How to adjust the amplitude of a spatial light modulator

Article Overview

Amplitude adjustment with SLMs is typically achieved using either single or dual SLM configurations, often combined with interferometric setups to correct phase distortions introduced during modulation.

Basic Principles

Spatial light modulators (SLMs) can modulate amplitude, phase, or polarization of an optical wavefront by controlling the optical properties of a pixelated array, usually via liquid crystal elements. When used for amplitude modulation, the SLM alters the intensity of the light beam, but this process often introduces unwanted phase shifts due to the refractive index changes in the liquid crystal layer .

Dual-SLM Configuration

A common method to achieve precise amplitude control while correcting phase errors involves using two SLMs in series:

• First SLM: Performs the desired amplitude modulation but also introduces a phase change.

• Second SLM: Compensates for the phase distortion, restoring the intended phase profile across the beam . This setup can be compact, with the two SLMs placed back-to-back to minimize optical path length, and optional polarizers can be used to enhance amplitude control .

Interferometric Techniques

Article Content

Arbitrary manipulation of spatial amplitude and phase using ...

By designing simple configurations with phase-only spatial light modulators (SLMs), we show the ability to arbitrarily manipulate the

Santec Spatial Light Modulator Solutions Guidebook

Light has multiple degrees of freedom, such as amplitude, frequency (wavelength), phase, and polarization, and the behavior of light

A Large-Area Liquid-Crystal Spatial Light Modulator for Amplitude ...

High-power lasers require spatial beam shaping to operate the system at optimal performance. Amplitude modulation is crucial to

HowTo: Spatial Light Modulators

Spatial light modulators (SLMs) are active optical components that can alter a light beam''s amplitude, phase, or polarization. For this

Spatial Light Modulator Principles

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

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

Fourier Optics and Spatial Light Modulators

Introduction: The technology of Spatial Light Modulators (SLM) grew from the need to quickly convert data in electronic form into

Spatial Light Modulators

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

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

CHAPTER 5: SPATIAL LIGHT MODULATOR SYSTEM

Modulation Scheme: The three characteristics of the input light that can be modulated are its amplitude, phase and polarization. The

Spatial Light Modulator Microscopy

The use of spatial light modulators (SLMs) for two-photon laser microscopy is described. SLM phase modulation can be used to

Spatial Light Modulator (SLM) Basics and Vendors

Learn about Spatial Light Modulators (SLMs), including optically addressed and electrically addressed types, their drawbacks, and a

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

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