Institute of Applied Physics
Friedrich-Schiller-Universität Jena

Internship, Research Labworks, Bachelor Thesis, Master Thesis

in the subject area of

Switchable meta surfaces

The thermochromic phase-change material Vanadium dioxide (VO_2) has a semiconductor-to-metal transition at 68°C. Especially in near infrared wavelength regime the complex refractive index changes significantly. It ca be used to realize meta surfaces exploiting these phase-change in order to achieve novel actively switchable micro-optical devices such as color filters, waveguide switches and polarizers.

The aim of the work on that topic is the development of new design concepts, including simulation and manufacturing, investigation of switching characteristics as well as the enhancement of existing manufacturing processes.

Covered subjects

- Design, simulation and manufacturing of thin films for optical applications
- Optical and electrical characterization of different thin films
- Improving current manufacturing processes, like ion beam deposition or reactive ion etching of VO_2

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Literatur:

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2. Olivares I. et al. (2018). Optical switching in hybrid VO2/Si waveguides thermally triggered by lateral microheaters. Opt. Express 26, 12387-12395. https://doi.org/10.1364/OE.26.012387
3. Walther, M., Siefke, T., Gerold, K. & Zeitner, U. (2022). Switchable optics based on guided mode resonance in lithographically patterned vanadium dioxide. EPJ Web of Conferences. 266. https://doi.org/10.1051/epjconf/202226605011