Standard Operating Procedure for FMR LabView

Figure 1: Rohde & Schwarz NGL202 Power Supply

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# Caution

1. Never put the signal generator amplitude more than 0 dBm (ask Dr. Kuntal before proceeding)
2. Make sure to switch on the electromagnet, chiller, signal generator, lock-in amplifier, before running the program
3. Make sure the following files are present in the same folder of the FMR labView file
   1. connectEM\_subVI.vi
   2. setConstantCurrent\_subVI.vi
   3. readMagneticField\_subVI.vi
   4. offEM\_subVI.vi

# Calculate probes offset

1. Put the electromagnet gauss probe and the lab’s Lakeshore gauss probe in between the poles
2. Make sure that both probe heads are in the same position
3. Open the following files (press ignore button, if any such pops up )
   1. connectEM\_subVI.vi
   2. setConstantCurrent\_subVI.vi
   3. readMagneticField\_subVI.vi
   4. offEM\_subVI.vi
4. In all the above said files, click on the VISA drop down box and select ‘COM 4’
5. In the connectEM\_subVI.vi file, click on the button on the toolbar, if the Succes led glows, then electromagnet is connected
6. In the setConstantCurrent\_subVI.vi file, provide some PWM in the range of your requirement, and then press the button in the toolbar
7. In the readMagneticField\_subVI.vi file, click on the button on the toolbar, after execution of the program it will read the magnetic field from the electromagnet gauss probe
8. Now measure the magnetic field showing the lakeshore gauss probe, and fill the corresponding value in the table provided below
9. Repeat the above steps, for 5 different PWM values
10. Calculate the mean offset from the table

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| S.No. | PWM | EM gauss probe reading H\_em | Lakeshore gauss probe reading H\_lg | Offset= H\_em – H\_lg |
| 1 |  |  |  |  |
| 2 |  |  |  |  |
| 3 |  |  |  |  |
| 4 |  |  |  |  |
| 5 |  |  |  |  |

Mean offset = Sum of all offset / 5

# Procedure

1. Open in the ‘FMR\_Lockin v4.vi’, make sure it opens in the NI LABVIEW 2019 version
2. If any load warning summary pop ups, click on the ‘Ignore’ button
3. Now in the Signal generator block, for the VISA, click on the drop-down box and select ‘SMB100A-181981’
4. Then the set the RF frequency (in Hz), Amplitude (in dBm) and the Limit (in dBm) in their respective boxes
5. Now in the Electromagnet block, for the VISA, click on the drop-down box and select ‘COM4’
6. Provide the PWM starting value and PWM ending value, in the ‘PWM Starts and PWM Stops’ input boxes respectively
7. Provide the offset value of the probe calculated
8. Now in the Lockin Amplifier block, for the VISA, click on the drop-down box and select ‘GPIB:’
9. Change the Input connection type and Input coupling in the Input signal sub-box
10. Change time constant and slope value (default value, time constant: 100 ms and slope: 12 dB/oct)
11. Change the Dynamic reserve to ‘Low Noise’ and sensitivity to ‘1V/uA’
12. In the Reference signal block, change the reference type to either ‘Internal’ or ‘External’ based on your requirement
13. If Reference type is internal, provide the Internal reference frequency (in Hz), Reference phase (in degree) and Sine Output Amplitude (in V)
14. Once all the parameters are given, check once more, and run the program by pressing the in the tool bar
15. As soon as the program starts, in the Status board block, the green leds will glow, indicating the status of the respective device
16. Finally, when the program execution is completed, ‘Process closed’ led will glow and R vs PWM and R vs Hdc graph will be plotted
17. On closing the program, a pop up appears to save some changes, press do not save (or anything like that)