

Spatial Light Modulator Amplitude Mode



Article Overview

Amplitude mode SLMs modulate the intensity of light across a spatial pattern, enabling precise control of light distribution for imaging, holography, and laser applications.

Overview of Amplitude Mode SLMs

A Spatial Light Modulator (SLM) is a device that can control light properties—intensity, phase, or polarization—on a pixel-by-pixel basis in a spatially varying manner. In amplitude mode, the SLM specifically modulates the intensity of the incident light, effectively controlling how bright or dim each pixel appears in the output light field (). Amplitude modulation is typically achieved using liquid crystal (LC) pixels that act as electro-optic modulators. Each pixel can be independently addressed with a voltage signal, which changes the transmission or reflection of light through that pixel. In transmissive SLMs, the voltage alters the light passing through the LC layer, while in reflective SLMs, it modifies the reflected light intensity ().

Working Principle

- **Pixel Control:** Each LC pixel responds to an applied voltage, adjusting the optical path or absorption to modulate light intensity.
- **Voltage-to-Intensity Mapping:** The gray level or voltage applied to a pixel corresponds to a specific light intensity, allowing programmable patterns.
- **High Resolution and Speed:** Modern amplitude SLMs offer ultra-high spatial resolution and fast modulation speeds, capable of real-time response to dynamic input signals ()....

Article Content

Jun 28, 2026

Optimisation of arbitrary light beam generation with spatial light ...

Phase only spatial light modulators (SLMs) have become the tool of choice for shaped light generation, allowing the

May 08, 2026

Full-property modulation of light beam based on the unified link ...

Full-property spatial light modulator is therefore developed based on the unification of these three properties, which

Jun 01, 2026

Transmission amplitude spatial light modulator

Transmission amplitude spatial light modulator is a kind of amplitude spatial light modulator, which has

Aug 05, 2025

Spatial Light Modulator with Phase and Amplitude Control for ...

Abstract A single layer phase and amplitude spatial light modulator for holographic displays is proposed. The device is 0.7 microns

May 13, 2026

Mastering Spatial Light Modulators

Introduction to Spatial Light Modulators Spatial Light Modulators (SLMs) are devices that modulate the amplitude,

Nov 25, 2025

Arbitrary manipulation of spatial amplitude and phase using phase

In this paper, we propose an alternative simple method to arbitrarily manipulate the amplitude and phase of the

Oct 14, 2025

Modulating both amplitude and phase in a single spatial light modulator ...

A LCoS-based SLM are able to perform both amplitude modulation (AM) and phase modulation (PM) within a single

Aug 01, 2025

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.

Jul 24, 2026

LCOS Spatial Light Modulators: Trends and Applications

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

Aug 23, 2025

Sample manuscript showing specifications and style

ABSTRACT Spatial light modulators (SLM) have been widely adopted for applications such as optical data storage, optical tweezers,

Oct 30, 2025

All-solid-state spatial light modulator with independent phase and ...

By controlling two voltage gates separately from one another, a spatial light modulator has been made that can

Jul 23, 2026

Spatial Light Modulators | MEETOPTICS Academy

What are Spatial Light Modulators? Spatial light modulators (SLMs) are a type of transmissive or reflective device that is used to

Nov 09, 2025

Spatial Light Modulators and Their Applications in Polarization ...

Spatial light modulators (SLMs) are electro-optical devices, pertaining to manipulating the fundamental

Mar 11, 2026

Spatial light modulator

Spatial light modulators can be either reflective or transmissive depending on their design and purpose. DMDs, short for digital

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Spatial Light Modulators

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

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A Route to Ultra-Fast Amplitude-Only Spatial Light Modulation using ...

A phase-change material based, thin-film, amplitude-only spatial light modulator is presented. The modulator operates

Sep 12, 2025

Two-dimensional pixel-level addressable mid-infrared metasurface ...

A mid-infrared amplitude metasurface spatial light modulator using phase change materials is demonstrated in a

Jun 19, 2026

Spatial Light Modulator Principles

Correction is accomplished by using two spatial light modulators in series. The first performs the necessary amplitude modulation,

Jun 22, 2026

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

Nov 19, 2025

Spatial Light Modulators (SLMs)

Juday, R.D. (1989) Correlation with a spatial light modulator having phase and amplitude cross coupling. Appl. Opt.,

May 17, 2026

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

Jul 22, 2026

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

Oct 05, 2025

LCOS Spatial Light Modulator Technology

LCOS Structure and Function — Intrinsic polarization modulation / phase modulation for p- and/or s-polarizations — Phase-only

Nov 07, 2025

Theory and Experiment of Spatial Light Modulation and Demodulation

Spatial light modulation enhances capacity of optical communications by modulating spatial amplitude, phase and

Aug 07, 2025

Melia Bonomo / SLM Intro

A spatial light modulator (SLM) is a transmissive or reflective device that's used to spatially modulate the amplitude and phase of an

Dec 30, 2025

MEMS Spatial Light Modulator for Phase and Amplitude Modulation of ...

We present a new micro-electro-mechanical system (MEMS) spatial light modulator (SLM) with a two-dimensional

Contact Us

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