Spatial Light Modulators And Applications Spatial Light Modulators For Applications In Coherent Communication Adaptive Optics And Maskless Lithography

Liquid Crystal on Silicon (LCoS) has become one of the most widespread technologies for spatial light modulation in optics and photonics applications. These reflective microdisplays are composed of a high-performance silicon complementary metal oxide semiconductor (CMOS) backplane, which controls the light-modulating properties of the liquid crystal layer. State-of-the-art LCoS microdisplays may exhibit a very small pixel pitch (below 4 ?m), a very large number of pixels (resolutions larger than 4K), and high fill factors (larger than 90%). They modulate illumination sources covering the UV, visible, and far IR. LCoS are used not only as displays but also as polarization, amplitude, and phase-only spatial light modulators, where they achieve full phase modulation. Due to their excellent modulating properties and high degree of flexibility, they are found in all sorts of spatial light modulation applications, such as in LCOS-based display systems for augmented and virtual reality, true holographic displays, digital holography, diffractive optical elements, superresolution optical systems, beam-steering devices, holographic optical traps, and quantum optical computing. In order to fulfil the requirements in this extensive range of applications, specific models and characterization techniques are proposed. These devices may exhibit a number of degradation effects such as interpixel cross-talk and fringing field, and time flicker, which may also depend on the analog or digital backplane of the corresponding LCoS device. The use of appropriate characterization and compensation techniques is then necessary.

Contents: SLM Technologies; Ferroelectric Liquid Crystals SLMs; Smart Pixel SLMs; International Perspective on Liquid Crystal SLMs; Silicon-Addressed Hybrid SLMs; Joint Optical Computing/Photonics in Switching/Spatial Light Modulators Plenary Session; Multiple-Quantum Well SLM Technology; Asymmetric Fabry-Perot MQW Modulators; Optical Interconnects and other SLM Applications; New Materials.

Summaries of Papers Presented at the Spatial Light Modulators and Applications Topical Meeting, September 10-12, Incline Village, Nevada

Conference : 31st Annual International Technical Symposium on Optical and Optoelectronic Applied Science and Engineering : Papers

Ferroelectric Liquid Crystal Spatial Light Modulators

Handbook of Optoelectronics (Two-Volume Set)

Technology and Applications

Optical MEMS (micro-electro-mechanical systems) devices have been used in a variety of applications including fiber-optic communications, projection TVs and in biomedical imaging. MEMS-based spatial light modulators (SLM) provide a compact, large scale, and cost-effective solution to these and other applications. In this dissertation, we introduce the design and fabrication of SLMs for three such applications.

Ferroelectric liquid crystals (FLCs) possessing the DHF (deformed helix ferroelectric) effect were developed with pitch of helix of the order of 0.2 micrometers and spontaneous polarization of the order of 150nC/cm2 at room temperature. The tilt angle is variable in range 31-42 degrees. The response time T is variable in range 0.5-5ms, depending on mixture. The refractive indicies of all developed materials were measured. The electrically and optically addressed spatial light modulators (OASLM) were fabricated utilizing the developed mixtures. Phase modulation was measured for double DHF modulator composed from two crossed DHF layers. The phase modulation depth was calculated for different cases of DHF materials. The strong nonlinear increase of the phase shift was found in dependence on voltage in accordance with calculations. The maximum phase shift agreed with the calculations and was equal 0.75 Lambda for cell thicknesses 16 micrometers without remarkable dependence on light polarization. Developed OASLM's based on DHF materials with large tilt angle 40 were investigated for real-time holography applications and showed very high figures of merit of basic parameters: diffraction efficiency, spatial resolution and operation rate. The new chemical structure of the DHF liquid crystal molecules was proposed for phase modulation only. Molecules should have banana shape and possess the perfluorinated fragment apart from chiral and dipole fragments. Proposed substances can have ferroelectric as well as antiferroelectric helical smectic packing. Low viscous nematic liquid crystals with high optical anisotropy above 0.25 were tested for phase modulation. Cell with thickness about 3.5 microns provided the phase modulation one wavelength in reflecting mode at frequency upto 60Hz. The operation rate for two-frequency nematic liquid crystal was measured up to 250Hz for phase modulation depth half of wavelength in transmissive mode.

Summaries of Papers Presented at the Topical Meeting Spatial Light Modulators and Applications, March 14-16, 1995, Salt Lake City, Utah

Spatial Light Modulator Technology

3rd Conference on Spatial Light Modulators : Papers

Summaries of the Papers Presented at the Topical Meeting, March 14-16, 1995, Salt Lake City, Utah

Spatial Light Modulators and Applications ...

A comprehensive review of the state of the art and advances in the field, while also outlining the future potential and development trends of optical imaging and optical metrology, an area of fast growth with numerous applications in nanotechnology and nanophysics. Written by the world's leading experts in the field, it fills the gap in the current literature by bridging the fields of optical imaging and metrology, and is the only up-to-date resource in terms of fundamental knowledge, basic concepts, methodologies, applications, and development trends.

This work offers comprehensive coverage of all aspects of spatial light modulators, from the various optical materials used for modulation, through the availability and characteristics of specific devices, to the main applications of SLMs and related systems. The gamut of SLMs is surveyed, including multiple-quantum-well, acousto-optical, magneto-optical, deformable-membrane, ferroelectric-liquid-crystal and smart-pixel modulators.

The Development and Application of a Liquid Crystal TV Spatial Light Modulator

Liquid Crystal on Silicon Devices: Modeling and Advanced Spatial Light Modulation Applications

Spatial Light Modulators and Applications Topical Meeting Held in Palm Springs, California on March 15-17, 1993. 1993 Technical Digest Series

The Development of a Colour Liquid Crystal Display Spatial Light Modulator and Applications in Polychromatic Optical Data Processing

Summaries of Papers Presented at the Spatial Light Modulators and Applications Topical Meeting, March 15-17, 1993, Palm Springs, California

Partial Contents: SLM Technologies; Ferroelectric Liquid Crystals SLMs; Smart Pixel SLMs; Poster Session; International Perspective on Liquid Crystal SLMs; Silicon-Addressed Hybrid SLMs; Joint Optical Computing/Photonics in Switching/Spatial Light Modulators Plenary Session; Multiple-Quantum Well SLM Technology; Asymmetric Fabry-Perot MQW Modulators; Optical Interconnects and other SLM Applications; New Materials.

Contents: MQW Spatial Light Modulators; SLM Applications; Joint Session with Optical Computing; SLM Structures; SLM Materials; and Liquid Crystals.

Technology and Applications : 31 July-1 August 2001, San Diego, USA

Spatial Light Modulators and Applications, January 26-27, Los Angeles, California

Devices and Applications

Atom Chips

Liquid Crystal on Silicon (LCoS) has become one of the most widespread technologies for spatial light modulation in optics and photonics applications. These reflective microdisplays are composed of a high-performance silicon complementary metal oxide semiconductor (CMOS) backplane, which controls the light-modulating properties of the liquid crystal layer. State-of-the-art LCoS microdisplays may exhibit a very small pixel pitch (below 4 μm), a very large number of pixels (resolutions larger than 4K), and high fill factors (larger than 90%). They modulate illumination sources covering the UV, visible, and far IR. LCoS are used not only as displays but also as polarization, amplitude, and phase-only spatial light modulators, where they achieve full phase modulation. Due to their excellent modulating properties and high degree of flexibility, they are found in all sorts of spatial light modulation applications, such as in LCOS-based display systems for augmented and virtual reality, true holographic displays, digital holography, diffractive optical elements, superresolution optical systems, beam-steering devices, holographic optical traps, and quantum optical computing. In order to fulfil the requirements in this extensive range of applications, specific models and characterization techniques are proposed. These devices may exhibit a number of degradation effects such as interpixel cross-talk and fringing field, and time flicker, which may also depend on the analog or digital backplane of the corresponding LCoS device. The use of appropriate characterization and compensation techniques is then necessary.

Liquid Crystal on Silicon DevicesMDPI

Optical Imaging and Metrology

Advanced Technologies

28-29 January 1998, San Jose, California

Spatial Light Modulators

Spatial Light Modulators and Applications: Summaries of Papers Presented at the Spatial Light Modulators and Applications Topical Meeting Held on March 15-17, 1993 in Palm Springs, California

High-resolution, high-speed, spatial light modulators that offer excellent spatial uniformity are the key devices impeding progress in the areas of optical information processing and computing. The thrust of the MIT research effort is in the area of materials, devices and systems for optical information processing. Our research is focused on 1) The growth, processing and characterization of optical crystals for spatial light modulation, 2) Spatial light modulator prototype device development and 3) Applications of spatial light modulators in symbolic optical processors. This final report describes the purchase assembly and operation of a RF sputtering system that is supporting a number of these and other DOD sponsored research programs at MIT. (RH).

A field as diverse as optoelectronics needs a reference that is equally versatile. From basic physics and light sources to devices and state-of-the-art applications, the Handbook of Optoelectronics provides comprehensive, self-contained coverage of fundamental concepts and practical applications across the entire spectrum of disciplines encompassed by optoelectronics. The handbook unifies a broad array of current research areas with a forward-looking focus on systems and applications. Beginning with an introduction to the relevant principles of physics, materials science, engineering, and optics, the book explores the details of optoelectronic devices and techniques including semiconductor lasers, optical detectors and receivers, optical fiber devices, modulators, amplifiers, integrated optics, LEDs, and engineered optical materials. Applications and systems then become the focus, with sections devoted to industrial, medical, and commercial applications, communications, imaging and displays, sensing and data processing, spectroscopic analysis, the art of practical optoelectronics, and future prospects. This extensive resource comprises the efforts of more than 70 world-renowned experts from leading industrial and academic institutions around the world and includes many references to contemporary works. Whether used as a field reference, as a research tool, or as a broad and self-contained introduction to the field, the Handbook of Optoelectronics places everything you need in a unified, conveniently organized format.

Summaries of Papers Presented at the Spatial Light Modulators and Applications Topical Meeting, September 10-12, 1990, Incline Village, Nevada

Application of Spatial Light Modulators in Optical Microscopy for Enhanced Resolution Measurement

Spatial Light Modulators and Applications II

Active Backplane Electrically Addressed Spatial Light Modulators for Display Systems and Other Applications

17-18 August 1987, San Diego, California

This stimulating discussion of a rapidly developing field is divided into two parts. The first features tutorials in textbook style providing self-contained introductions to the various areas relevant to atom chip research. Part II contains research reviews that provide an integrated account of the current state in an active area of research where atom chips are employed, and explore possible routes of future progress. Depending on the subject, the length of the review and the relative weight of the 'review' and 'outlook' parts vary, since the authors include their own personal view and style in their accounts.

Conference Edition

Materials, Devices, and Applications

Spatial Light Modulators and Applications III

Topical Meeting : Papers

Postconference Edition