

Spatial Light Modulator Processing



Overview

Shaping or splitting of a Gaussian beam is often desired to optimise laser-material interactions, improving throughput and quality. The spatial light modulators developed at Fraunhofer IPMS consist of arrays of micromirrors on semiconductor chips, with the number of mirrors varying from a few hundred to several million depending on the application. In most cases, this requires a highly integrated application-specific integrated. These are called Spatial Light Modulator. Currently, Spatial Light Modulators are used in a wide range of applications, including adaptive optics in microscopes, quantum bit control in quantum computing, and process control. Current wavefront shaping technologies face a fundamental dichotomy: liquid-crystal-on-silicon spatial light modulators (LCoS-SLMs) offer high pixel count but suffer from low refresh rates, while acousto-optic deflectors (AODs) provide moderate speed with restricted optical beam geometries Brown et. The spatial light modulators of Fraunhofer IPMS already enable applications in the field of semiconductor technology today, thanks to customized tilting and piston mirror systems. They have the potential to become key components for future applications in material processing, 3D holographic display. Spatial light modulator (SLM) is a general term describing devices that are used to modulate amplitude, phase, or polarization of light waves in space and time. HOLOEYE's Spatial Light Modulator systems are based on translucent (LCD) or reflective (LCOS) liquid crystal microdisplays. Until recently, maximum exposure has been limited to circa 120.



Article Content

Advanced laser beam shaping using spatial light modulators for material ...

Advanced laser beam shaping using spatial light modulators for material surface processing Thesis submitted in accordance with the 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

Spatial light modulation for femtosecond laser manufacturing: Current ...

Since the invention of lasers, spatial-light-modulated laser processing has become a powerful tool for various

Advances in Ultra Short Pulse Laser based Parallel Processing using

Presented here are latest advances in ultra short pulse laser based parallel processing using a spatial light modulator

LCOS spatial light modulators enable next-gen laser processing

Recent advances in liquid crystal on silicon (LCOS) technology led to the development of spatial light modulators (SLMs) with 1-kW

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

High throughput diffractive multi-beam femtosecond laser processing ...

High throughput femtosecond laser processing is demonstrated by creating multiple beams using a spatial light

Spatial Light Modulators and Their Applications in Polarization ...

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

Spatial Light Modulator-based printing technologies for optical ...

Abstract Spatial Light Modulator (SLM)-based printing technologies, including Digital Light Processing (DLP) and

Efficient Ultrashort Pulsed Laser Processing by Dynamic Spatial Light ...

We demonstrate a highly efficient femtosecond laser ab-lation process of stainless steel for different laser spot distributions, based

Recent Research Using Meadowlark Optics Spatial Light Modulators

Thermal and optical performance characteristics of a spatial light modulator with high average power picosecond laser exposure

Ultrafast laser beam shaping for material processing at imaging plane ...

An original ultrafast laser beam shaping technique for material processing using a spatial light modulator (SLM) was

Spatial light modulator

The image on an optically addressed spatial light modulator, also known as a light valve, is created and changed by shining light

Spatial light modulator design and generation of structured ...

Keywords: spatial light modulator, digital micro-mirror device, digital light processing, structured electromagnetic waves, orbital

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

High-Performance NIR Laser-Beam Shaping and Materials

Shaping or splitting of a Gaussian beam is often desired to optimise laser-material interactions, improving throughput

Spatial Light Modulators

We develop custom spatial light modulators with segmented micromirror arrays and a high pixel count—tailored for demanding

Dynamic spatial beam shaping for ultrafast laser processing: a review

<p>This review examines the state-of-the-art in spatial manipulation of ultrafast laser processing using dynamic light modulators, with

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

Santec Spatial Light Modulator Solutions Guidebook

Currently, Spatial Light Modulators are used in a wide range of applications, including adaptive optics in microscopes, quantum bit

Spatial light modulators for optical computing and information ...

A review of spatial light modulator (SLM) technologies is presented, including the description and performance parameters of the

Spatial Light Modulators in Laser Microprocessing

Signal/Modulation properties vs. addressed „grey level“, measured with interferometric system. Red - max. phase, black - min. phase,

Spatial light modulator via optically addressed metasurface

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

Spatial Light Modulators

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

Variable holographic femtosecond laser processing by use of a spatial ...

We propose a holographic femtosecond laser processing system capable of parallel, arbitrary, and variable patterning.

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

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

Spatial Light Modulation for Enhanced Holographic Data Processing

The primary function of a Spatial Light Modulator (SLM) in optical systems is to convert electricity into light. The

Contact Us

For more information, pricing, or custom solutions, please contact us:

Website: <https://kilitech.co.za>

Email: info@kilitech.co.za

Phone: +44 20 7183 2649

Address: 1st Floor, The Shard, 32 London Bridge Street, London, SE1 9SG,
United Kingdom

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