Data Collection 5 --- Lab Guide

1 Overview

This week you will take your final set of data. You will take J-V and EQE measurements for all eight pixels on your cell. After you have completed your measurements, you will leave your cell with your TA so it can be packaged and returned to NLR for post-mortem analysis.

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. Then download the Data Collection 5 Colab notebook file and the normalized stressing station spectra file (`led_spectra.h5`) 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.
  - Plot your PCE values with error bars for each pixel using data from the baseline measurements and Weeks 1–5 (plus TA data collection week) of stressing.
  - 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.
- **Histograms and Gaussian Fits:**
  - Download the normalized stressing station spectra file from Canvas (`led_spectra.h5`).
  - Plot all spectra together and include the mean spectrum.
  - Next, choose a single wavelength, create a histogram of the normalized intensities across all stressing stations at that wavelength, and fit a Gaussian curve to your data.
  - You will need to answer the questions in the 'Histograms and Gaussian Fits' section of your Colab notebook.
- **EQE Data:**
  - You will take EQE measurements for all of your pixels and create subplots showing how the EQE curves changed from the baseline to this week's data.
  - 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 Cell Stressing is Complete

Once your team has completed cell measurements for the week, instead of returning it to the stressing station, take your cell to your TA so it can be packaged with the other cells. The cells will be returned to NLR for post-mortem analysis.

3 Post-lab Activities

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