

Optical Components for Spatial Light Modulators





Overview

A Spatial Light Modulator (SLM) is an optical component that changes the spatial distribution of light in real time. The incident light can be modulated pixel by pixel using liquid crystals or micromirrors, which enables highly precise control. In most cases, this requires a highly integrated application-specific integrated. The SPIE Digital Library offers a comprehensive collection of research articles, conference papers, and technical documents focused on spatial light modulators (SLMs), reflecting the breadth and depth of this rapidly evolving technology. Manipulation of light at the nanoscale is cornerstone for the realization of miniaturized optical devices with enhanced efficiencies.



Optical Components for Spatial Light Modulators

Generation of high uniformity flat-top beams by reconstructing the

Comparison of diffractive optical elements and refractive optical elements, spatial light modulator (SLM) facilitates the expedient and versatile manipulation of beam shapes by

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Deep-Turbulence Simulation in a Scaled-Laboratory Environment

Figure 1. The atmospheric turbulence simulator (ATS) within the Phasor Laboratory at AFRL/RDL uses five modules in series with spatial light modulators (SLMs) to simulate deep-turbulence effects.

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Swave Photonics Honored with CES 2026 Innovation Award for

"Our HXR Spatial Light Modulator is continuing to advance in development and testing thanks to the work of the incredible Swave team and our partners.

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Polarisation optics for biomedical and clinical applications

The review focuses on methodologies and biomedical applications of polarisation optics. It also presents prospects on development trends, the potential multi-modal uses in conjunction with

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Optical Modulators - acousto-optic, electro-optic

An optical modulator is a device which can be used for manipulating a property of light --



often of an optical beam, e.g. a laser beam. Depending on which property

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Title: font: times; size: 18 point; style: plain; justified: center

Fabrication of microscale medical devices by two-photon polymerization with multiple foci via a spatial light modulator Shaun D. Gittard,¹ Alexander Nguyen,^{1,2} Kotaro Obata,¹ Anastasia Koroleva,¹

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Spatial Light Modulators , MEETOPTICS Academy

Spatial light modulators (SLMs) are a type of transmissive or reflective device that is used to modulate amplitude, phase, or polarization of an optical wavefront in space and time.

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Freeform optical flow based on meta-conveyors for compact

Programming light flow offers significant potential for diverse applications. However, conventional spatial light modulators are bulky, have large pixels, and slow switching.

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Spatial Light Modulator SLM-30

Embedded Module of high power spatial light modulator Datasheets PDF Designed for integration in industrial equipment. Inherits the functions of the SLM-300, while achieving a compact size and low

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French Startup Combines Electronics, Photonics And

Techniques like spatial light modulators (SLMs) from free space optics are limited by modulation frequency, he said, while silicon photonic modulators



Metasurface-assisted spatial light modulation with a large field of view

Spatial light modulators have a wide range of applications in beam generation, wavefront shaping, and holographic display. Due to the finite pixel size, spatial light modulators struggle to achieve a large

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Generation of 10-dB squeezed light from a broadband

Even with including optical coupling loss of the modularization, we observe 6.3-dB squeezed light from the DC component up to a 6.0-THz sideband

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Spatial Light Modulators

It uses arrays of sub-wavelength nanostructures, so-called nanoantennas, to realize ultra-thin components that can replace, or even

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(PDF) Spatial light modulators

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

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Double-freeform lens design for angular-spatial control of light fields

This framework eliminates the need for auxiliary optical components while delivering performance comparable to that of conventional multi-lens systems. Comprehensive numerical



(PDF) Terahertz single pixel imaging with an optically

Terahertz single pixel imaging with an optically controlled dynamic spatial light modulator David Shrekenhamer, Claire M. Watts, and Willie J. Padilla ?

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Spatial light modulators

Additionally, the library features studies on integration techniques for SLMs with other optical components and systems, illustrating their significance in emerging applications such as augmented

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Spatial Light Modulator



What is a Spatial Light Modulator? A Spatial Light Modulator (SLM) is an optical component that changes the spatial distribution of light in real time. The incident

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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

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Spatial Light Modulators Expand Beyond Established Markets

In response, much of today's research in SLM technology involves exploring entirely new modulation mechanisms, ranging from different liquid crystal mixtures and backplane designs to magneto

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Correcting curvature in micromirror-based spatial light modulators with

Computer-generated holography requires high-speed spatial light modulators (SLMs) for dynamically patterning light in 3D. Piston-motion micromirror-based SLMs support high-speed (≥ 10

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Acousto-optic Modulators - AOM, Bragg cells, diffraction

Acousto-optic modulators use the acousto-optic effect to modulate laser beam intensity, or possibly other beam properties.

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Electro-optic spatial light modulator from an engineered



Here, the authors present an SLM device based on an organic electro-optic material that manipulates the properties of individual pixels by electronic signals at speeds up to 50 MHz.

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High-clockrate free-space optical in-memory computing

DOE diffractive optical element, BS beam splitter, PBS polarized beam splitter, HWP half waveplate, SLM spatial light modulator. b Comparison of experimental results and digital ground

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Fabrication of microscale medical devices by two-photon

Applications: Digital-/Computer Holography/CGH Optical Computing / Quantum Optics
ABSTRACT November, 2025 PLUTO / PLUTO-2 Spatial Light Modulators Authors:
Chenliang Chang, Chenzhou

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A smaller, lighter form factor enabled by removing waveguides, varifocal lenses, and other bulky optical components Seamless compatibility with prescription eyewear with thin, curved lenses

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Eindhoven University of Technology MASTER Intensity patterns

2.4 The spatial light modulator in combination with a lens he previous section some mathematical expressions are derived which describe the effect of diffraction. Two diffraction equation

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Spatial Light Modulation Principles



Whether you're working with modulation transfer functions, electro-absorption, or epsilon-near-zero materials, Meadowlark's SLMs provide flexible, high

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Generating scalar and vector modes of Bessel beams utilizing

Axicon is an interesting optical element for its optical properties. This paper presents an approach to dynamically generated tunable axicons with a spatial light modulator (SLM).
256-level

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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

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