

KIDS TALK

“Electrochromic micro-iris and gradient filters for image adaption in miniature cameras”

Speaker: Carsten Kortz, AG Oesterschulze

Abstract: In the last years outnumbers of different hand-held electronics with integrated cameras were presented. However, their optical imaging quality is still limited because there is no micro-iris available that allows the control of both intensity as well as depth of focus. The main obstacle for iris integration is the limited space in the camera as well as the unavailability of appropriate actuators that meet the additional requirements of low voltages and power consumption.

Our goal is to prevent any mechanical based iris but to establish the same functionality using electrochromic materials like viologens molecules chemically bonded to appropriate nanoparticle thin films. To fabricate such miniaturized devices microfabrication techniques are required as they are available in the Nanostructuring Center (NSC). For the realization of a thin film iris we investigate different transparent conductive layers (ITO/FTO), nanoparticle materials (TiO_2/ATO), and specially synthesized electrochromic molecules tailored to comply with the desired function of the iris.

In close collaboration with our project partners we currently work on the realization of the world-wide first electrochromic iris for an endoscope used in human medicine. For this particular application special requirements like a long life-time and sufficient temperature stability during high temperature sterilization have to be fulfilled. In a second project, we work on an actively controlled gradient filter (Fig. 2a), that is used to adapt the spatial intensity distribution during imaging avoiding overexposure or accentuating particular areas of the image. In this way, HDR images may be recorded without further image postprocessing. To realize different spatial absorption profiles a potential distribution like the one shown in Fig. 2b) is required on the working electrode.

Thesis topics and HiWi positions available.

When: Friday, June 9th 2017, 10:00 am

Where: Room 46-387/388

All undergraduate and graduate students as well as postdocs are welcome and encouraged to join our discussion!

***** COFFEE, TEA AND COOKIES WILL BE SERVED *****

For questions, comments or suggestions: cjoerg@physik.uni-kl.de



Abb. 1: EC Iris, with the inner ring switched on

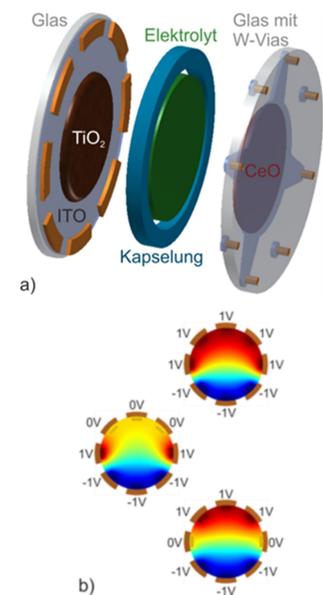


Abb. 2: a) Scheme of a gradient filter with 8 electrodes; b) simulated field distribution on the electrode.

