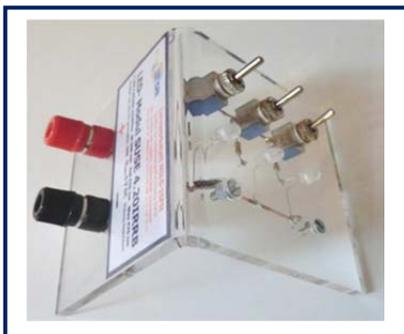
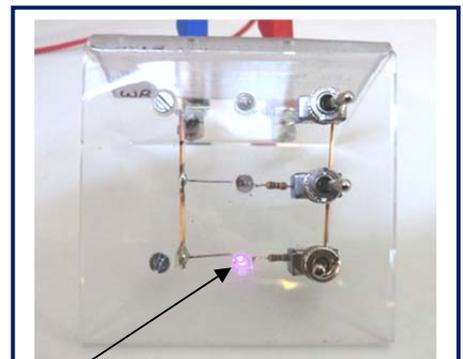
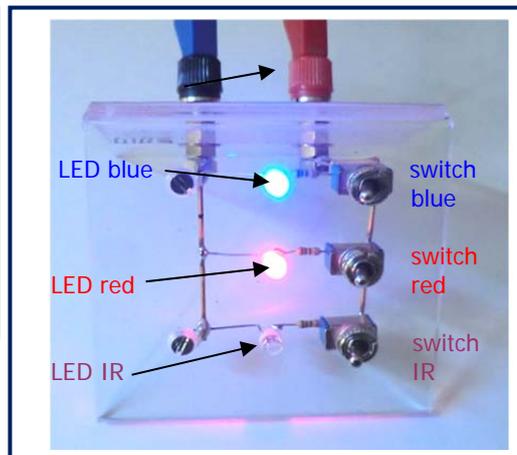


## The LED module SUSE 4.20IRRB

LED module with 3 individually switchable LEDs infrared IR 950 nm, red 626 nm, blue 470 nm, with binding posts for plugging in lab wires or for clamping bell wire



The LED module SUSE 4.20 IRRB  
On the left hand side the two binding posts and the model plate are located, on the right hand side in the middle the 3 LEDs and at the top the 3 switches



Glowing IR LED only visible through digital camera!

Only the IR LED is turned on, the digital camera or smartphone camera shows the infrared light purple, the glowing is not visible with the naked eye.

The **LED module SUSE 4.20IRRB** consists of 3 LEDs, **infrared IR (950 nm)**, **red (626 nm)**, **blue (470 nm)**, which can be turned on and off separately with their own switch. The input voltage at the binding posts can be 5.0 V maximum.

The module consists of a transparent roof-shaped bent plexiglass base plate and is suitable for a connection to a series connection of 3-8 solar cells, it can also be connected to the solar motor SUSE 4.16, if the motor is operated as a generator. Additionally it can be operated using batteries with 4.5 V. The **IR light is invisible for the human eye**, but can be observed using digital cameras.

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. Using the LED module the function of solar cells in series connection can be demonstrated even without any measuring device. The more solar cells are connected, the brighter the LED lights up.

The minimum voltage for lighting up the LEDs is about 1.1 V for the IR LED, 1.5 V for the red LED and 2.7 V for the blue LED.

At the binding posts lab wires with plugs can be plugged in or hookup wire can be clamped. The right polarity has to be followed, with the wrong polarity the LEDs do not light up.

The 3 LEDs in the module can be used as a **solar cell** themselves: If a voltmeter in the measurement range 20 V is connected to the binding posts and the LEDs are held into the sunlight or the light of a lamp, a voltage of about 1 V for the IR LED, about 1.5 V for the red LED and about 2.5 V for the blue LED can be observed. These voltages are substantially higher as the the voltage of a silicon solar cell (0.6 V), because another semiconductor material is used for LEDs, e.g. **gallium arsenide** for the red LED, thus a higher voltage as in silicon (normal standard solar cell) develops. The further the light emitted is from IR to blue in the spectrum, the higher this voltage.

It is important, that the light illuminates the LED centrally on the optical axis, because the curved front of an LED acts as a convex lens and focuses the light onto the tiny semiconductor crystal. Due to the tiny area of the semiconductor inside the LED these LED solar cells only deliver a very low current in the range of under 100  $\mu$ A, this can be measured using a multimeter.