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Photovoltaik-System SUSE

Solarthermiesystem Wärme von der Sonne

innovative Solarsysteme für Schule und Ausbildung

BNE Bildung für Nachhaltige Entwicklung

Name:.....**School**.....**Date**.....

QR short manual english

Short guide to Experiments
with the solar module SUSE CM315

Follow the QR codes for the extensive experimentation manual in German and English →

QR english

QR deutsch

After you completed and tested the solar module, you can now conduct some experiments on photovoltaics with it. You can download the extensive 14 page experimentation manual to your phone via the QR codes.

1. Determine voltage, current, power with measurements

For this you need a multimeter with 2 lab wires (red + black) and the basic device SUSE 4.0 (halogen spot lamp 120W).

Settings of the multimeter for measuring the voltage: 20V DC, black negative wire into com jack, red positive wire into V jack, for measuring the current: 10A DC, black negative wire into com jack, red positive wire into 10A jack (indoors use measurement range 20mA DC).

Measurement site	**Voltage V in V** Motor on	**Voltage V in V** Motor off	**Short-circuit current I in A**	**Power P in W** P = V*I*0,8
On glass plate (center) of an overhead projector				
40 cm in front of halogen lamp 120W				
Outdoors with bright sunshine				
Outdoors with clouded sky				
Indoors in a conventionally lit room				

What do you notice? Note your observations on the measurements and the rotational speed of the motor as well as other evaluation ideas here:

2. Determining the irradiance (light intensity) of the light

For this you need a multimeter in the **measurement range 10A DC** with 2 lab wires (red + black), switch the motor off for measurements! Black negative wire into com jack, red positive wire into 10A

The intensity of the light (= irradiance S in W/m²) can be determined by measuring the short-circuit current, because that value is directly proportional to the irradiance. With this equation S can be calculated from the short-circuit current:

Measurement site	**Short-circuit current I in A**	**Irradiance S In W/m²**
On glass plate (center) of an overhead projector		
Outdoors with bright sunshine adjusted towards the sun		
Outdoors with clouded sky adjusted southward		
Outdoors in the shade		

$$S = \frac{\mathbf{I}\ \text{in A} * \mathbf{1000}}{\mathbf{0{,}45}\ \text{A}}\ \text{W/m}^2$$

0,45A is the short-circuit current of the solar cell with S = 1000W/m²

Note your observations and evaluation here:

3. Series connection of solar cells

For this you need a multimeter in the measurement range 20V DC with 2 lab wires (red + black), switch the motor on and off for measurements! Additional lab wires are required to connect several modules.

Because solar cells only have a low voltage of approximately 0,6 V, in big solar modules they are connected in series electrically, often 36 or 60 or even 72 cells. This increases the voltage.

Arrange 2 solar modules SUSE CM315 in the light of a halogen lamp and connect the negative pole of module 1 to the positive pole of module 2. You can now measure the total voltage between the positive pole of module 1 and the negative pole of module 2. Note the values in the table and extend the circuit to 3 or 4 modules in series connection.

Number of modules	**Voltage module 1 in V**	**Voltage module 2 in V**	**Voltage module 3 in V**	**Voltage module 4 in V**	**Total voltage in V**
2			xxxxxxxxxx	xxxxxxxxxx	
3				xxxxxxxxxx	
4					

Additionally you can also connect a solar motor SUSE 4.16 or an LED module SUSE 4.15 or the radio SUSE 4.36 to the total voltage. You may require more than 4 solar cells in series connection! If you are interested in the detailed **technical data of the solar cell**, you can find those via this QR code:

Note your observations and evaluation here:

QR technische Daten /technical data Solarzelle SUSEmod5