

Data Collection 2 --- Lab Guide

1 Overview

This week you will continue collecting data and stressing your cell. You will take J-V and EQE measurements for all eight pixels on your cell. After you have completed your measurements, you will return your cell to its stressor station.

2 Data Management Reminder

Important

It is very important that you **do not modify the raw data files or their file names at all**. If you want to explore the data, create a new file (with a different name such as by adding “_analysis”) and place it in an appropriate folder. This way, the original data will not get modified and will allow the instructional team to aggregate all of the data into a usable format for the research questions that you will be working on towards the end of the semester.

Note

Team roles reminder: Consider switching up your team roles this week so everyone gets a chance to contribute in different ways.

3 Lab Activities

3.1 Data Collection and Analysis

You will spend all of your lab time this week taking data and completing analysis using those data. If you are waiting for your turn on the apparatus, you can start setting up the analysis code in your Colab notebook.

Look at the Apparatus Schedule to determine your team's schedule for the week and then download the Data Collection 2 Colab notebook file from Canvas. You will be collecting data at both apparatus this week, so make sure to upload all data files to your team Google Drive folder.

- **J-V Data Analysis:**

- After collecting these data, in your Colab notebook create a SINGLE plot of all of the J-V curves of the **forward scans**. We are using the forward scans as NLR believes they are better representative of the cell.
- You will calculate the Power Conversion Efficiency (PCE) for the pixels you plotted above, and save the PCE and J_{sc} values to a CSV file.
- You will plot your PCE values for all weeks you have data for on a graph **with appropriate error bars**. See lecture slides about propagation of errors.
- You will need to answer the question in the 'J-V Analysis' section of your Colab notebook.

- **EQE Data:**

- Do not forget to record measurement times in the EQE timelog.

- After collecting these data, in your Colab notebook create a SINGLE plot of the External Quantum Efficiency (EQE) curves with data from your cell. You will also save the EQE data to a CSV file.
- You will also need to answer the question in the 'EQE Analysis' section of your Colab notebook.

If you have any questions about editing the new code, **please ask your TAs for assistance.**

After completing the notebook, each member of your team must submit an identical copy of the .ipynb file and PDF to Canvas by the due date listed on Canvas.

Note

To convert your .ipynb to a PDF, use the [Notebook to PDF](#) online tool.

3.2 Return Cell to Stressor Station

Once your team has completed cell measurements for the week, take your cell to the stressor room, plug in the resistor box, and place it on the hot plate in your team's stressor station. **Be careful not to burn yourself while placing your cell on the hot plate.**

4 Post-lab Activities

Please complete this week's reflection by the due date listed on Canvas.