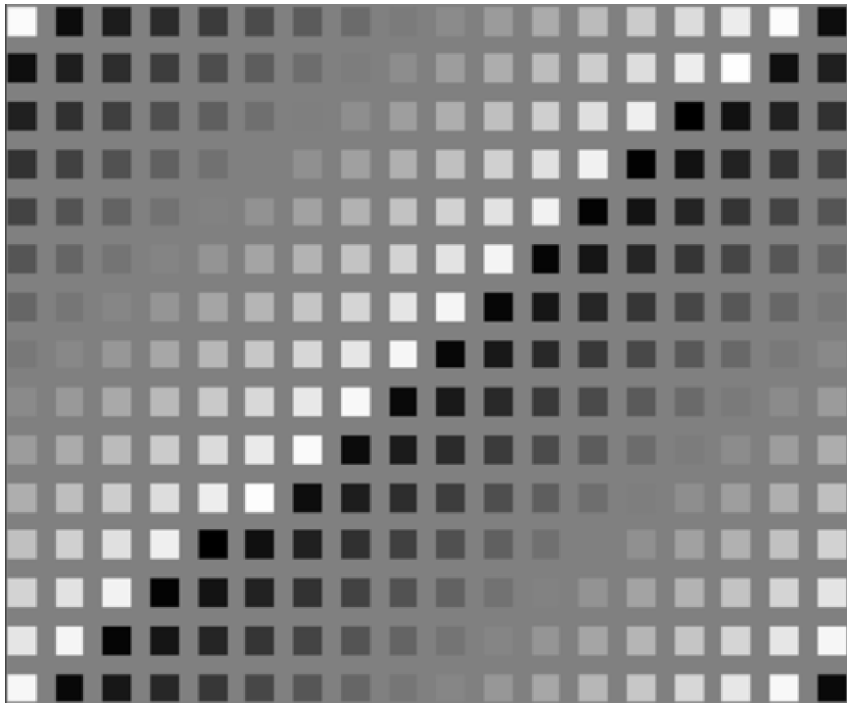


Simulation of Light Diffraction at Pixels of a Spatial Light Modulator

Abstract

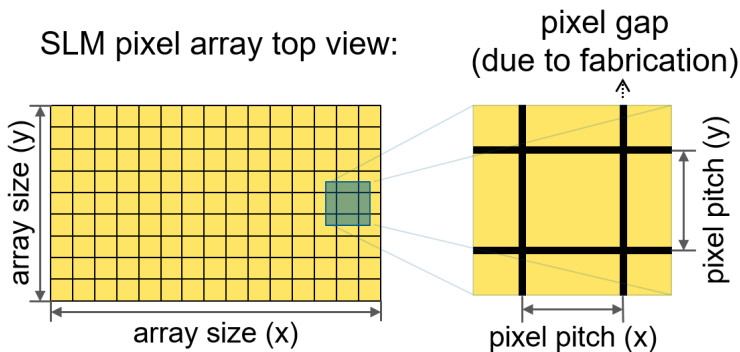


The performance of diffractive optical elements can be affected by several different factors. Nowadays, SLMs are often employed as programmable diffractive optical elements. As an example, a Gaussian-to-top-hat diffractive beam shaper is implemented by using a SLM. Due to fabrication limitation, there is always gaps amongst the pixels of a SLM, which may cause undesired diffractions. Such effects are investigated in VirtualLab Fusion, and especially, the influence on the final beam shaping results is analyzed.

Modeling Task

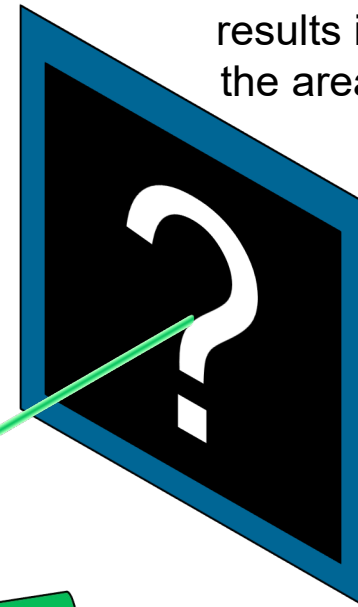
The area filling factor / pixel gaps varies from 60% to 100%.

SLM pixel array top view:



How is the beam shaping results influenced by the area filling factor of the SLM?

Fourier lens



SLM

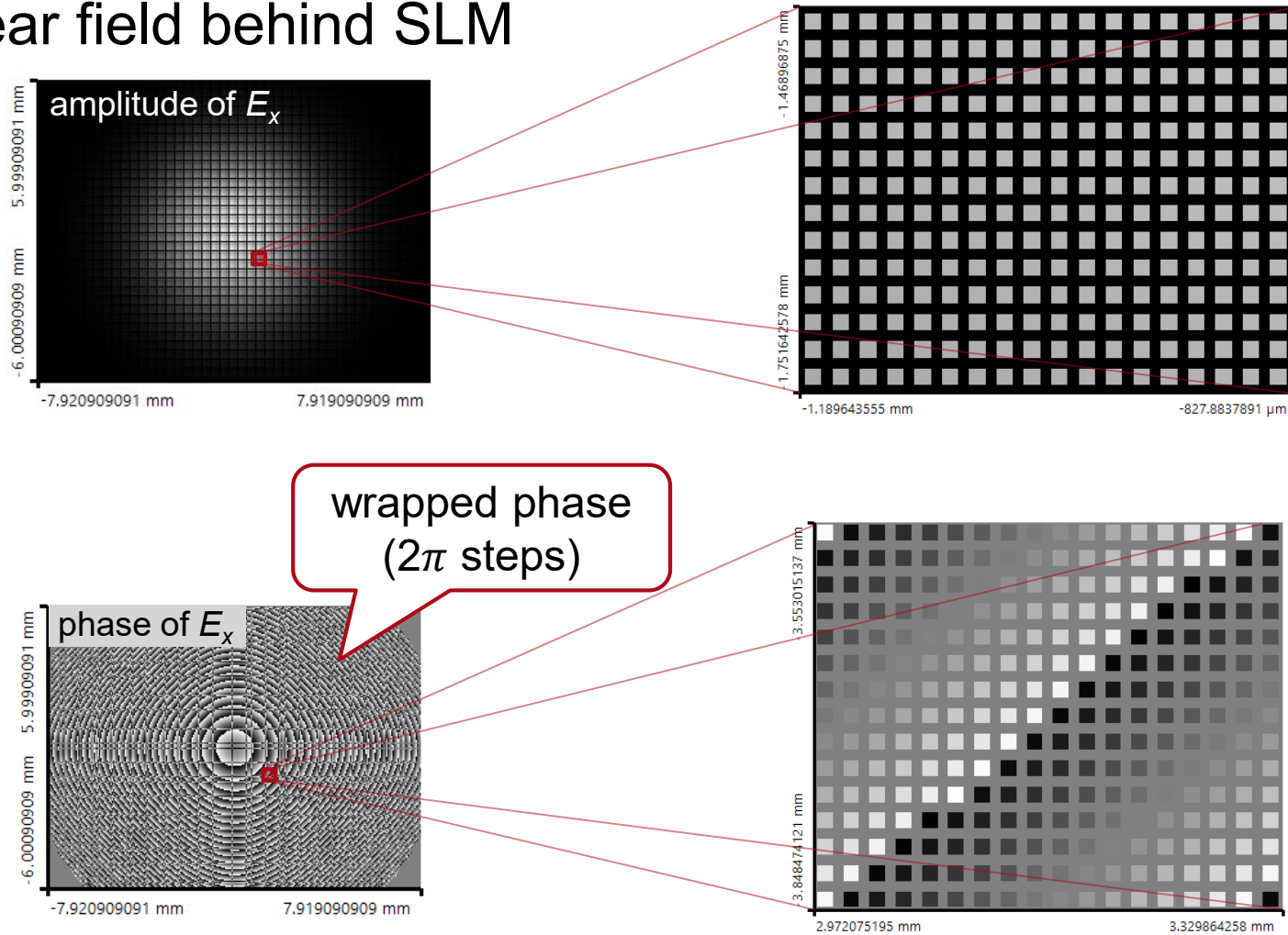
- pixel pitch $20 \times 20 \mu\text{m}$
- area size $15.84 \times 12 \text{mm}$
- tilt (w.r.t. optical axis) 10°
- loaded with Gaussian-to-top-hat transmission

laser source

- fundamental Gaussian
- wavelength 532nm
- diameter (waist) 6.6mm

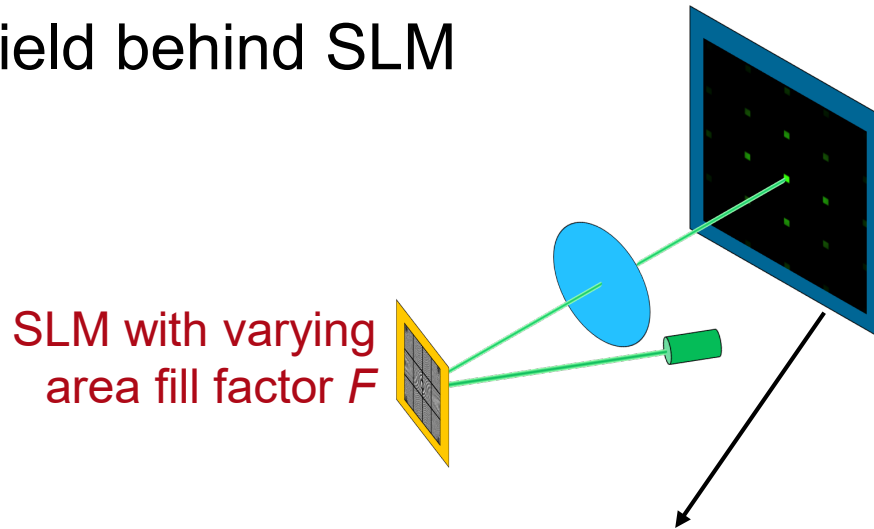
Results

- Near field behind SLM

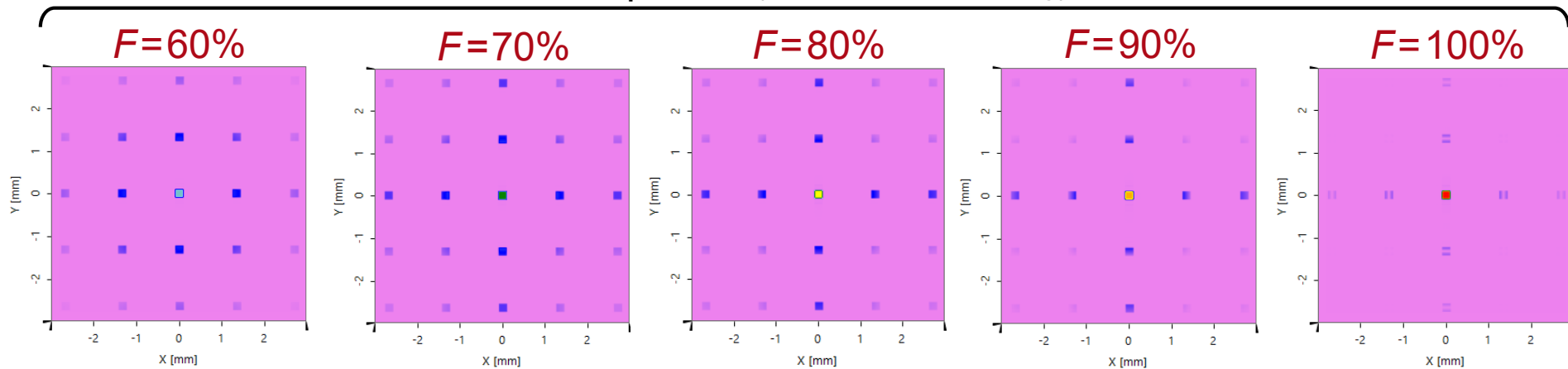


Results

- Far field behind SLM



amplitude (identical color scaling)



Document Information

title	Simulation of Light Diffraction at Pixels of a Spatial Light Modulator
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VL version used for simulations	7.0.3.4
category	Application Use Case
