

Data Collection 1 --- 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

Collaborative coding reminder: Only one person should edit the Colab notebook at a time to avoid version control issues.

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. Look at the Apparatus Schedule to determine your team's schedule for the week and then download the Data Collection 1 notebook file from Canvas. You will be collecting data with both apparatus this week, so make sure to upload all data files to your team Google Drive folder. If you are waiting for your turn on the apparatus, you can start setting up the analysis code in your Colab notebook. Your team will complete the following analysis for each set of data.

- **J-V Data:** Take a measurement for all eight pixels. **Do the data look qualitatively like you expect? If not, consider what might be off or ask your TA.**
 - After collecting these data, you will calculate the short circuit current density (J_{sc}) and Power Conversion Efficiency (PCE) for each of your pixels using the **forward scans**. On the Week 6 Colab notebook, you have been given new code to help create CSV files for your J_{sc} and PCE values each week and code to help you create eight subplots (using the [subplots function](#)) to begin to compare how the J_{sc} and PCE values of your pixels are changing over time. You will also need to answer the question in the ‘J-V Analysis’ section of your Colab notebook.
- **EQE Data:** Take a measurement for all eight pixels. **Do the data look qualitatively like you expect? If not, take a look at the troubleshooting guide or ask your TA.**

- After collecting these data, in your Colab calculate the External Quantum Efficiency (EQE) with data from all pixels that you measured. You have been given code to create a CSV file for the data of your EQE curves. You have also been given code to help you create subplots to begin to compare how the EQE curves of your pixels are changing over time. 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.