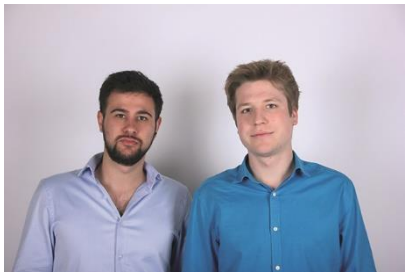
Zurich University
of Applied Sciences

School of Engineering

ICP Institute of Computational Physics

OLED Life-Time Tester



Diplomierende
Alex Meier
Rafael Ropelato

Dozierende
Otto Fluder
Kurt Pernstich

During this thesis, a cryostat was developed for the spin-off company Fluxim. The cooling process is executed by using Peltier-elements. The use of the developed device is to test and measure organic light-emitting-diodes (OLED) at different temperatures. OLEDs are used in a wide range of applications, especially for displays.
To analyse and understand physical processes, tests are often conducted at low temperatures. During this project, a prototype which was developed in one of our earlier projects, was extended and optimized. By using an eight-channel sensor shield, an Arduino microcontroller is used to measure and control the temperatures. Additionally, the microcontroller also communicates with the existent optoelectrical measurement unit for OLEDs. To allow a controllable supply voltage, an electric circuit was built to regulate the output of a DC-DC stepdown converter. To carry away the heat from the Peltier-elements, an industrial circulation cooling unit is used. By executing finite-element simulations, the geometry could be optimized. This allows to achieve temperatures between -60 °C and +70 °C. The controller was designed by using Simulink and can control temperatures with less than 0.1 °C deviation.
A modular geometry allows to test multiple probes with simple extensions. The prototype can easily be transferred into a marketable product by the industrial partner.

Overview of the Cryostat with open Vacuum-Cap