

# **SOLAR CELL PHOTOCURRENT AND ANGLE OF INCIDENCE OF LIGHT SOURCE**

From Physics *through Hydrogen, Heliocentris Energiesysteme, 1998*

## **INTRODUCTION**

A solar cell is a specially designed semiconductor diode, which generates an e.m.f. when exposed to light. The solar cell absorbs light energy and converts it to electrical energy. The amount of light falling on the solar cell will affect the current output. A solar module is a number of solar cells connected in series.

## **PURPOSE**

To investigate the behavior of a solar module when the angle of incident light is varied.

## **SAFETY**

Follow all operating instructions!

The solar module becomes hot – DO NOT OVER HEAT!

## **MATERIALS**

Solar module

Load measuring box or multi-meter

Protractor

Lamp 100-150 Watts

Connecting leads

## **PRE LAB**

Devise and draw a circuit that allows you to measure the current output from the solar module when illuminated.

Outline what you plan to do to vary the amount of light falling on the solar module.

## **PROCEDURE**

1. Construct your circuit and check that the apparatus gives reading over a suitable range.
2. Position the solar module using the protractor at  $0^\circ$  and illuminate it with the lamp. The distance between the lamp and the module should be about 50 cm and NEVER less than 20 cm.
3. Vary the amount of light falling on the solar module and measure the current output. Ensure that there is no load resistor across the solar module. NOTE: Wait until the solar module has reached a stable temperature before beginning the experiment.
4. Measure the photocurrent at different angles ( $0^\circ$  to  $90^\circ$ ) on both sides and calculate the average.
5. Devise a suitable data table and record your data either on paper or a spreadsheet.
6. Plot the current output (I) against the angle of inclination ( $\alpha$ ) of the solar module.
7. Plot I against cosine  $\alpha$ .

## **QUESTIONS**

1. What are the functional relationships as exhibited in your graphs?
  
2. Why should installers of solar panels on houses be concerned about how the photocurrent varies with angle of inclination?
  
3. Research the optimum angle at which solar modules should be installed in this country and explain your findings.

*Solar Cell Photocurrent and Angle of Incidence of Light Source*

Angle scale for solar module - Winkelkala für Solarmodul

