



## Lab 1 : Current-Voltage

### Aim:

When we have made a solar cell, it is important to measure the basic operating parameters of that cell and determine its efficiency. To ensure results are comparable all around the world, we use standardized test conditions.

In this experiment, we will use the AAA rated TS Space Systems 1000 solar simulator to measure the efficiency of a CdTe thin film solar cell and extract its parameters; both manually and automatically.

Video lab-script: <http://tinyurl.com/cdtpv-labs> (Solar Simulator)

### Tasks:

1. Make sure you have completed a risk assessment for this lab.
2. Load the provided cell into the testing stage
3. Use the setup tab to position the probes
4. Measure I-V curves in the dark and the light
5. Use the setup tab to create the position array for the contacts
6. Measure dark I-V curves for every cell
7. Measure light I-V curves for every cell, output the parameter array into a file

### Questions:

1. What are the standard test conditions for measuring solar cells?
2. Describe AM1.5 and explain why this spectrum was chosen.
3. Pick a device, work out all the standard cell parameters manually from the light I-V curve ( $\eta$ ,  $V_{oc}$ ,  $J_{sc}$ , FF). Compare your results to those given by the software.
4. Calculate the series and shunt resistance ( $R_s$ ,  $R_{sh}$ ) for your device, along with the dark current,  $J_0$ .