Solar Panel Behavior

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Solar energy from the sun is about a 1000 W/m^2 at the top of the Earth's atmosphere. How can we capture that energy?

1. Lamp info

Lamp name / type _____ incandescent | LED

Rated input power _____ W

Rated brightness _____ lm

Measured input power _____ W

2. Solar panel info

Num. cells in series _____

Open circuit voltage _____ V

→ computed _____ V / cell

3. Shading cells

The series connection of the individual solar cells into the complete panel has consequences for how partial shade affects the panel's output.

Measure short-circuit current _____ mA

- ☐ Block panel slowly from one direction while watching the measured current.

- ☐ Block panel slowly from 90° to the last direction, watching the measured current.

4. Current vs. Angle

The short-circuit current represents the power generated by a solar panel (multiplied by the “loaded” voltage gives power in watts). The optimum voltage decreases a bit when the temperature of the solar cell increases.

- ▢ Mark the measured short-circuit current value for 0° tilt angle and **decide your *y*-axis scale marks**.
- ▢ Tilt the panel up to about 15° and mark on the plot the new short-circuit current. Estimate the angle by moving it to 45° and then splitting into thirds.
- ▢ Continue to tilt the panel to each angle and record the current.