
Linear Fit
Magnetic Flux (G)
Current (A)
200
100
0
-100
-200
-1.0
-0.5
0.0
0.5
1.0


Exp
Fit
Equation y = a + b*x
Plot L
Weight No Weighting
Intercept 0.0381 ± 0.01149
Slope 3.72338 ± 0.00949
Residual Sum of Squares 0.05269
Pearson's r 0.99994
R-Square (COD) 0.99988
Adj. R-Square 0.99987
Voltage (V)
Current (A)
8
6
4
2
0
-2
-4
-6
-8
-2.0
-1.5
-1.0
-0.5
0.0
0.5
1.0
1.5
2.0

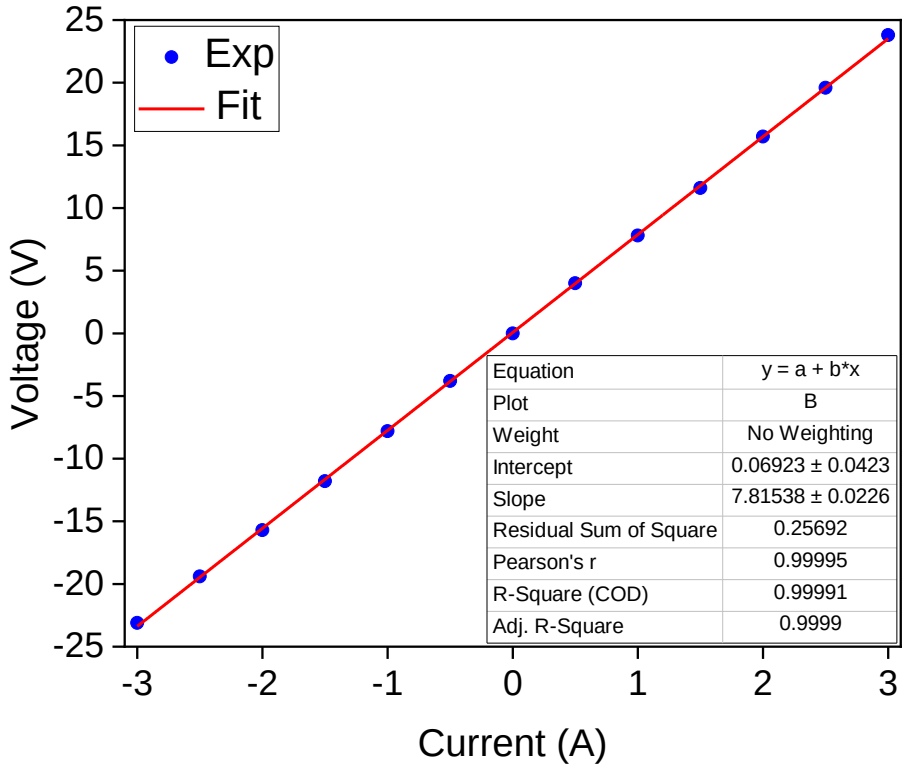
Optics Lab 2 electromagnet:

- This data was obtained on 20-11-19
- Spacing between two poles = 2.3 cm

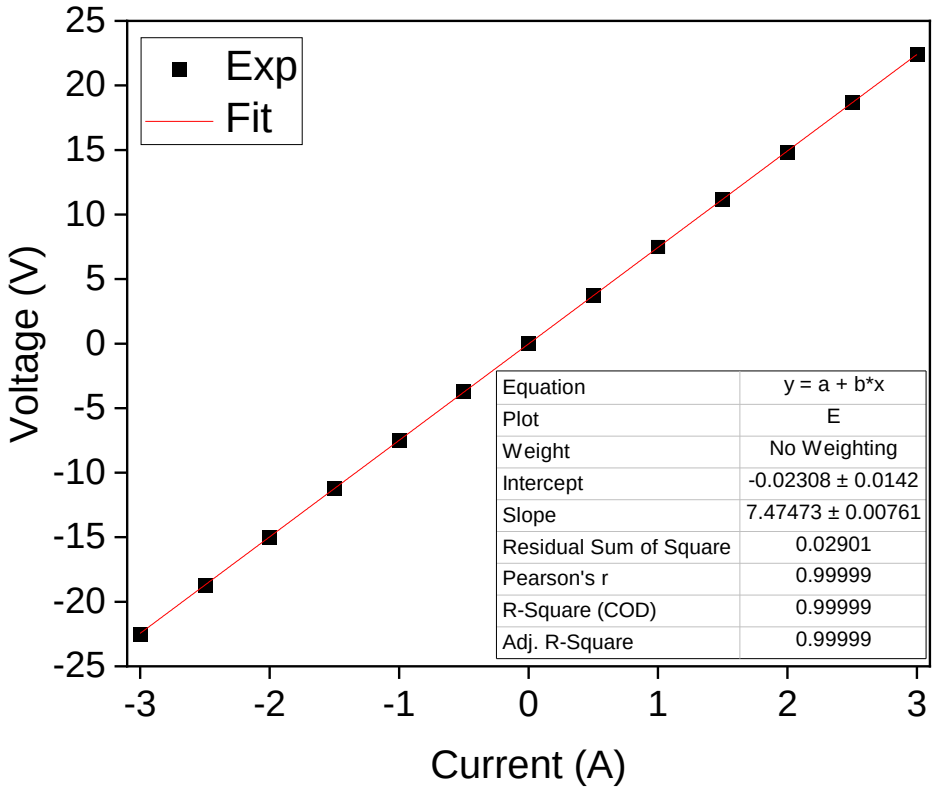




Spin physics lab FMR setup electromagnets:



Equation	y = a + b*x
Plot	B
Weight	No Weighting
Intercept	0.06923 ± 0.0423
Slope	7.81538 ± 0.0226
Residual Sum of Square	0.25692
Pearson's r	0.99995
R-Square (COD)	0.99991
Adj. R-Square	0.9999



Equation	y = a + b*x
Plot	E
Weight	No Weighting
Intercept	-0.02308 ± 0.0142
Slope	7.47473 ± 0.00761
Residual Sum of Square	0.02901
Pearson's r	0.99999
R-Square (COD)	0.99999
Adj. R-Square	0.99999

Electromagnet	Slope (G/A)	Resistance (Ohm)
Electromagnet A	8.05	2.25
Electromagnet B	7.18	-
Optics Lab 1 electromagnet	192.7	3.72
Optics Lab 2 electromagnet	407	4.69
Spin physics lab electromagnets	-	7.81