Data Collection 4 --- 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. You will also iterate on your team project proposal based on your TA's feedback.

> Important
>
> The proposals have a different due date than other activities so the instructor has time to read them and give you feedback before your next lab section.

2 Lab Activities

2.1 Data Collection and Analysis

You will take J-V and EQE data this week. If you are waiting for your turn on the apparatus, you can start setting up the analysis code in your Colab notebook or finish up your project proposal.

Look at the Apparatus Schedule to determine your team's schedule for the week and then download the Data Collection 4 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:**
  - Calculate the Power Conversion Efficiency (PCE) and associated uncertainties for all of the pixels, and save the PCE and J_{sc} values to a CSV file.
    - You should now have CSV files with PCE values and uncertainties for baseline data, Data Collection 1, Data Collection 2, Data Collection 3, and this week's data.
  - You will need to answer the questions in the 'J-V Analysis' section of your Colab notebook.
  - Remember to **update the time values** for this week's data.
- **Linear Regression:**
  - After saving your PCE and uncertainty data, upload **all** of your PCE+uncertainty CSV files into your Colab notebook. You will perform a linear regression to fit a line to your PCE values over time and generate residual plots to evaluate how well the model represents your data.
  - You will need to answer the questions in the 'Linear Regression' section of your Colab notebook.
- **EQE Data:**
  - You will **take EQE measurements for all of your pixels**, but will not do any additional analysis with these data this week.
  - Remember to record measurement times in the EQE timelog.

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.

2.2 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.**

2.3 Team Project Proposal

You have received feedback from your TA on your proposal draft. **Take remaining open time in lab to iterate on your proposal using that feedback.**

3 Post-lab Activities

Submit the completed second draft of your team's project proposal by the due date listed on Canvas.

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