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IETR

A highly configurable platform for advanced PPG analysis

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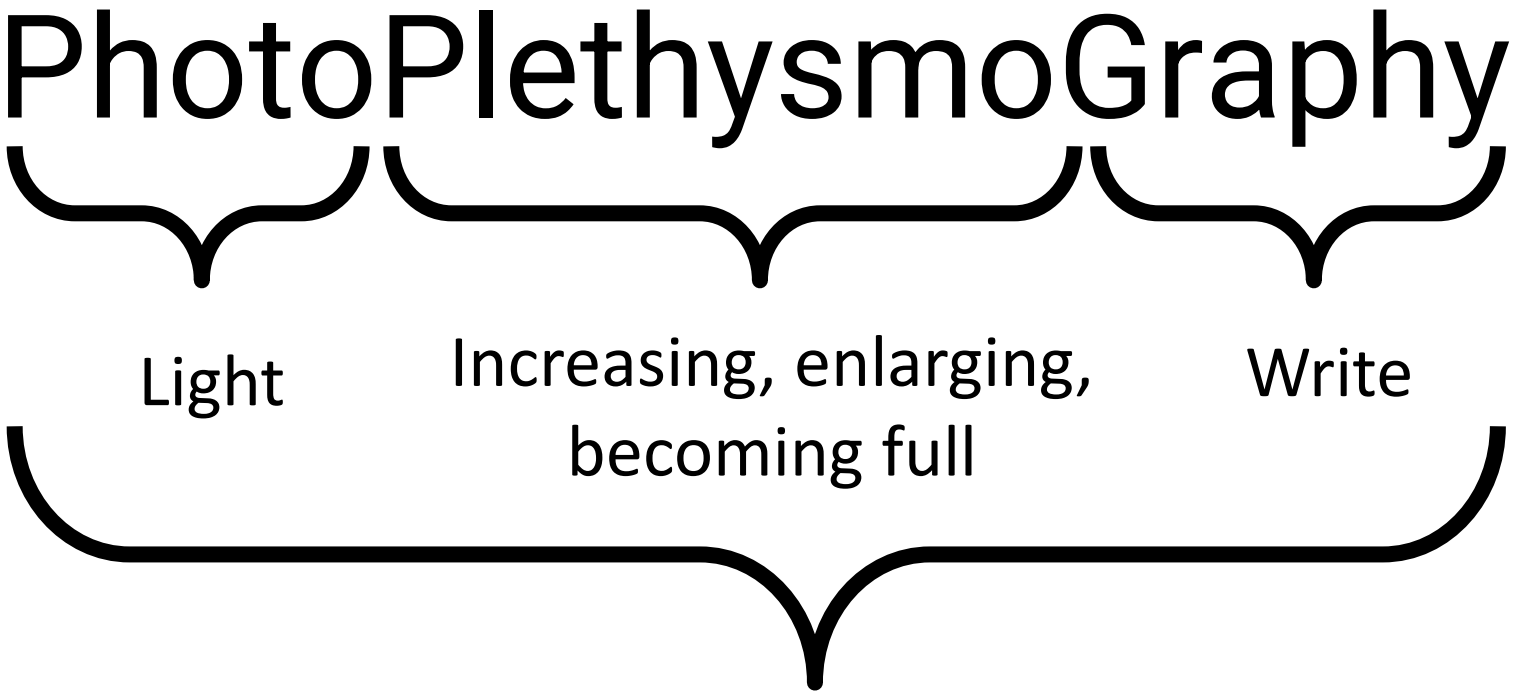
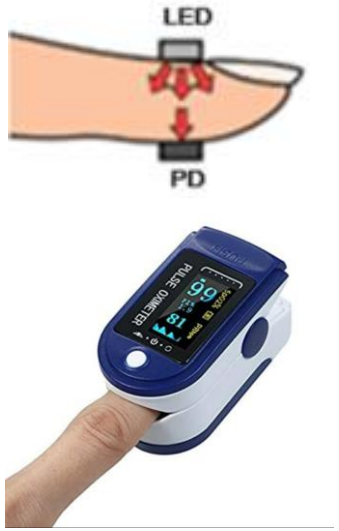
Signification of PPG

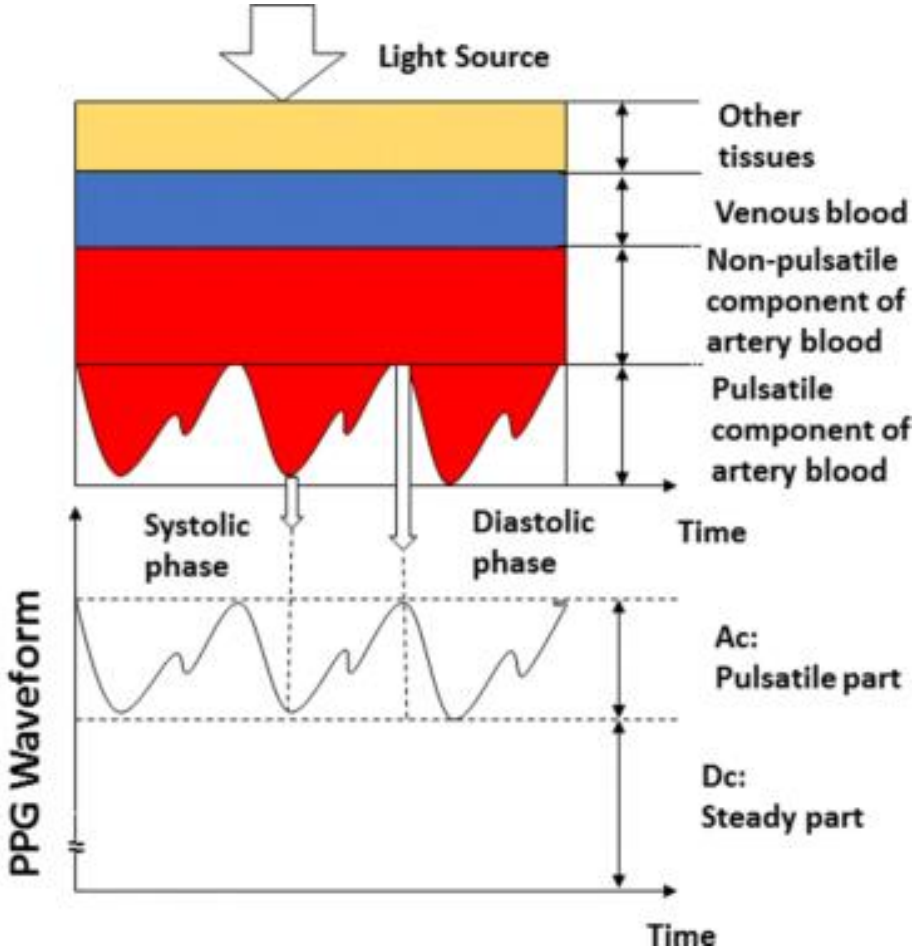


How does PPG works ?

Transmitted



Reflected



List of possible measures and application of the PPG

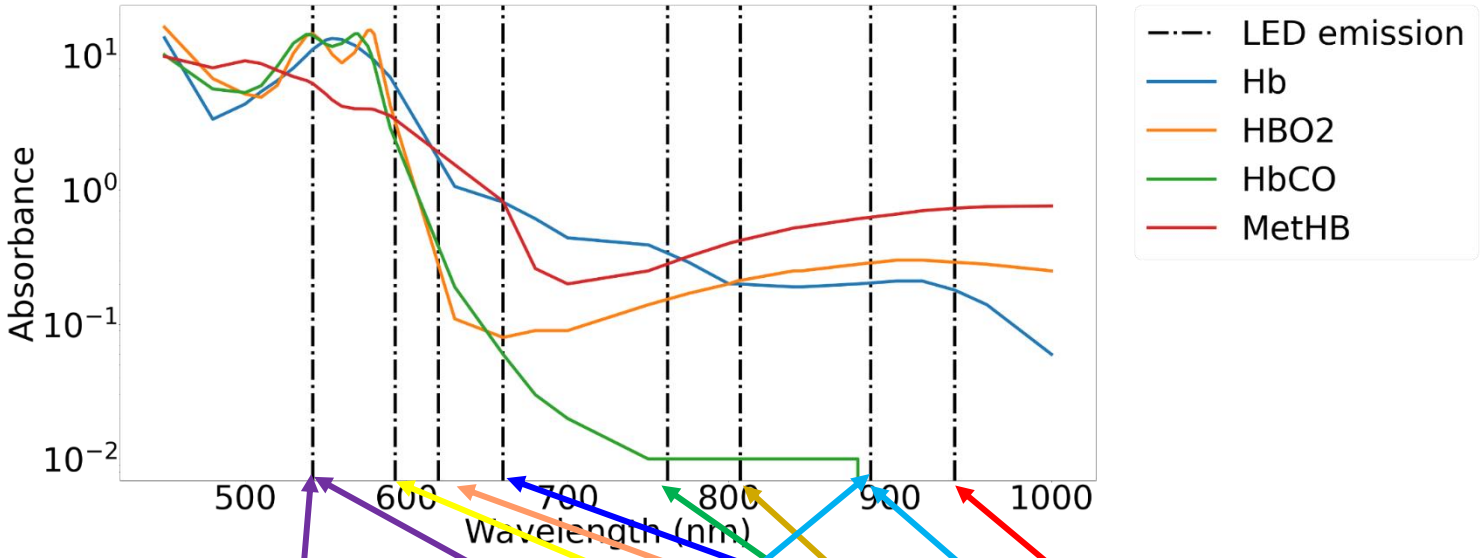
Measures

- Heart Rhythm
- Heart Rhythm Variation
- Oxygenation
- Breathing
- Blood pressure
- Glycemia
- Hydration

Application

- Training monitoring
- Stress monitoring
- Cardiovascular health assessment
- Training overload detection
- Disease detection
- Epileptic seizure detection

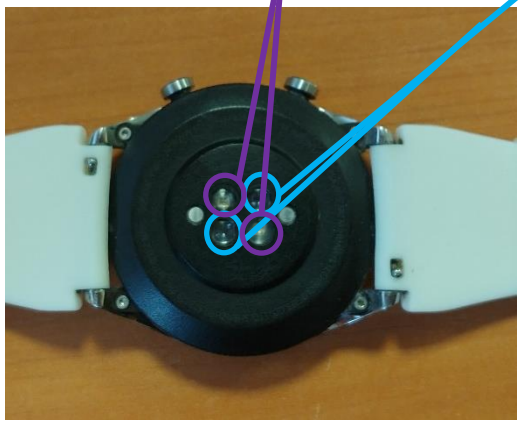
Physical principal of the calculation of the oxygenation



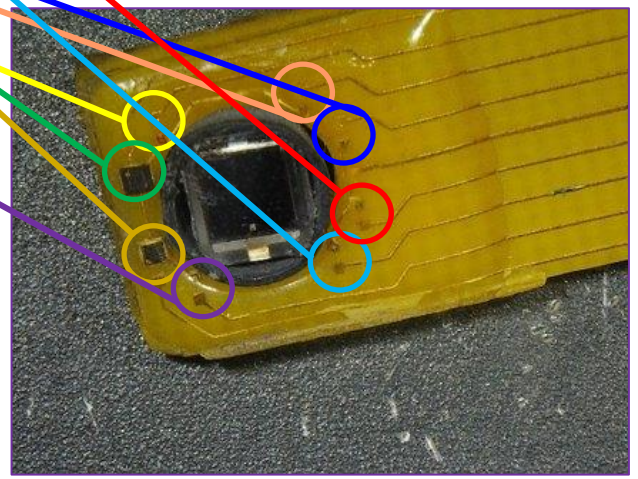
$$A = \varepsilon c l$$

A	Absorbance	
ε	Molar absorption coefficient	$M^{-1}cm^{-1}$
c	Molar concentration	M
l	optical path length	cm

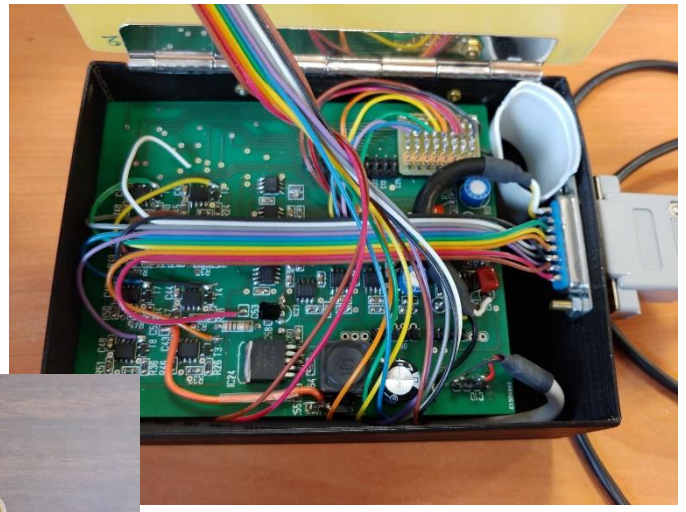
Classical sport watch

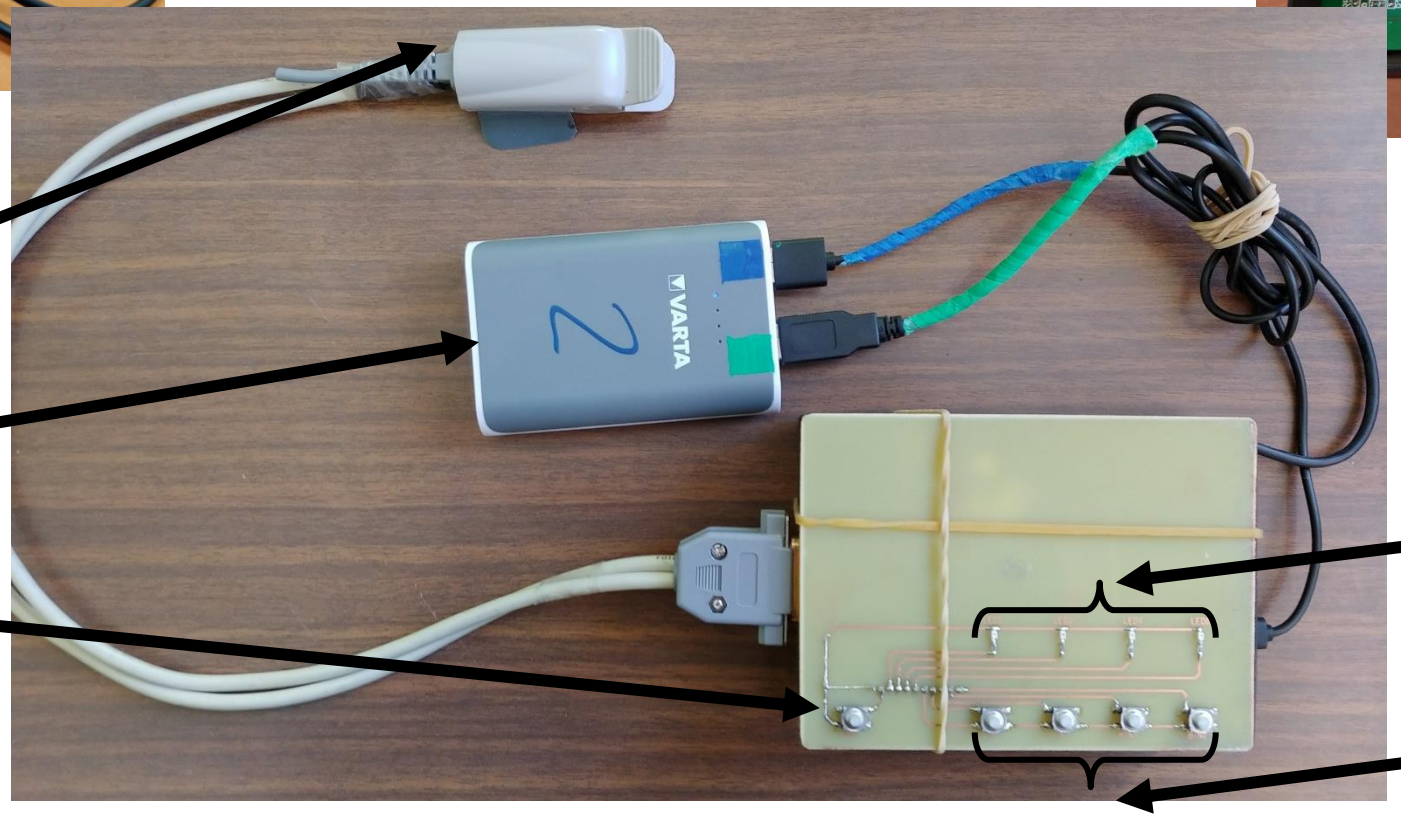


Proposed PPG sensor



Our proposed platform





Photodiode and LEDs

Battery

Reset Button

Indicator LEDs

Control Button

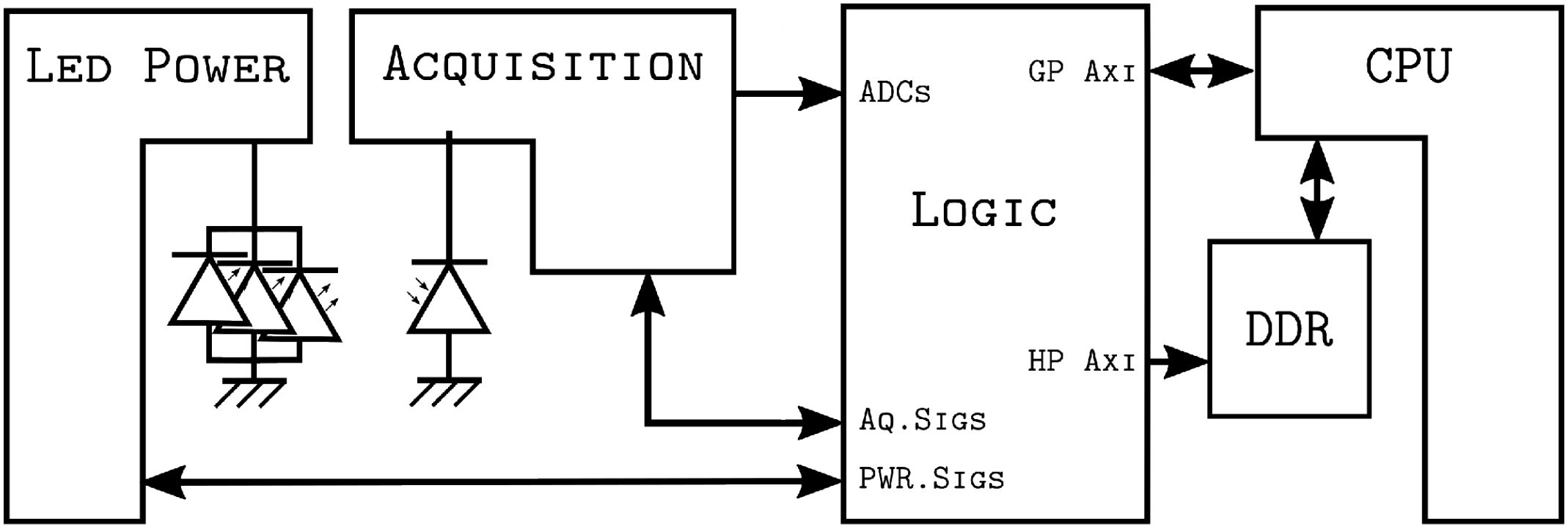
Proposed platform originality

- 8 wavelengths
- Highly configurable
  - Sampling frequency
  - Illumination parameters
  - etc
- High accuracy
- Choice between reflectance and transmittance
- Access to raw data

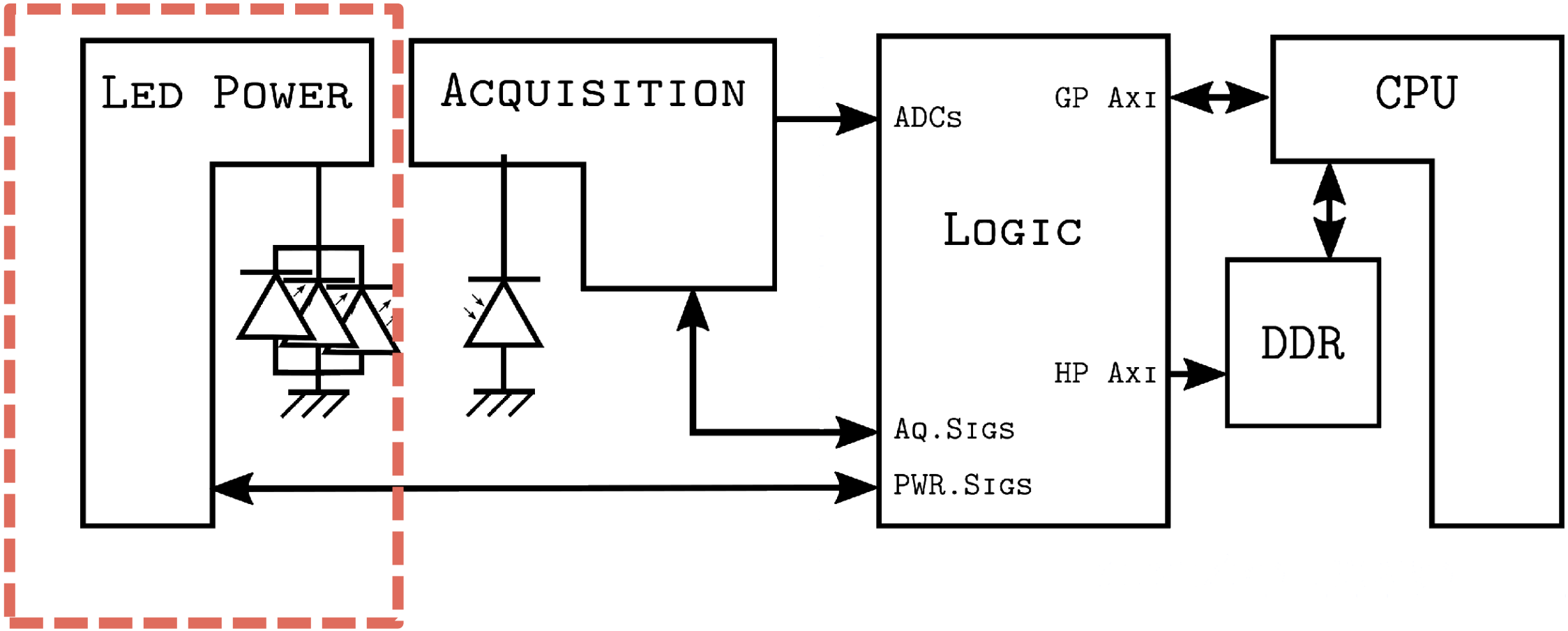
New possibility with our proposed platform

- Be able to test different and new scenarii
- Determine optimal parameters
- Test energy aware scenarii
- Use in different light environment
- Adapt to the physiological differences between subjects

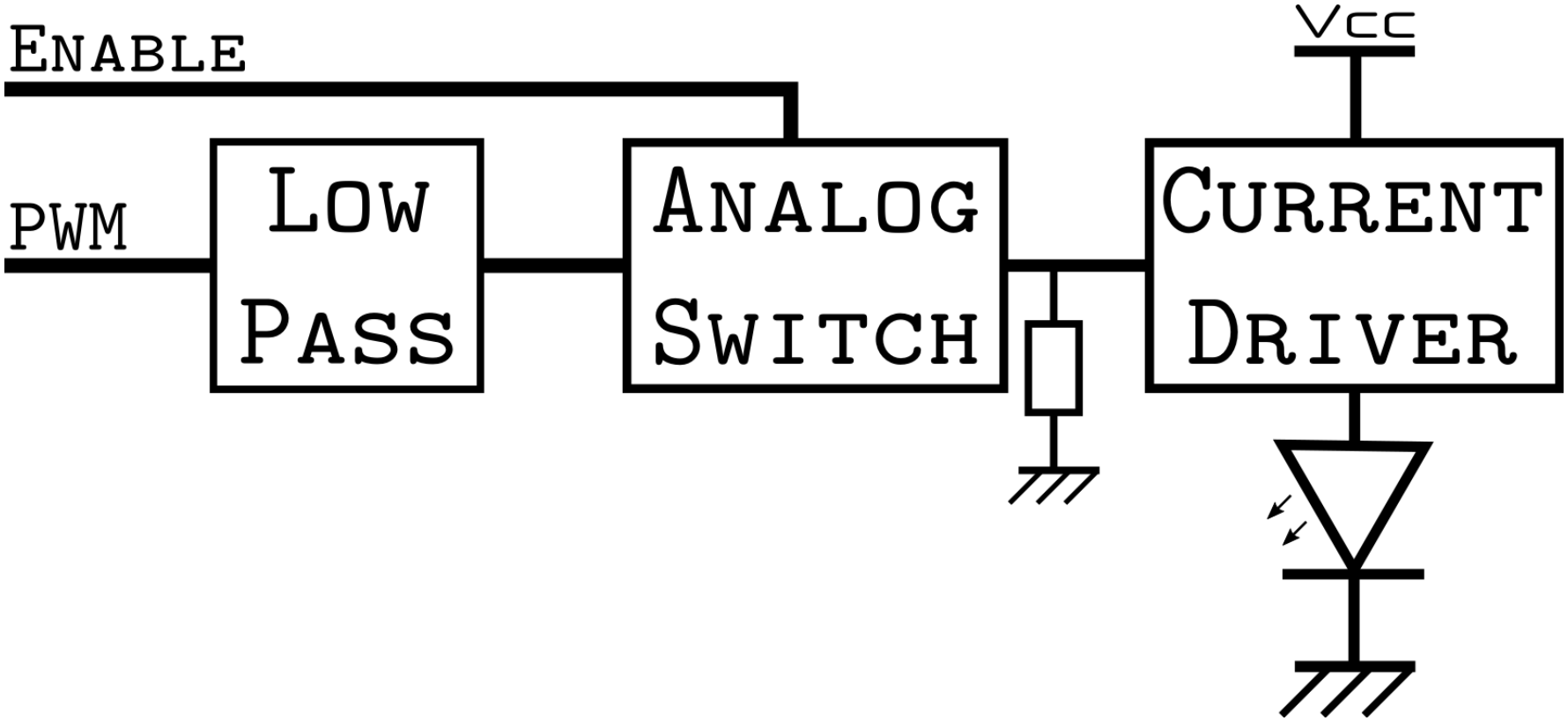
Global schematics



More detail on the Led power stage

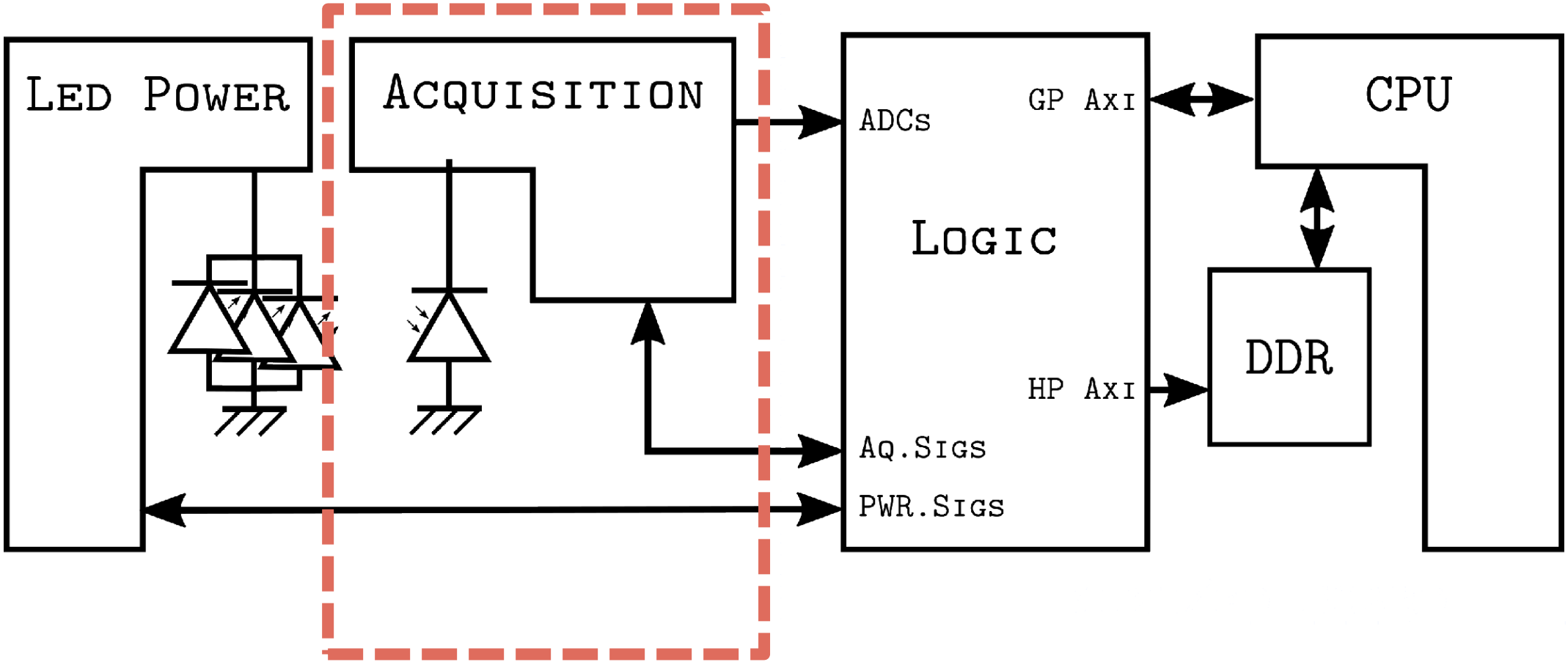


More detail on the Led power stage



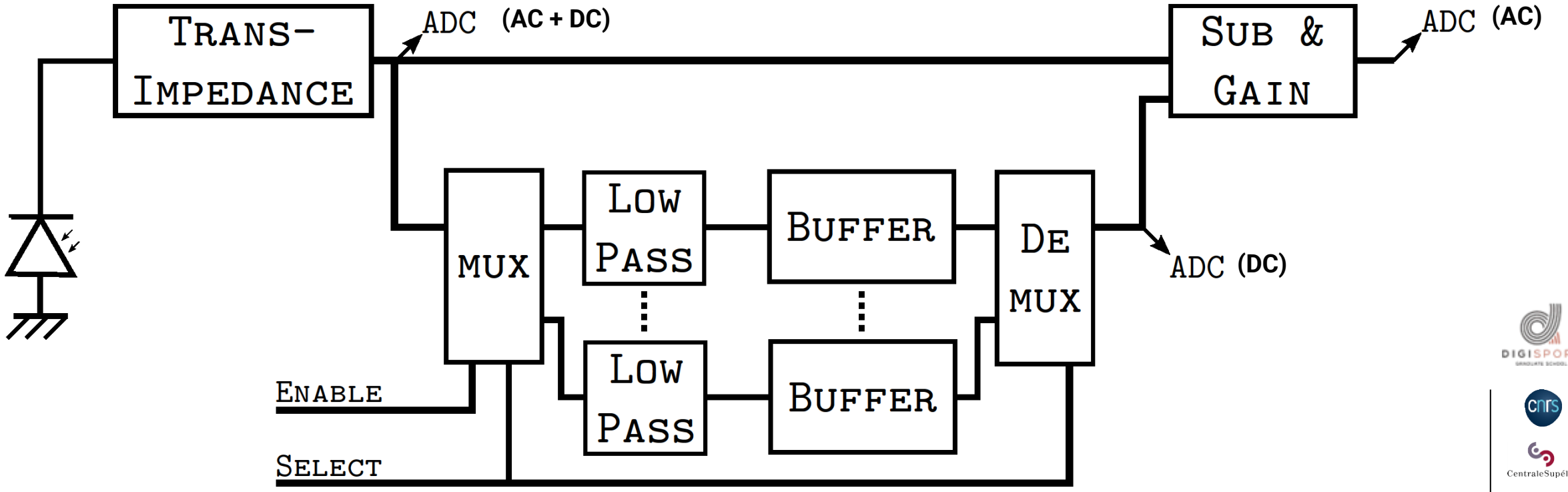
More details on the acquisition stage

How?

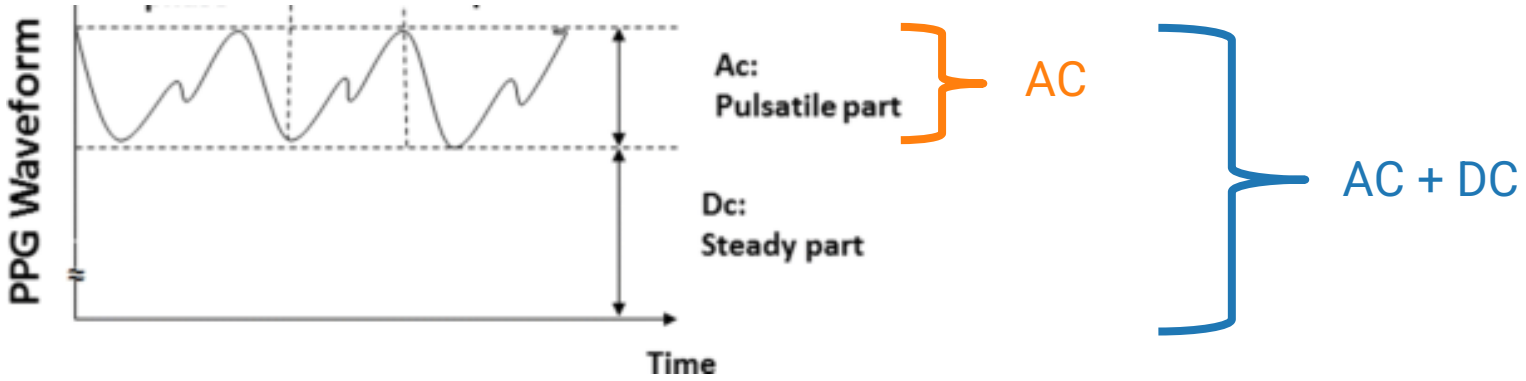


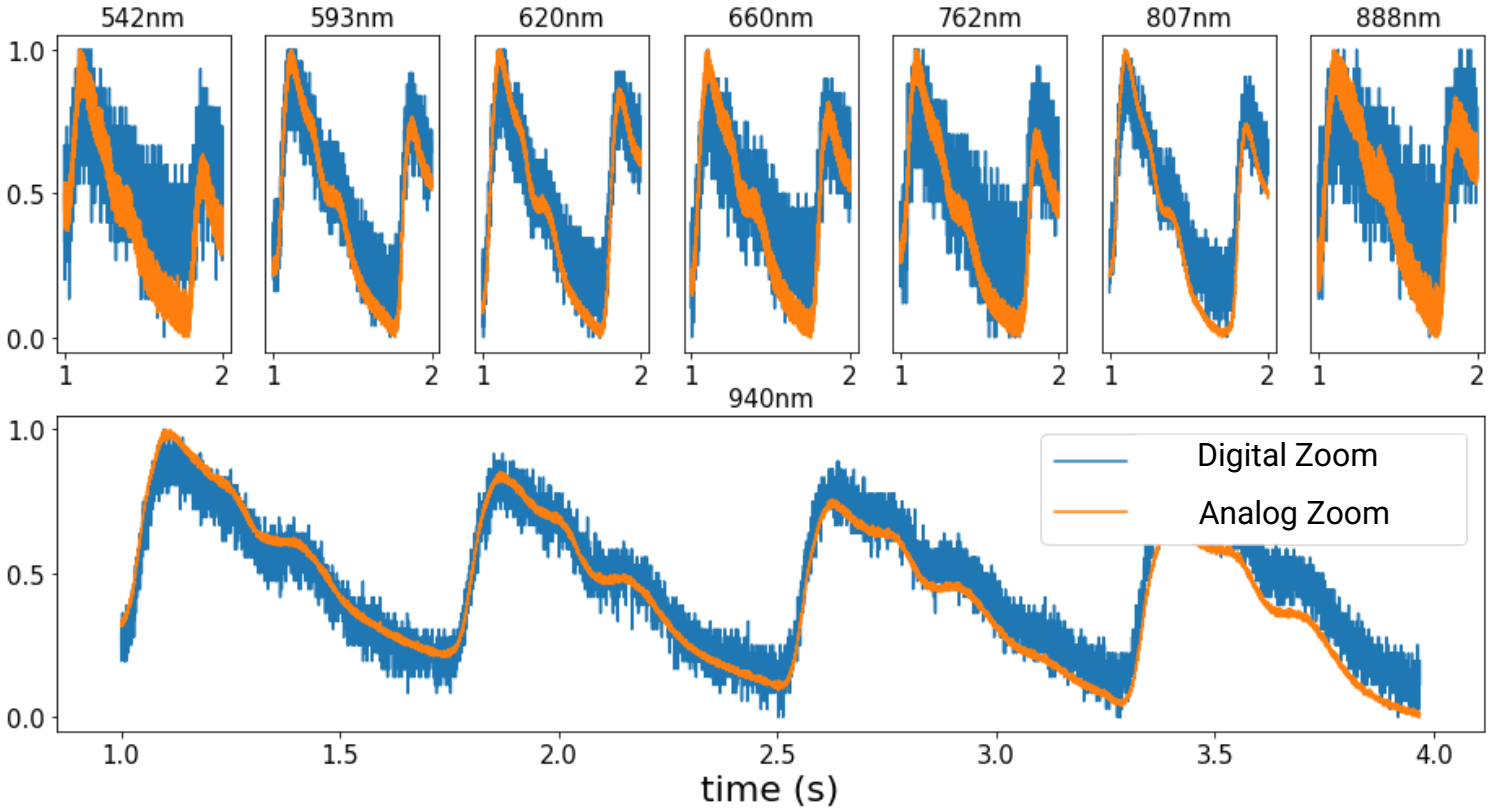
More details on the acquisition stage

How?

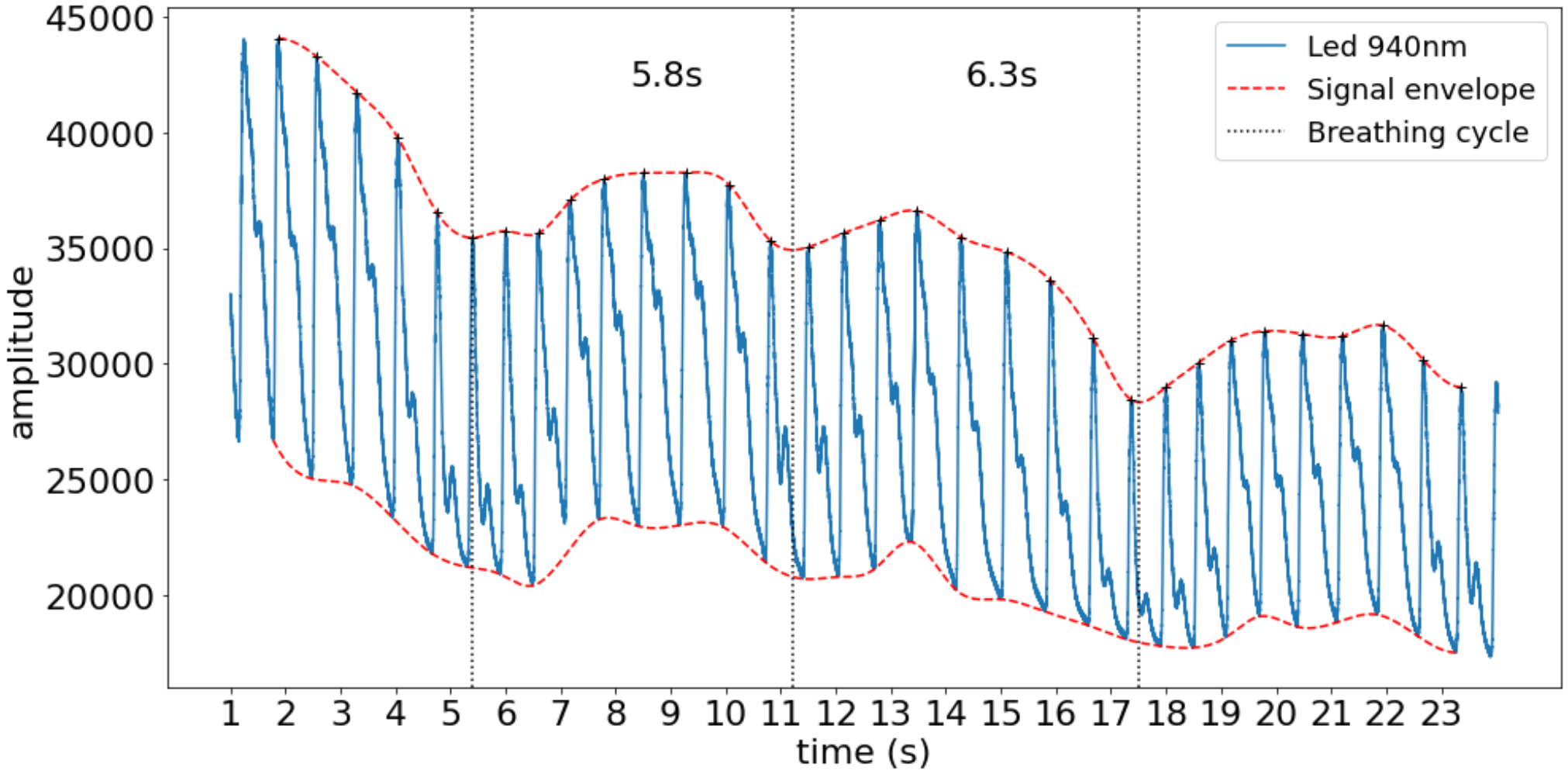


Differences between Analog and Digital Zoom

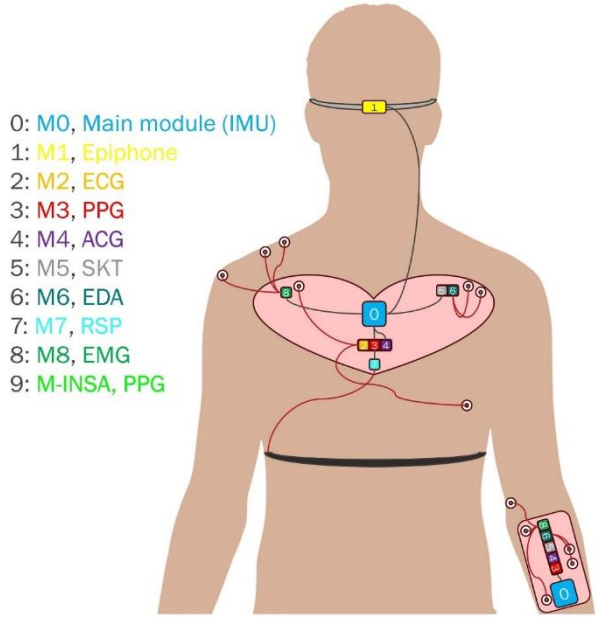




Finding breathing pattern : proof of concept

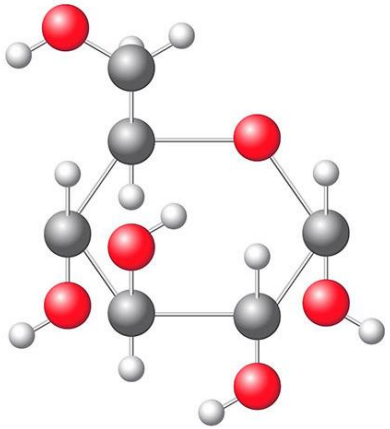


Future



Creation of a dataset

- Test of our sensor against different type of other sensors
- Large panel of activities



New applications

- Glycemia estimation
- SpO2 estimation
- Dyshemoglobin estimation

Conclusion

PPG in general

- Non invasive
- Easy to transport
- Easy to use
- Lot of measures possibles
- Lot of applications

Addition of our platform

- 8 wavelengths
- Highly configurable
- High accuracy
- Choice between reflectance and transmittance
- Access to raw data
- New measures
- New applications