

Spatial Light Modulator Square



Article Overview

A square spatial light modulator (SLM) is a device with a square array of individually addressable pixels that modulate light's phase, amplitude, or polarization for precise optical control.

Overview and Structure

A spatial light modulator (SLM) is an optical device that can control light in a spatially varying manner, either by modulating intensity, phase, or polarization. Square SLMs typically feature a square grid of pixels, each acting as an independent variable retarder or modulator. These pixels are often made from liquid crystal (LC) materials on a transparent substrate (LCD) or on silicon (LCOS), exploiting the optical and electrical anisotropy of LC molecules. Each pixel can be addressed individually via patterned electrodes, allowing precise phase shifts up to one full wavelength between adjacent pixels. Minimizing pixel spacing is critical for high resolution and smooth wavefront control. Square SLMs are commonly used in beam shaping, holography, optical computing, adaptive optics, and ultrafast pulse shaping.

Types of Square SLMs

- Transmissive LCD SLMs: Light passes through the LC layer, and phase modulation is achieved by varying the refractive index via applied voltage.
- Reflective LCOS SLMs: Light reflects off a silicon backplane, offering high-resolution, high-speed phase modulation with minimal crosstalk between pixels.
- Digital Micromirror Devices (DMDs): While primarily for intensity modulation, DMDs can be arranged in square arrays for maskless lithography or projection application...

Article Content

Nov 08, 2025

Beam shaping by spatial light modulator and 4 f system to square and ...

Request PDF | On Feb 27, 2017, Kazuhito Osawa and others published Beam shaping by spatial light modulator and 4 f system to

Jan 28, 2026

Spatial Beam Shaping with a Liquid-Crystal Spatial Light Modulator for ...

Keywords Computer-generated holography · Spatial light modulator · Parallel laser beams · Aberration compensation · Adaptive

Feb 12, 2026

Flächenlichtmodulatoren

Wir entwickeln kundenspezifische Flächenlichtmodulatoren mit segmentierten Mikrospiegelarrays und

Sep 29, 2025

Spatial Light Modulators

Spatial light modulator (SLM) is a general term describing devices that are used to modulate amplitude,

Jan 22, 2026

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

May 08, 2026

Spatial Light Modulators

Our liquid crystal on silicon (LCoS) spatial light modulators boast exceptional speed, efficiency, and high

Jun 12, 2026

Spatial Light Modulator Principles

Our SLMs consist of liquid crystal (LC) pixels, each independently addressed, acting as separate variable retarders. These SLMs are

Jul 04, 2026

Getting to grips with spatial light modulators

Spatial Light Modulators (SLMs) have advanced the fields of complex and structured light. These Liquid-Crystal-on

Oct 07, 2025

Spatial light modulator via optically addressed metasurface

Emerging demands for dynamic wavefront modulation in holographic displays, augmented/virtual reality, and light

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High resolution multispectral spatial light modulators based ...

A spatial light modulator is demonstrated based on Fabry-Perot nanocavity resonances, enabling micrometer-sized

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Complex spatial light modulation capability of a dual layer in-plane ...

This paper presents a flat panel complex spatial light modulator that consists of dual in-plane switching liquid crystal

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Spatial Light Modulators

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

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Spatial Light Modulators

We develop custom spatial light modulators with segmented micromirror arrays and a high pixel

Sep 01, 2025

Beam shaping by spatial light modulator and 4f system to square and

By filtering the higher spatial frequency component at Fourier plane in 4f system, the spatial amplitude distribution of the zero-order

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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

Aug 15, 2025

Special Section Guest Editorial: Spatial Light Modulators: Devices and ...

This special section of Optical Engineering devoted to Spatial Light Modulators: Devices and Applications includes

May 01, 2026

Spatial Light Modulators and Their Applications in Polarization ...

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

Sep 15, 2025

Spatial light modulators and their applications

Reviews the spatial light modulators and their applications to optical signal processing. Different technologies currently under study

Oct 06, 2025

Spatial Light Modulation Principles

Spatial Light Modulation Principles - Delivering the highest quality optics for over 40 years: polarizers,

Apr 03, 2026

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

Feb 03, 2026

CHAPTER 5: SPATIAL LIGHT MODULATOR SYSTEM

CHAPTER 5: SPATIAL LIGHT MODULATOR SYSTEM 5.1 SPATIAL LIGHT MODULATOR Spatial Light Modulator (SLM) is a

Jul 13, 2026

Recent Research Using Meadowlark Optics Spatial Light Modulators

Liquid crystal spatial light modulators act as a programmable lens that can be used to manipulate the wavefront of the excitation

Apr 14, 2026

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.

Aug 08, 2025

Spatial Light Modulators

The compact spatial light modulator (EXULUS-SE1) consists of a built-in SLM panel with compact housing.

Jan 09, 2026

Spatial light modulators

Spatial light modulators The SPIE Digital Library offers a comprehensive collection of research articles, conference papers, and

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Spatial Light Modulator Applications Explained | Laser 2000

Spatial Light Modulator Applications This blog is dedicated to the large range of applications that LCOS SLMS provide and goes into

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