

LightTrans talk at DGaO 2019

# Fast-Physical Optics Modeling of Advanced Microscopy Systems

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## **Abstract**

Nowadays, various types of optical microscopes are widely applied in different fields, such as optical lithography, optical storage, and bio-photonics. In addition to the early-stage microscopy setups, those advanced microscopy in modern optics are often designed with more physical-optics principles involved and they are used for the investigation of more complicated effects/phenomena. Thus, we present a fully physical-optics-based modeling for the analysis of such systems, and that include an electromagnetic representation of light with coherence and polarization and also an electromagnetic field solver for the interaction of light with micro- and nano-scaled samples. As example, modeling of a two-photon microscopy with 3D-structured illumination is demonstrated, and we analyze its performance in terms of contrast, inhomogeneity and the temporal focusing of the 3D-structured illumination in the focal region.