

Optical control of Photonic integrated circuits using duo-chromatic microLED technology

Graduation/internship project | in collaboration with Faculty of Electrical Engineering, ECO group

Introduction

Large scale control of photonic integrated circuits (PICs) is a growing challenge in the field of photonics. Traditional activation of PICs using distributed networks of electrically driven actuators is facing limitation from both the design of required electronic ICs and the co-packaging of photonic and electronic ICs. In the ECO group in the EE department, researchers are working on the next generation of PIC control using microLED technology (see figures 1,2). MicroLEDs are emerging as the go-to technology for next generation displays for consumers (figure 3) and as the ideal display technology for VR and AR goggles.

Project

The use of microLED technology for PIC control still requires proper packaging and even more so when more than one such microLED arrays is needed in the case that polychrome or duo chromatic illumination is required. The project therefore will revolve around the design of an appropriate optical and mechanical solution for fixing at least two microLED arrays into an appropriate housing so that the light from both can impinge upon the PIC surface and that the illumination patterns from both arrays is accurately overlapping.

Goal | milestones and achievements

- Mechanical design of required microLED holder for single and dual microLED use case.
- Optical design including prisms and lenses to ensure that patterns from microLED displays is properly focused on the PIC surface and well aligned to each other.
- Simulation and definition of required thermal dissipation solution for microLEDs mounted on holder.
- Fabrication, assembly and testing of opto-mechanical microLED holder in photonics lab.
- (optional) demonstration of use of microLEDs in holder to control a PIC in photonics lab.

References

Interested?

dr. R. Luttge (r.luttge@tue.nl) | GEMZ 3.111

