

Spatial Light Modulator Models



AI Overview

Spatial Light Modulators (SLMs) are classified primarily as electrically addressed or optically addressed, and as transmissive or reflective devices, with Liquid Crystal on Silicon (LCoS) being a widely used reflective type. Electrically Addressed vs Optically Addressed SLMs

Electrically Addressed SLMs (EASLMs) convert an electrical signal into a spatially modulated light pattern. They are widely used due to higher sensitivity, better contrast, and more reliable manufacturing compared to optically addressed types.

Optically Addressed SLMs (OASLMs) use a photoconductor to detect light, which then modulates a liquid crystal layer. These SLMs can convert incoherent light into a spatially modulated form but tend to have lower sensitivity, image retention issues, and variable contrast.

Transmissive vs Reflective SLMs

Transmissive SLMs allow light to pass through a modulating medium, typically a liquid crystal layer, altering the amplitude, phase, or polarization of the transmitted light.

Reflective SLMs reflect light off a modulating surface, often using LCoS technology. These devices are optimized for phase and amplitude control and can achieve high spatial resolution and efficiency.

Liquid Crystal on Silicon (LCoS) SLMs

LCoS SLMs are reflective devices where a liquid crystal layer is sandwiched between a glass substrate and a CMOS silicon backplane. A mirror on top reflects light, and the orientation of liquid crystal molecules modulates the phase of the reflected light. LCoS SLMs can control millions of pixels independently, allowing precise phase modulation, beam shaping, holography, and diffraction pattern generation. They are used in high-resolution applications such as holographic displays, adaptive optics, and laser beam shaping, offering high spatial resolution and 10-bit phase control for fine wavefront manipulation.

Modulation Capabilities

SLMs can modulate:

- Amplitude (intensity) of light
- Phase of light
- Polarization of light

Some advanced SLMs can simultaneously modulate phase, amplitude, and polarization, enabling complex optical wavefront c...

Article Content

Spatial light modulator

Spatial light modulator Schematic of a liquid crystal-based Spatial Light Modulator. Liquid crystals are birefringent, so applying a voltage to the cell changes the effective refractive index seen by the

Spatial Light Modulators

Thorlabs' Exulus® Spatial Light Modulators (SLMs) employ Liquid Crystal on Silicon (LCoS) technology to produce high-resolution, high-speed reflective phase

An Introduction to Spatial Light Modulators

Spatial light modulators are used to spatially modify an optical wavefront in two dimensions. The most commonly used models are electrooptical with liquid

Spatial Light Modulators

We develop custom spatial light modulators with segmented micromirror arrays and a high pixel count—tailored for demanding industrial applications. Our advanced micromirror technology enables

High resolution multispectral spatial light modulators based ...

A spatial light modulator is demonstrated based on Fabry-Perot nanocavity resonances, enabling micrometer-sized pixels and efficient full phase control at multiple wavelengths

Spatial light modulator design and generation of structured ...

Spatial light modulators (SLMs) are versatile devices used for optical studies. These instruments have a wide area of application in photonics. Additionally, SLMs have potential utility in different applications,

Spatial light modulator

A spatial light modulator (SLM) is a device that can control the intensity, phase, or polarization of light in a spatially varying manner. A simple example is an overhead projector transparency. Usually when

LCOS Spatial Light Modulators: Trends and Applications

PDF | IntroductionLCOS-Based SLMsSome Applications of Spatial Light Modulators in Optical Imaging and MetrologyConclusion References | Find,

Digital spatial light modulators

Digital spatial light modulators Spatial control of the phase and amplitude of a laser beam is useful for applications ranging from imaging and holography to interferometry and optical tweezers ...

Santec Spatial Light Modulator Solutions Guidebook

Santec's Spatial Light Modulator offer a wide range of options to suit your application, including models with excellent response speed and kW-class light resistance that rivals other methods.

Spatial Light Modulators

Spatial light modulator (SLM) is a general term describing devices that are used to modulate amplitude, phase, or polarization of light waves in space and time.

Comprehensive model and performance optimization of phase-only

Several spurious effects are known to degrade the performance of phase-only spatial light modulators. We introduce a comprehensive model that takes into account the major ones: curvature

Spatial Light Modulators

Discussing the properties of spatial light modulators and how to include them in a comprehensive analysis including optical requirements.

A 10 Megahertz Spatial Light Modulator

Here we introduce a new class of spatial light modulator that provides both 2D pixel geometry and high speed. The device operates by encoding spatial information in frequency bins via a broadband

Spatial Light Modulator (LCOS-SLM) | Santec AOC

High-output model for laser processing, 1kW-rated with near infrared wavelength. Enables holographic reproduction with smooth and rapid real-time response.

A review of liquid crystal spatial light modulators: devices and ...

<p>Spatial light modulators, as dynamic flat-panel optical devices, have witnessed rapid development over the past two decades, concomitant with the advancements in micro- and opto-electronic

Spatial Light Modulators and Their Applications in

Abstract Liquid crystal spatial light modulators (LC-SLMs) have gained substantial interest of the research fraternity due to their remarkable light

A review of liquid crystal spatial light modulators: devices and ...

Yiqian Yang 1, Andrew Forbes 2 * and Liangcai Cao 1 * Spatial light modulators, as dynamic flat-panel optical devices, have witnessed rapid development over the past two dec-

Spatial light modulator via optically addressed metasurface

Emerging demands for dynamic wavefront modulation in holographic displays, augmented/virtual reality, and light detection and ranging require spatial light modulators (SLMs) with

Digital spatial light modulators

The Model 12,288 linear series spatial light modulator from Boulder Nonlinear Systems (Lafayette, Colorado, USA) operates in reflection and is based on liquid-crystal-on-silicon (LCOS) technology.

spatial light modulator

A spatial light modulator (SLM) is a pixellated liquid crystal device that can individually control the phase value of each pixel. It imposes spatially varying modulation onto an incident beam, allowing for the

Spatial light modulators

Spatial Light Modulators (SLMs) are quasi-planar devices, allowing for the modulation of the amplitude, phase and polarization, or a combination of these parameters of an incident light beam according to

CHAPTER 5: SPATIAL LIGHT MODULATOR SYSTEM

CHAPTER 5: SPATIAL LIGHT MODULATOR SYSTEM 5.1 SPATIAL LIGHT MODULATOR

Spatial Light Modulator (SLM) is a device that modulates the coherent light based on its control input. It is used in

A full degree-of-freedom spatiotemporal light modulator

Panuski et al. demonstrate a programmable photonic crystal cavity array, enabling the spatiotemporal control of a 64 resonator, two-dimensional spatial light modulator with nanosecond-

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