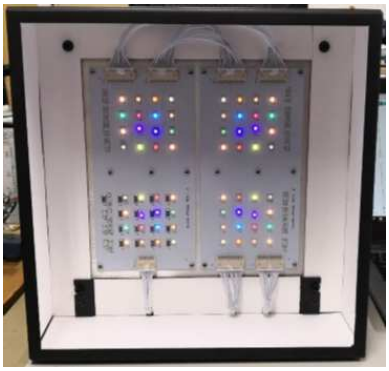
Development and calibration of light source for psychophysical experiments on mice and humans



Graduate Michellod Yan

Objectives

The goal is to calibrate the LEDCube to examine the contribution of melanopsin cells to control the pupil reaction and the circadian cycle of the mice thanks to the method of silent substitution. In the same time, we will see if it's possible to calibrate this light source for psychophysical experiment on humans. Otherwise another system must be created.

Methods | Experiences | Results

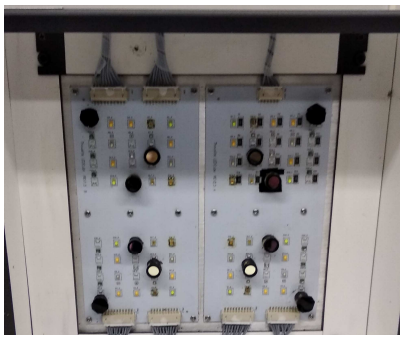
Psychophysical experiments need precise stimulations to have conclusive results. A light stimulation is characterized by its spectrum and its intensity. First the primaries must be chosen for having the best contrast on the melanopsins cells. 400nm (UV), 450nm (Blue), 550nm (Green) and 595nm,625nm,635nm (Red) are selected by the simulations of Sei-Ichi Tsujimura, PhD. To set the intensity, the current through LEDs is selected according to the characteristics of the LED current driver and to decrease even more the power, some ND filters (Neutral Density) are used. The shape of the spectrum is modified by IF (Interference Filter). Using this kind of filter modify the mixing of color on the diffuser and prevent the calibration for human, because the light source is not uniform anymore. That's why a new light engine based on the best elements of the actual ganzfeld which is a experiment in the lab and the best of the LEDCube is developed. Indeed, the optic system used in the ganzfeld allows having a uniform light source thanks to the optic fiber.

Bachelor's Thesis
| 2019 |

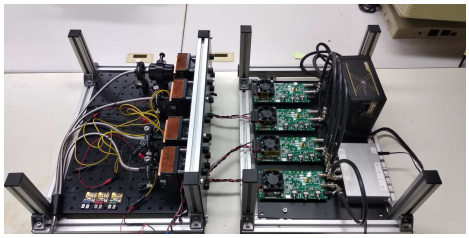
Systems engineering
Infotronic

Field of application
Major

Supervising professor
Dr Geiser Martial
martial.geiser@hevs.ch



LEDs panel of the LEDCube calibrated for mice experiments with IF and ND filter.



Light engine system for high power LEDs composed of ARM µC, high power current driver and optic fiber mounted in a breadboard