

## The LED module SUSE 4.15

LED module for the connection to 4-8 solar cells in series (5 V version)  
or up to 20 solar cells in series (12 V version)

With sockets for the connection to lab wires with 4 mm plugs



Front side



General view

LED **red**, **green**, **blue**,  
**white**, or **rainbow**

**2 sockets** to plug in lab wires  
(**red + black -**)

**Mind the polarity!**

**With the wrong polarity the  
LED does not glow!**

### SUSE 4.15 device manual, technical data and experiments

The LED-module SUSE 4.15 consists of optionally a red, green, blue, white, or rainbow colored LED with a series resistance on a transparent plexiglass base plate and is applicable for the connection to 4-8 solar cells in series up to 5 V. Selectively a 12 V version is also deliverable, here up to 20 solar cells can be connected in series. The LED rainbow is changing colors automatically through all rainbow colors, an optically pleasant play of colors!

The positive pole of the solar cell series connection has to be connected to the positive pole of the LED module (red binding post), the negative pole to the black binding post. With the LED module the function of solar cells in a series connection can be demonstrated even without any measurement equipment.

The more solar cells are connected to each other, the brighter the LED lights up (at least 4 solar cells required!). Lab wires with 4 mm plugs can be plugged into the sockets.

The **right polarity** has to be regarded, with false polarity the LED is non-luminous.

The LED module SUSE 4.15 can (optimally with red and green) also be used as a solar cell itself (but not the LED rainbow, because it contains an internal electronic chip that regulates the color change, the white LED doesn't function this way, too). If the binding posts are connected to a voltmeter in the measurement range of 20 V and the LED is held into the sunlight or into the light of a lamp a voltage of about 1.5 V for the red LED can be observed.

This voltage is significantly higher than the voltage of a silicium solar cell (0.6 V), because the semiconductor material of a red LED is **gallium arsenide** and therefore a higher voltage than in silicium (normal standard solar cell) occurs.

It is important that the light irradiates centrally on the optical axis into the LED, because the curved front edge of an LED represents a convex lens and the light is focused onto the tiny semiconductor crystal.

However, because of the tiny area of the semiconductor in the LED this LED solar cell provides only a minor current in the range of under 100  $\mu$ A, this can be measured with a multimeter.

The LED module SUSE 4.15 can also be connected to batteries of 3V....4.5 V with the right polarity.