A tutorial on controlling wavefronts with spatial light modulators

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KEY WORDS: spatial light modulators, wavefront shaping, Fourier filtering in microscopy, aberration correction, phase contrast, quantitative phase imaging, 3D imaging, scanning microscopy.

This tutorial intends to give an overview of Spatial Light Modulators (SLMs) and their applications in microscopy. It will treat the working principle of different SLM variants, such as liquid crystal based devices, deformable mirrors and digital micro mirror arrays. Possibilities and limits will be discussed.

The tutorial will then focus on state-of-the-art and emerging applications in light microscopy, such as adaptive optics and the development towards a "programmable microscope". Various applications from widefield and scanning microscopy will be given.

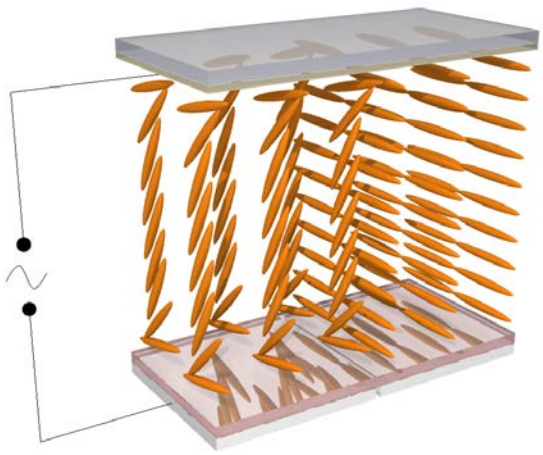

Figure 1: 1Illustration of liquid crystal in a SLM

[1] C. Maurer, A. Jesacher, S. Bernet, and M. Ritsch-Marte: „SLM-Microscopy: What spatial light modulators can do for microscopy", *Lasers and Photonics Reviews,* **5**, 81-101 (2011)