

Calibration of Spatial Light Modulator



Summary of Content

Calibrating a spatial light modulator involves measuring and correcting pixel-level phase variations and optical flatness, typically using interferometry or software-assisted automated methods.

Interferometric Calibration

One of the most precise methods for calibrating phase-only SLMs is using Twyman-Green interferometry. This approach allows you to measure both the phase response and optical flatness of the SLM at single-pixel resolution. The procedure generally involves:

- Displaying a series of gray-level patterns on the SLM to modulate the interference intensity.
- Capturing interferograms corresponding to each gray level.
- Extracting the phase shift and flatness correction from the interferograms.
- Applying a pixel-wise correction map to compensate for nonuniformities. This method can be performed with as few as 18 interferograms, significantly reducing acquisition time compared to traditional N-step phase shift interferometry, while maintaining high accuracy .

Software-Assisted Calibration

Modern SLM control software, such as slmsuite, provides automated calibration routines that handle Fourier-to-image-space transformations, aberration correction, and optimized hologram generation. These tools can:

- Automatically map SLM pixels to camera pixels.

Article Content

Calibration of spatial light modulators suffering from spatially ...

Generation of high-purity structured light beams is challenging due to transverse phase aberrations in the optical setup

A technique to calibrate spatial light modulator for varying phase ...

There are various techniques to calibrate for the varying phase response by characterizing the phase modulation at

An open-source, accurate, and iterative calibration method for liquid ...

An iterative method for accurately measuring and calibrating liquid crystal-based spatial light modulators (SLMs)

High-Precision Calibration of Phase-only Spatial Light Modulators

Abstract—In the fields of optics and photonics, phase-only spatial light modulators (SLMs) play an increasingly important role in wave

Simple and fast calibration method for phase-only spatial light ...

Abstract: Phase-only spatial light modulators (SLMs) are widely used to engineer the phase of light in various applications. However,

Fast and robust calibration method of liquid-crystal spatial light ...

A phase modulation characteristic calibration and compensation method for liquid crystal on silicon spatial light

Spatial Light Modulators

Watch a demonstration of an interferometric method for calibrating the phase delay of reflective SLMs.

Phase Modulation Characteristics of Spatial Light

In general, SLM is applied to modulate amplitude, phase or polarization of a light wave. However, reliable application of SLMs as

Rapid stochastic spatial light modulator calibration and pixel ...

Accurate calibration of the wavefront and intensity profile of the laser beam at the SLM display is key to the high

Generalized phase calibration method of liquid crystal spatial light ...

Spatial light modulators (SLMs) are widely used in many optical fields such as wavefront modulation, beam shaping

Progress in Phase Calibration for Liquid Crystal Spatial Light ...

The principles of phase-only SLM are introduced. The main phase calibration methods are discussed and reviewed.

AN020 Calibration of Spatial Light Modulators

Kavita Chand and Justin Mansell 10/05/10 A calibration of Spatial Light Modulator (SLM) is an experimental determination of the

Calibration of phase-only liquid-crystal spatial light modulators by ...

Phase-only spatial light modulator (SLM) is a key device for light manipulation. It is critical to calibrate the grayscale

Inline calibration of spatial light modulators in nonlinear microscopy

Abstract We present a method for calibrating the response of a phase-only spatial light modulator in nonlinear

Calibration Method of Liquid-Crystal Spatial Light Modulator Based on

In this paper, based on a phase retrieval algorithm, a novel phase calibration method with high efficiency and

Calibration of phase-only liquid-crystal spatial light modulators by ...

Introduction Liquid-crystal spatial light modulators (SLMs) are widely used in various fields, benefitting from their

Reference-free in situ rapid regional calibration of phase-only spatial ...

Spatial light modulators (SLMs) have become an indispensable element in modern optics for their versatile

High-Precision Calibration of Phase-Only Spatial Light Modulators

Zhao and others, developed a method for the spatial light modulators which has the advantages of high-precision

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,

Robust and efficient calibration method of liquid-crystal spatial light ...

Driven by voltages, the liquid crystal molecules are deflected, changing the equivalent refractive index and achieving

Spatial Light Modulator Principles

Spatial Light Modulator Principles Meadowlark Optics award-winning Spatial Light Modulators (SLMs) provide precision retardance

An open-source, accurate, and iterative calibration method for liquid ...

In this work, we developed an iterative method that calibrates SLMs with high accuracy, by employing a Michelson

Fast and robust calibration method of liquid-crystal spatial light ...

We propose a fast and robust method for calibrating Spatial Light Modulators (SLMs) based on polarization phase

Calibration Method of Liquid-Crystal Spatial Light Modulator Based on

Liquid-crystal spatial light modulator (LC-SLM) has been widely applied as a programmable digital device. However,

Calibration of spatial light modulators suffering from spatially ...

We present a method for converting the desired phase values of a hologram to the correct pixel addressing values of a

Grayscale-phase calibration of liquid crystal spatial light

Liquid crystal spatial light modulators (LC-SLMs) are widely used in optics, and grayscale

Phase Calibration of Liquid-Crystal-Based Spatial Light Modulators ...

Phase-only spatial light modulators (SLMs) are very useful and versatile components for various wavefront-shaping

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