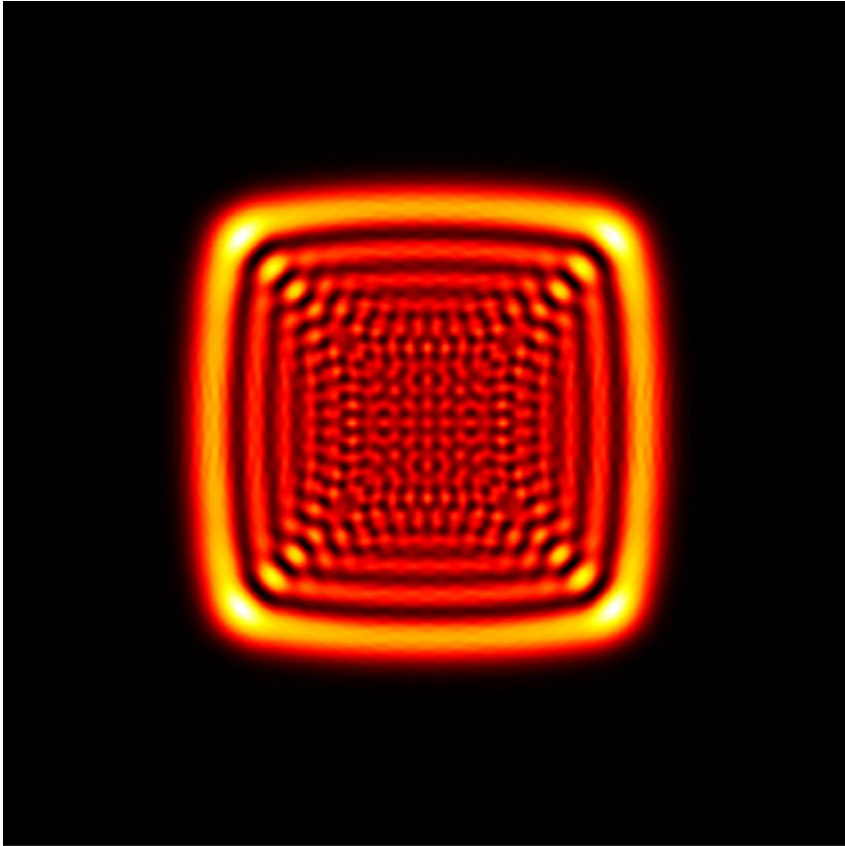


Investigation of Lens Aberrations in a SLM-based Beam Shaping Setup

Abstract

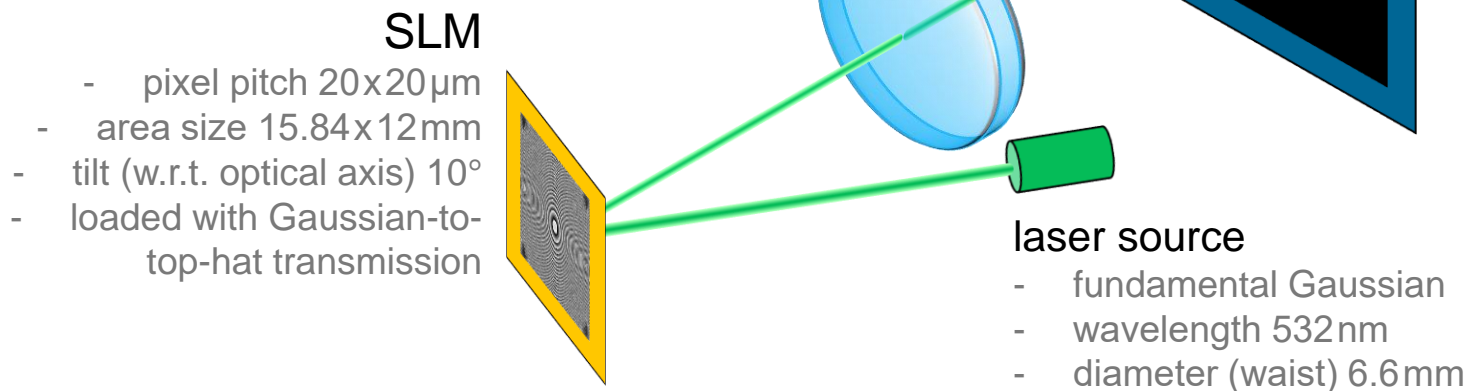


Diffractive beam shapers are usually used in combination with other optical components, like focusing lenses. Therefore, the quality of the shaped beam depends not only on the diffractive beam shaper itself, but also on the other components. It is important to understand the role and contribution of each component in the resulting beam quality. In this example, the influence from lens aberrations on the performance of a beam shaping system is investigated in VirtualLab.

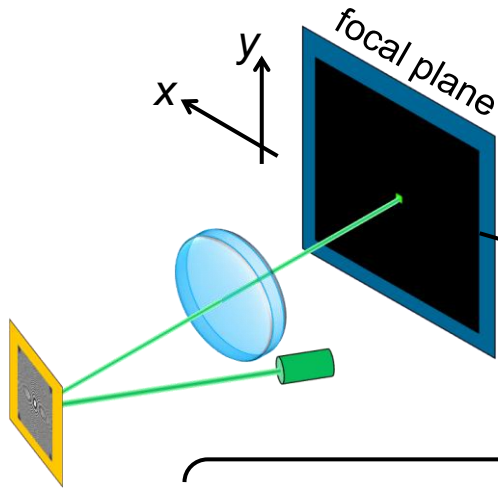
Modeling Task

	Lens #1	Lens #2	Lens #3
type	spherical biconvex (not optimized)	spherical biconvex (optimized)	aspherical (Asphericon A25-50LPX)
eff. focal length	50 mm	50.95 mm	49.20 mm

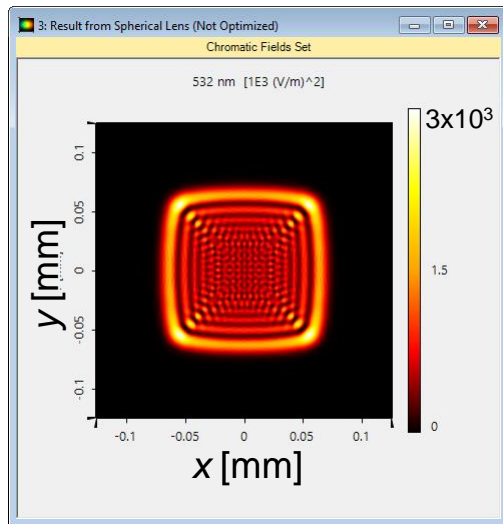
How do different lenses,
with different aberrations,
affect beam shaping
performance?



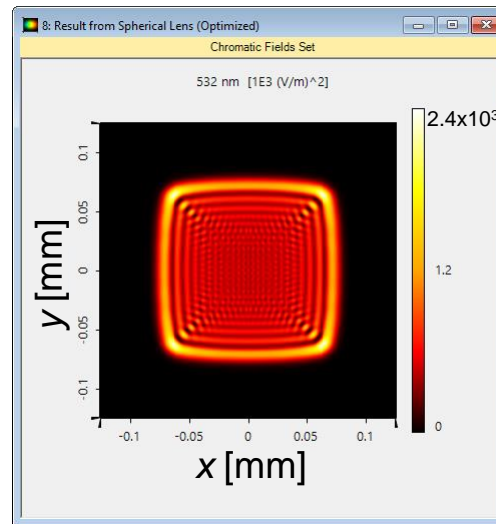
Results



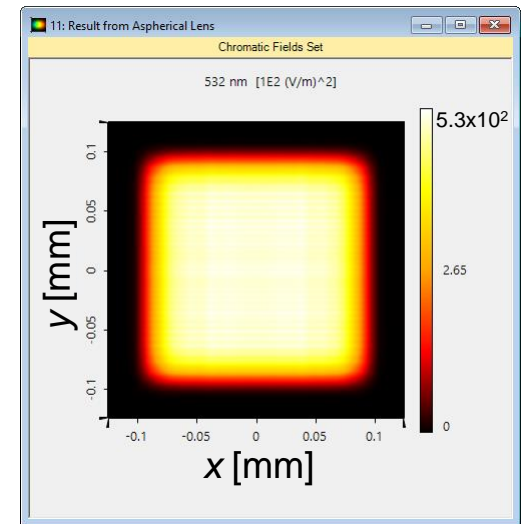
Modeling of both diffractive beam shaper and real lenses including aberrations in one optical system are available in VirtualLab.



lens #1 (spherical, not optimized)

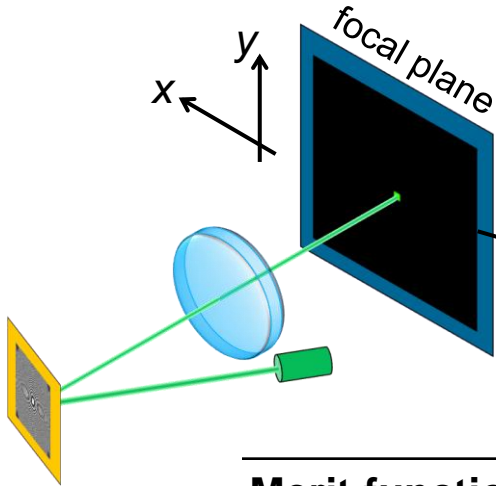


lens #2 (spherical, optimized)



lens #3 (aspherical)

Results



Merit functions	Lens #1 (spherical, not optimized)	Lens #2 (spherical, optimized)	Lens #3 (aspherical)
conversion efficiency	57.02%	68.87%	88.98%
signal-to-noise ratio	4.27%	6.12%	24.78%
...			

Different merit functions can be accessed for quantitative evaluations of the system performance.

Document Information

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