

# Spatial Light Modulator Diffraction Grating



## Overview

In this article, we will explain how to model and simulate a diffraction grating with spatial variation using the LSWM plugin. The basic principle is to define a grid of points, each labeled with an index. The Grating Light Valve (GLV<sup>®</sup>) is a high-performance spatial light modulator comprising a linear array of thousands of micro-ribbons anchored on the surface of a silicon chip. By electronically controlling the deflection of the ribbons, the GLV<sup>®</sup> functions as a programmable diffraction grating. Micro-electro mechanical systems (MEMS)-based phase-only spatial light modulators (PLMs) have the potential to overcome the limited speed of liquid crystal on silicon (LCoS) spatial light modulators (SLMs) and operate at speeds faster than 10 kHz. In other words, it performs the function of an amplitude modulator, but is based fundamentally on phase modulation and retains many of the advantageous characteristics. The diffraction characteristics of orthogonal gratings with variable duty cycles and phase modulation depths are analyzed by using a spatial light modulator. The design with optimal efficiency features a continuous phase profile, which cannot be easily reproduced, and is typically affected by quantization.

## Article Content

Using a spatial light modulator (SLM) as a diffraction

Using a spatial light modulator (SLM) as a diffraction grating. The parts shown in (a) replace the transmission grating and rotating linear polarizer shown in Fig. 5.

Using a spatial light modulator (SLM) as a diffraction

With modularized hardware and polarized laser modulation, we developed a nanoscale super-resolution structured illumination microscope (SR-SIM) imaging

Microsoft Word

Diffraction efficiency of stepped gratings using high phase-modulation spatial light modulators Ignacio Moreno,<sup>1,\*</sup> Benjamin K. Gutierrez,<sup>2</sup> María M. Sánchez-López,<sup>3</sup> Jeffrey A. Davis,<sup>2</sup> Himkala P.

Lumerical Sub-Wavelength Model: How to Simulate a

For certain applications, such as augmented reality glasses, it is necessary to spatially vary the gratings along specific directions. In this article, we will explain

Diffraction characteristics of orthogonal gratings analysis based on a ...

Abstract The diffraction characteristics of orthogonal gratings with variable duty cycles and phase modulation depths are analyzed by using a spatial light modulator.

Diffraction Efficiency Characteristics for MEMS-Based

DMD works by tilting the micromirrors between two states, sending the light in two directions. When the mirrors are in one state, the light is directed

GAEA-2.1 Phase Only LCOS-SLM

GAEA-2.1 Phase Only LCOS-SLM The GAEA-2.1 Spatial Light Modulator is the highest resolution SLM on the market with extremely small pixel pitch.

A non-iterative frame-reduced structured illumination microscopy using ...

Structured illumination in total internal reflection fluorescence microscopy using a spatial light modulator Opt Lett, 33 (14) (2008), pp. 1629 - 1631, 10.1364/OL.33.001629

10: Grating Light Modulators

This is the same as what we realized using our phasor model of the grating light modulator, but now we are in a position to get a more complete picture of how the light is distributed between diffraction

Diffraction characteristics of orthogonal gratings analysis

Meanwhile, the influences of the duty cycle and phase modulation depth on the diffraction characteristics of the orthogonal grating are discussed. The simulation

## 10: Grating Light Modulators

10: Grating Light Modulators 399 capture several diffraction orders and maintains good contrast with the reflected light. We also realize, however, that the different diffraction orders propagate in different

General algorithm to optimize the diffraction efficiency of a phase ...

We present a general approach for optimizing the diffraction efficiency of a phase-type spatial light modulator (SLM). While the SLM displays a one-dimensional phase grating, the phase shift of one

## Grating Light Valve (GLV®)

By electronically controlling the deflection of the ribbons, the GLV® functions as a programmable diffraction grating, enabling attenuation, modulation and switching of laser light with unparalleled

Experimental implementation of phase triplicator gratings in a spatial ...

In this work, we compare different methods for implementing a triplicator, a phase grating that generates three equi-intense diffraction orders. The design with optimal efficiency features a continuous phase

Simple method to evaluate the pixel crosstalk caused by fringing field ...

Keywords: Liquid-crystals displays, Diffraction gratings, Phase modulation, Fringing Introduction Spatial light modulators (SLM) are opto-electronic micro-displays capable to modulate the amplitude, the

Suppressing laser-power noise with a multifunctional liquid crystal ...

While applying a transverse oscillating magnetic field can mitigate low-frequency noise 11, pump light fluctuations near the modulation frequency remain the dominant limitation on sensitivity.

Second order diffractive optical elements in a spatial light modulator ...

This allows operating phase-only diffractive optical elements in the second harmonic diffraction order, instead of in the usual first diffraction order. This type of implementation shows

Diffraction efficiency of stepped gratings using high phase-modulation ...

We study the diffraction efficiency of linear phase (blazed) diffraction gratings displayed onto spatial light modulators (SLMs) that exhibit a large maximum phase modulation range  $M \geq 2\pi$ ,

Multi-Wavelength Compatible Single-Shot Full-Stokes Polarimetric ...

In this work, we propose a parallel uncoupled spatial frequency modulation structure for multi-wavelength compatible, single-shot full-Stokes imaging. This is achieved by integrating a 2D

Analysis of diffraction gratings displayed in spatial light modulators ...

In this work we analyze diffraction gratings displayed on a pixelated spatial light modulator (SLM) at its spatial resolution limit (Nyquist limit) i.e., with largest diffraction angle, where the binary phase profile

Bragg Gratings

Bragg gratings are reflecting structures with a periodic refractive index modulation. They are contained in dielectric mirrors and in some fiber devices.

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