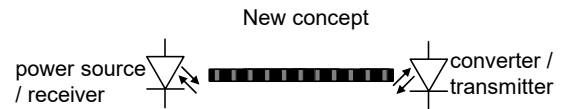


**J. Fischer, T. Schuster, M. Luber, P. Urbanek, O. Ziemann**

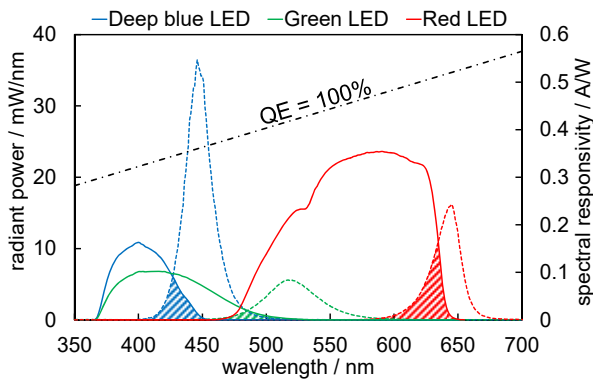
Polymer Optical Fiber Application Center, Technische Hochschule Nürnberg Georg Simon Ohm, Nuremberg, Germany

## Motivation

As a solution to reduce the need of different optical components for optically powered optical sensor links from 4 to one kind, a LED will be used as light source and photodiode.



## LEDs mutual responsivity

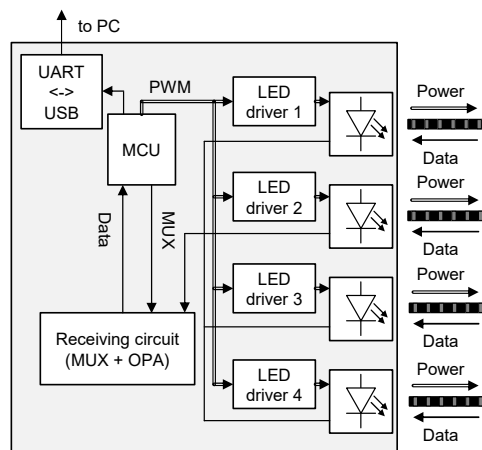


- Mutual responsivity is the sensitivity of the LEDs to their own emitted light spectrum
- It is represented by the “overlapping” area if spectral responsivity and radiant power are plotted
- The red LED has the highest mutual responsivity of all LED under test
- The efficiency corresponds to a quantum efficiency (QE) of up to 77 %

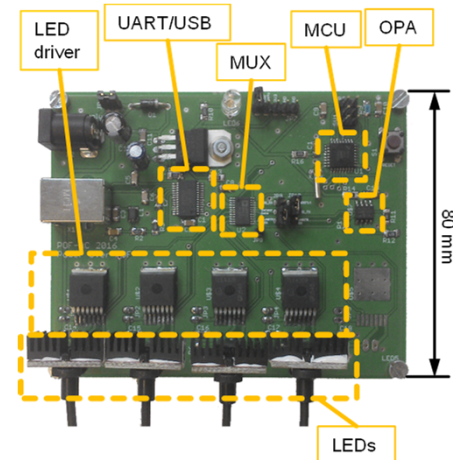
LED	Deep blue	Green	Red
U / V	2,30	1,33	1,58
I / mA	3,11	0,096	5,87
P / mW	7,16	0,127	9,29

## Central board

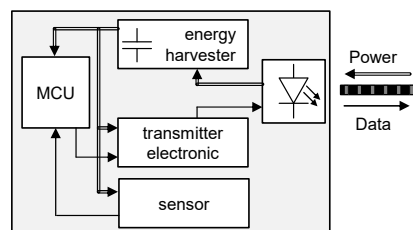
### Block diagram



### Hardware setup

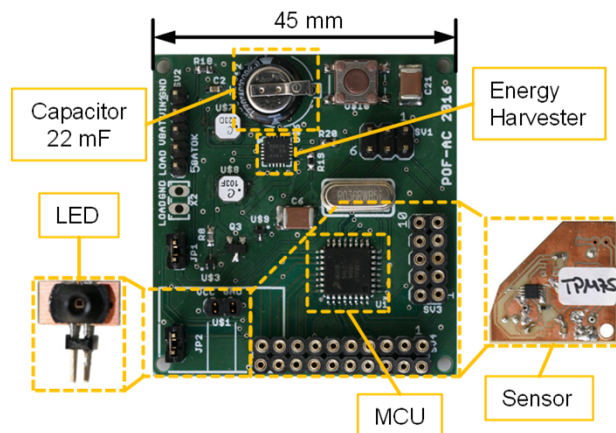


## Sensor board



Sensors:

- Temperature (TMP75)
- Atmospheric pressure (MS5637)
- Relative humidity (SHT21)
- Photoelectric (TCST2103)



Parts of this work have been funded by the Staedler-Stiftung within the project “OSALED – Optische Sensor-Anbindung mit Leuchtdioden”.

Further improvements are planned in cooperation with Avago Technologies GmbH, A Broadcom Limited Company.