

ADVANCE PROGRAM



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WITH

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The Magnetics
Society of
Japan (MSJ)

The Institute of
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Communication
Engineers (IEICE)

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of Japan

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Image Electronics
Engineers of Japan

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Image Information
and Television
Engineers

The Japan Society
for Precision
Engineering

The Laser Society of
Japan

International Symposium on

Imaging, Sensing, and Optical Memory 2020

ISOM'20 will be held online only due to COVID-19, and there is no on-site event.

Nov. 29 - Dec. 2, 2020

SPONSORED BY

- The Optical Society of Japan (OSJ)

COSPONSORED BY

- The Japan Society of Applied Physics (JSAP)
- Optoelectronics Industry and Technology Development Association (OITDA)

FINANCIALLY SUPPORTED BY

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TAKANO FUNDS



[https:// isom.jp/](https://isom.jp/)

Symposium Schedule

	Sunday Nov. 29	Monday Nov. 30	
9:00		Mo-A Keynote	9:00
		Break	
10:00		Mo-B Sensing I	10:00
		Break	
11:00		Mo-C Advanced Optics and Device I	11:00
		Lunch	
12:00			12:00
	Opening Remarks		
14:00	Su-A Optical Memory I	Mo-D Imaging	14:00
	Break		
15:00		Break	15:00
	Su-B Digital Holography I	Mo-E Digital Holography II	
16:00			16:00
		Break	
17:00		Mo-F Optical Memory II	17:00
18:00			18:00
19:00			19:00
20:00			20:00

	Tuesday Dec. 1	Wednesday Dec. 2	
9:00	Tu-A Special Invited	We-A Sensing III	9:00
	Break		
10:00	Tu-B Sensing II	Break	10:00
	Break		
11:00	Tu-C Digital Holography III	We-B Nanophotonics and Plasmonics	11:00
12:00	ISOM'21 Announcement		12:00
	Lunch		
		ISOM'20 Commemorative Photo	
13:00		Lunch	13:00
14:00	Tu-D1 Special Session 3D Imaging/Sensing, Display	We-C Biological and Life Application II	14:00
	Break	Break	
15:00	Tu-D2 Special Session 3D Imaging/Sensing, Display	We-D Optical Memory III	15:00
16:00	Break		16:00
		Break	
17:00	Tu-E Advanced Optics and Device II	We-PD Post Deadline Papers	17:00
	Break	Awards & Closing Remarks	
18:00	Tu-F Biological and Life Application I		18:00
19:00			19:00
20:00			20:00

WELCOME TO ISOM'20

WELCOME STATEMENT FROM THE ORGANIZING COMMITTEE CHAIRPERSON



We decided to hold the 30th ISOM (ISOM'20) in a considerably different style from the original plan, in response to the spread of COVID-19 infections. The **ONLINE** conference will be held from Nov. 29 to Dec. 2, 2020 without holding on-site meeting at SUNPORT TAKAMATSU, Takamatsu, Kagawa, Japan.

On behalf of the ISOM organizing committee, I am delighted to welcome all of you to the ISOM'20 .

The last ISOM meeting held in Niigata, Japan was very successful to share new developments of holographic memories, digital holography, computational imaging, bio-sensing, display, nanophotonics and plasmonics, etc.

In 2017, ISOM extended the conference scope to broader optical fields and applications, and changed the conference name as “International Symposium on Imaging, Sensing, and Optical Memory.” The new ISOM includes the fields of image sensing, medical and bio-optics, nano photonics, information system, holographic technologies, as well as optical memory. We believe that the change of ISOM produces technological innovations in imaging and sensing technologies, and many applications of optical memory technologies in the fields of medical and bio-technologies, image sensing, nanotechnologies, etc.

We are very proud of the ISOM activities, because many of technologies leading new developments and new applications have been first presented and discussed in ISOM meeting. Since the first ISOM meeting in 1987, ISOM has led innovation of optical memory and economic growth in optical industry.

I sincerely ask all of ISOM'20 participants to discuss on new technologies of the next generation optical memory and new applications of optical memory technologies in coming ISOM'20.

志村 努

Tsutomu Shimura
ISOM'20 Organizing
Committee, Chairperson

INTRODUCTION

The 30th ISOM (ISOM'20) will be held ONLINE ONLY due to the COVID-19 pandemic, from Nov. 29 to Dec. 2, 2020 WITHOUT the on-site meeting at Takamatsu.

The origin of ISOM is SOM (Symposium on Optical Memory), which was held firstly in 1985 in Tokyo as a Japanese domestic symposium. The first ISOM (International Symposium on Optical Memory) was held in 1987 also in Tokyo. Until 1994, ISOM and SOM were held alternately every other year, and since 1995, ISOM has been held every year. The total number of papers of the past symposiums has reached 3,516, and the total number of participants has reached 10,515.

The purpose of the symposium was to provide a forum for information exchange on a broad range of topics covering science and technology in optical memory and its related fields. However, information explosion in the internet and cloud service has been enforcing optical memory to change from that for consumer storage to that for enterprise storage. Many colleagues of us have been seeking for new frontiers of optical memory technologies. Considering this situation, the scopes of ISOM are being continuously updated and have been reorganized in 2016. To further highlight them, the official name of ISOM was changed from “International Symposium on Optical Memory” to “International Symposium on Imaging, Sensing, and Optical Memory” in 2017. Presentations related to the new scopes as well as the conventional ones would be strongly encouraged.

In ISOM'20, along this direction, it will be very much expected to discuss the current status of optical memory, imaging, sensing, and other related technologies. In addition, lots of papers have been submitted more than usual in this ISOM.

We appreciate your participation as presenters and audience, and we are looking forward to seeing you at online meeting.

SCOPE OF THE SYMPOSIUM

ISOM'20 will discuss the current status of Optical Memory, Imaging, Sensing, and Other Related Technologies.

The scope of ISOM'20 covers the above research fields. ISOM will provide the attractive fields to exchange the latest advances and/or ideas in the above research fields and also provide scientific interaction and collaboration.

Topics to be covered in this symposium include, but are not restricted to:

1. Optical Memory

- Professional Archive System
- Holographic Memory
- High-density Recording
- Media and Material Science
- Drive Technologies and Signal Processing
- Components and Devices
- Testing Methods
- Others

2. Imaging

- Computational Imaging
- Wavefront Coding
- Image Processing
- Optical System Design
- Devices
- Others

3. Sensing

- Medical and Bio-systems
- Three-dimensional Sensing
- Digital Holography
- Spectroscopy
- Bio-lab on a Disc
- Others

4. Other Related Technologies

- Optical Interconnection and Switching
- Optical Information Processing
- Nanophotonics and Plasmonics
- Components
- Material
- Display
- Photolithography
- Nonvolatile Memory
- Emerging Technologies and New World
- Others

REGISTRATION

All participants (including speakers) are requested to register.

I. Registration Fee

The Symposium registration information and forms can be obtained from ISOM'20 website (<https://isom.jp/>). If you have any questions, please contact ISOM'20 secretariat office.

Type	Registration Fee
Regular	JPY 35,000
Student & Retiree	JPY 10,000

The registration fee for the symposium includes admission to all the technical sessions and an online Technical Digest. The information to join the online Symposium will be informed those who paid the participation fee, later.

II. Registration and Payment

Those who wish to attend ISOM'20 is able to register on the web now.

Payment should be made in Japanese Yen by bank transfer (inside Japan only) or by credit cards (VISA and Master Card) payable to ISOM'20. No personal checks will be accepted.

III. Registration Cancellation Policy

As a rule, no refunds of the registration fee will be made for any reasons whatever. Even in the event of registrant unable to attend the symposium, they will be able to download the online Technical Digest.

INSTRUCTION FOR SPEAKERS

PRESENTATION

▶ Time assigned for

Type	Total	Presentation	Discussion
Keynote	35 min.	30 min.	5 min.
Special Invited	30 min.	25 min.	5 min.
Invited	25 min.	20 min.	5 min.
Contributed	15 min.	12 min.	3 min.

▶ Please refer the ISOM website for the detail for presentation. The instruction will be appeared.

POST-DEADLINE PAPERS

Three papers were accepted as post-deadline papers and scheduled in the final session.

- Time assigned for:

Type	Total	Presentation	Discussion
Post deadline	15 min.	12 min.	3 min.

PUBLICATION OF SYMPOSIUM PAPERS

Online Technical Digest includes invited papers, accepted contributed papers, and limited numbers of post deadline papers. It will be available from Nov. 24 to Dec. 2, 2020. If you complete the payment, you will be informed of the website of the online Technical Digest on Nov. 24, 2020 and able to download it in advance.

The conference papers will be published in Oct. 2021 as a special issue of the OPTICAL REVIEW, which is the English-language journal of the Optical Society of Japan (OSJ). The authors who will have, by themselves, presented papers at ISOM'20 will be allowed to submit their papers for publication in this special issue. The authors of invited and contributed (including post-deadline) papers are encouraged to submit Progress Reviews and Regular Papers, respectively.

The instructions for preparation of manuscript and the agreement form for the special issue will be sent via e-mail after the conference. The deadline for submission of manuscripts is Feb. 28, 2021. Submitted papers will be reviewed based on the OPTICAL REVIEW standard.

GENERAL INFORMATION

I. Official Language

The official language of ISOM'20 is English.

II. Others

To receive further ISOM'20 announcement, please visit ISOM website (<https://isom.jp/>).

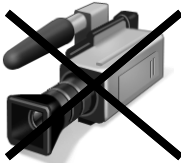
ATTENTION

It is not allowed to take photos and videos of any presentation materials in ISOM'20.

No Photo



No Video



No Recorder



TECHNICAL PROGRAM

November 29, 2020 (Sunday)

13:00 - 13:15 Opening Remarks

Tsutomu Shimura (The University of Tokyo, Japan)
Akinori Furuya (Tokushima Bunri University, Japan)

Su-A: Optical Memory I

Presider: Mitsuru Irie (Osaka Sangyo University, Japan)

Su-A-01

13:15 Optical Signal Amplification between Pages for Holographic Data Storage

Kazuyoshi Yamazaki¹, Masahiro Yamaguchi²

¹Hitachi, Ltd. (Japan), ²Tokyo Institute of Technology (Japan)

In holographic data storage, in order to increase its capacity, reproduction technique for a low diffraction beam from optical disk is required. In response to this request, we newly propose an optical signal amplification between two pages for holographic data storage.

Su-A-02

13:30 20:9 Modulation Code for Complex Amplitude Multi-Level Recording in Holographic Memory

Nobuhiro Kinoshita, Teruyoshi Nobukawa, Yutaro Katano, Tetsuhiko Muroi, Norihiko Ishii

Japan Broadcasting Corporation (NHK) (Japan)

Features of a modulation code we developed are defined reference symbol, four complex amplitude symbols in nine symbols, and position modulation and complex amplitude modulation tables. These modulation tables were optimized by genetic algorithm. The optimized modulation code could reduce bit error rates by half compared to random modulation code.

Su-A-03

13:45 Polarization-dependent control of optical path length for single-shot SQAM signal detection with transport of intensity equation method

Kazuya Tashiro, Masatoshi Bunsen

Fukuoka University (Japan)

We investigate an optical method that can control optical path length in a single optical path depending on the polarization. By combining the method and the TIE method with pixelated polarization camera, we can realize single-shot detection of SQAM signal beam. We numerically confirm the basic principle of the method.

Su-A-04

14:00 Simulation on Parameter Optimization of Semiconductor Ring Resonator with Nano-Antenna for HAMR Device

Jinghan Chen¹, Ryuichi Katayama¹, Satoshi Sugiura²

¹Fukuoka Institute of Technology (Japan),
²InnovaStella, Inc. (Japan)

The authors' group previously proposed a novel device for heat-assisted magnetic recording in which a metal nano-antenna is attached to a semiconductor ring resonator. In this research, the width of the ring resonator was optimized through a numerical simulation considering the device manufacturing tolerance and stability of laser oscillation.

Su-A-05

14:15 Advanced Techniques of OFDM Applied to Optical Disc Readout

Kimihiro Saito

Kindai University Technical College (Japan)

The FTN-OFDM method applied to optical disc recording is proposed and confirmed the potency. The optical disc simulation with signal processing of the orthogonality compensation shows the possibility of 1.5 times recording density of BDXL systems. Some other techniques for OFDM application such as reducing PAPR will also be discussed.

Su-A-06

14:30 Influence of photo-sensitizer and thermo-initiator concentrations on holographic recording performance of PQ/PMMA photopolymer

Yuxin Chen, Xiaodi Tan

Fujian Normal University (P.R.China)

The concentration of the photo-sensitizer and thermo-initiator is an important factor affecting the properties of holographic materials. Proper concentration balance has huge impacts on the performance of materials. In this paper, we obtained a relatively suitable concentration balance of PQ/PMMA photopolymer, making it more suitable for volume holographic data storage.

14:45 - 15:00 Break

Su-B: Digital Holography I

Presider: Tetsuhiko Muroi (NHK, Japan)

Su-B-01

15:00 Preliminary Evaluation of Visible Arrayed Waveguide Gratings for Planar Lightwave Circuit Digital Holographic Microscope

Hideaki Gomi¹, Shutaro Kodama¹, Katsunari Okamoto², Eriko Watanabe¹

¹The University of Electro-Communications (Japan),

²Okamoto Laboratory (Japan)

We evaluated AWGs to realize PLC-DHM with visible light AWG. By the composition which combined 8 channel AWG and 32 channel AWG, we experimentally demonstrated that the light emitted from the end-face of the waveguide has a high coherence of 1.8 mm, which can be used for DHM.

Su-B-02

15:15 Interpolation-extrapolation method for high resolution in-line digital holography

Zhengzhong Huang, Liangcai Cao

Tsinghua University (P.R.China)

The resolution of the reconstructed image is greatly limited by the pixelated detectors for the diffraction-limited holographic imaging. This work proposes a interpolation-extrapolation method to compensate the limited size of the digital hologram.

Su-B-03

15:30 **Complex Amplitude Reconstruction via Single-Pixel Imaging with Off-Axis Digital Holography**

Fukune Kaya, Shuhei Yoshida

Kindai University (Japan)

In this study, we propose digital holographic single pixel imaging based on Fourier transform method. In the proposed method, the Fourier transform method is used instead of the phase shift method to reduce the number of measurements.

Su-B-04

15:45 **Study on Influence of Iteration Number on Temperature Measurement using Phase Retrieval Holography**

Takuma Matsumura, Yohsuke Tanaka, Hiroki Matsushi, Shigeru Murata

Kyoto Institute of Technology (Japan)

In this study, we compare the convergence depending on the iteration number in the case of the two-constraints phase retrieval holography and the three-constraints phase retrieval holography by numerical experiments. We numerically generated a phase difference of a temperature distribution based on Gladstone-Dale relation.

Su-B-05

16:00 **Temperature measurement of flame by common-path off-axis digital holography**

Manoj Kumar¹, Yasuhiro Awatsuji², Osamu Matoba¹

¹Kobe University (Japan), ²Kyoto Institute of Technology (Japan)

We have presented a common-path off-axis digital holographic system based on a beam splitter and demonstrated it for the measurement of the refractive index by using the Abel inversion method and finally the temperature by the Lorentz-Lorenz formula, inside a candle flame.

Su-B-06

16:15 Holographic Microscopy using Dual-Wavelength with a Color Camera in Phase Retrieval Holography

Hiroki Matsushi, Yohsuke Tanaka, Takuma Matsumura, Shigeru Murata

Kyoto Institute of Technology (Japan)

This paper presents the elimination method of the twin-image on the reconstructed hologram by using dual-wavelength with a color camera in phase retrieval holography. A color hologram recorded the USAF 1951 test target can be virtually recorded at two different positions. We compared the proposed method with Gabor holography.

November 30, 2020 (Monday)

Mo-A: Keynote

Presider: Takanori Nomura (Wakayama University, Japan)

Mo-A-01 Keynote

9:00 Scanless three-dimensional fluorescence imaging techniques for bioapplications

Osamu Matoba¹, Manoj Kumar¹, Xiangyu Quan¹,
Sudheesh K. Rajput¹, Yasuhiro Awatsuji², Yosuke
Tamada³

¹Kobe University (Japan), ²Kyoto Institute of
Technology (Japan), ³Utsunomiya University
(Japan)

Scanless three-dimensional fluorescence imaging techniques are important to measure the 3D behavior of living cells or cellular networks in neuroscience and biology. Conventional two-photon microscopy can measure only one point at a time and then 3D fluorescence distribution can be obtained by scanning a focused point. Experimental results are presented.

09:35 - 09:50 Break

Mo-B: Sensing I

Presider: Akinori Furuya (Tokushima Bunri University,
Japan)

Mo-B-01 Invited

9:50 Study of Optical Sensing Technologies in Evaluating Short-Range Wireless Systems with Quasistatic Fields

Ai-ichiro Sasaki

Kindai University (Japan)

The use of optical sensing technologies for evaluating certain wireless systems is investigated. The advantage of optical sensing is that the effects of the measurement apparatus on the systems being evaluated are eliminated. The basic concepts and applications of optical sensing are also explained.

Mo-B-02

10:15 **Optical Balance Adjustment for Electro-Optic Probe by Changing Laser Diode Wavelength**

Riku Okada¹, Mitsuru Shinagawa¹, Jun Katsuyama², Yoshinori Matsumoto²

¹Hosei University (Japan), ²Yokogawa Electric Corporation (Japan)

This paper describes the improvement of the signal-to-noise ratio (SNR) of an electro-optic probe. Differential detection is used to improve the SNR by optical balance adjustment. The optical balance is adjusted by changing the wavelength of the laser source. We simulated the optical balance adjustment using a Jones matrix.

Mo-B-03

10:30 **Two-dimensional Waveguide Grating for Sensing Three-dimensional Angle Fluctuation**

Shogo Ura¹, Ryugo Tsuji¹, Junichi Inoue¹, Kenji Kintaka²

¹Kyoto Institute of Technology (Japan), ²National Institute of Advanced Industrial Science and Technology (AIST) (Japan)

A microoptic angle-fluctuation sensor is proposed. Transmission spectra of a two-dimensional waveguide grating are investigated for simultaneous sensing of fluctuations in three angle directions. Sensitivities by a design example are estimated to be 5 and 11 nm/deg. for incidence angles and 0.3 dB/deg. for a polarization angle.

Mo-B-04

10:45 **Polarization Noise Analysis of Electro-optic Sensor System**

Mai Tominaga¹, Mei Okajima¹, Mitsuru Shinagawa¹, Jun Katsuyama², Yoshinori Matsumoto²

¹Hosei University (Japan), ²Yokogawa Electric Corporation (Japan)

We studied the effect of noises of electro-optic (EO) sensor by using a Jones vector and FFT. The applied voltage noise to the EO crystal and the circuit noise cannot be reduced by differential detection.

11:00 - 11:15 **Break**

Mo-C: Advanced Optics and Device I

Presider: Daisuke Barada (Utsunomiya University, Japan)

Mo-C-01

11:15 Improving the reconstruction quality of spatial mode exchange technique by adjusting the diffusion angle of diffuser

Shuanglu Zhang¹, Atsushi Okamoto¹, Kazuhisa Ogawa¹, Akihisa Tomita¹, Taketoshi Takahata², Satoshi Shinada³, Yuta Goto³, Naoya Wada³

¹Hokkaido University (Japan), ²OPTOQUEST Co., Ltd. (Japan), ³National Institute of Information and Communications Technology (NICT) (Japan)

To achieve higher exchange performance in the spatial mode exchange technique using volume holograms, we confirm the dependence of the reconstruction quality on the diffusion angle of the random optical diffuser. The numerical simulation results showed a considerable reconstruction quality enhancement for the two-mode group by adjusting the diffusion angle.

Mo-C-02 Invited

11:30 Topological source of quantum light

Sunil Mittal¹, Venkata Vikram Orre¹, Elizabeth A. Goldschmidt², Mohammad Hafezi¹

¹University of Maryland (U.S.A.), ²University of Illinois (U.S.A.)

We will present a topological source of quantum light where edge states are used for enhanced generation of energy-time entangled photon pairs, and for robust engineering of the quantum correlations between generated photons. We will show that this spectral engineering allows us to achieve tunable quantum interference between generated photons.

Mo-C-03

11:55 Mode Compensation using Progressive Phase Conjugation Technique

Zeyu Shen, Atsushi Okamoto, Shuanglu Zhang, Kazuhisa Ogawa, Akihisa Tomita

Hokkaido University (Japan)

In order to compensate the mode coupling of the spatial mode beam in the multimode fiber, we conducted a numerical analysis to evaluate the effect of mode compensation using progressive

phase conjugation (PPC). The simulation results showed that PPC can effectively compensate the mode without requiring external reference beam.

Mo-C-04

12:10 Non-contact Thickness Measurement for Dielectric Plate using Electro-Optic Probe

Takumi Horikawa¹, Mitsuru Shinagawa¹, Jun Katsuyama², Yoshinori Matsumoto²

¹Hosei University (Japan), ²Yokogawa Electric Corporation (Japan)

This paper describes a thickness measurement method for a dielectric plate using an electro-optic probe system. The thickness is measured by a signal source with a parallel electrode using two copper plates. The output voltage increases monotonically as the thickness of the dielectric sample plate increases.

12:25 - 13:15 Lunch

Mo-D: Imaging

Presider: Yusuke Nakamura (Hitachi, Ltd., Japan)

Mo-D-01 Invited

13:15 Optical-frequency-comb microscopy for multivariate spectroscopic imaging utilizing amplitude and phase information

Takeo Minamikawa

Tokushima University (Japan)

We propose a novel optical microscopy employing optical-frequency-comb (OFC). The OFC microscopy enables spatio-temporal imaging with comprehensive optical information such as amplitude, phase and polarization spectra and temporal waveform based on mechanically-scanless Fourier transformation spectroscopy.

Mo-D-02 Invited

13:40 Efficient full-color computational imaging by utilizing human vision property - “giving in to the blues”

Ziheng Qiu, Zibang Zhang, Jingang Zhong

Jinan University (P.R.China)

The high performance of computational imaging is generally at the expense of imaging efficiency (such as, measurements and computational time).

Psychologists found that human eyes have a lower resolving power in blues than reds and greens. Is it possible to exploit such a property to achieve efficient full-color computational imaging?

Mo-D-03 Invited

14:05 Toward a Thinking Microscope: Deep Learning-enabled Computational Microscopy and Sensing

Aydogan Ozcan

UCLA (U.S.A.)

We will discuss recently emerging applications of the state-of-art deep learning methods on optical microscopy and microscopic image reconstruction, which enable new transformations among different modalities of microscopic imaging, driven entirely by image data.

Mo-D-04

14:30 Super-resolution Measurement By Virtual Phase Conjugation Using A Small Number Of Pixels For Optical Detection

Satoshi Kawashima, Atsushi Okamoto, Kazuhisa Ogawa, Akihisa Tomita

Hokkaido University (Japan)

To maximize the performance of super-resolution measurement using virtual phase conjugation without using a noise reduction method that consumes extra imaging resources, relationships between the size of the signal light area, resolution of the image sensor, and the amount of noise are quantified and evaluated.

Mo-D-05

14:45 Spatial Characteristics of Guided-mode Resonance Filter in Oblique Incidence

Shinichiro Okamoto, Kotaro Yoshimoto, Junichi Inoue, Shogo Ura

Kyoto Institute of Technology (Japan)

A subwavelength waveguide grating on a transparent substrate can provide a narrowband reflection spectrum. Position shift and deformation of a reflection beam in oblique incidence were discussed with the coupling strength of the grating.

Mo-D-06

15:00 Single Shot Phase Imaging Based on Higher Order Transport-of-Intensity Equation Using a Computer-Generated Hologram

Aoi Onishi, Naru Yoneda, Yusuke Saita, Takanori Nomura

Wakayama University (Japan)

Measurement accuracy of the transport-of-intensity phase imaging is improved by using multiple defocused images which is usually captured with mechanical scanning. To acquire these images without scanning, a computer-generated hologram technique has been introduced. In this study, the feasibility of the proposed method is confirmed by numerical and optical experiments.

15:15 - 15:30 Break

Mo-E: Digital Holography II

Presider: Xiaodi Tan (Fujian Normal University, China)

Mo-E-01 Invited

15:30 Incoherent-holography-based computational imaging system for 3D imaging and infinite depth-of-field imaging

Teruyoshi Nobukawa, Yutaro Katano, Tetsuhiko Muroi, Nobuhiro Kinoshita, Norihiko Ishii

Japan Broadcasting Corporation (NHK) (Japan)

Incoherent digital holography (IDH) is an attractive approach to passive computational imaging. We previously proposed a bimodal IDH system, which implements both 3D imaging and infinite depth-of-field imaging. This presentation reviews the basic operation of the proposed system and provides proof-of-principle experimental results.

Mo-E-02 Invited

15:55 Tomographic imaging of blood coagulation structures in flow cytometry using digital holographic microscopy

Hideki Funamizu

Muroran Institute of Technology (Japan)

Blood coagulation is an important role in hemostasis process. Aggregation structures of red blood cells indicate the degree of blood coagulation. Digital holographic microscopy (DHM) is a

powerful tool for quantitative phase imaging of biological cells. We report tomographic imaging of blood coagulation structures in flow cytometry using DHM.

Mo-E-03

16:20 Twin-Image Reduction of Low-Coherence In-Line Digital Holography Using a Diffuser

Kenya Kawano, Takanori Nomura

Wakayama University (Japan)

A twin-image reduction method of digital holography using an LED and a diffuser was proposed. As the size of the optical system is compact against a conventional system, it has portability. Simulation results show that the proposed method can obtain the reconstructed image comparable to the laser-based conventional method.

Mo-E-04

16:35 Compressed Sensing Based Holographic Particle Velocimetry for Complex Microflow Measurement

Kan Itakura, Shuhei Yoshida

Kindai University (Japan)

In this study, we applied compressed sensing (CS) to holographic particle tracking velocimetry (HPTV) for measurement of the complex microflow. In the proposed method, the particle distribution can be directly reconstructed with high accuracy by applying the compressed sensing based on the sparse particle distribution.

Mo-E-05

16:50 Evaluation of Spatial Resolution in Motionless Optical Scanning Holography

Naru Yoneda, Yusuke Saita, Takanori Nomura

Wakayama University (Japan)

Motionless optical scanning holography (MOSH) has been proposed to realize single-pixel 3D incoherent imaging. In MOSH, a reproduced hologram is expressed as a convolution between an object and a Fresnel zone plate. In this study, a point spread function of MOSH is evaluated by numerical simulation.

17:05 - 17:20 Break

Mo-F: Optical Memory II

Presider: Kimihiro Saito (Kindai University Technical College, Japan)

Mo-F-01 Invited

17:20 Phase data acquisition and multiplexing techniques for in-line holographic data storage based on computer-generated holograms

Yusuke Saita, Naru Yoneda, Aoto Matsumoto, Takanori Nomura

Wakayama University (Japan)

Holographic data storage using a computer-generated hologram has been researched. Our recent studies about phase data acquisition and multiplexing techniques to improve its recording capacity are based on a digital holographic technique and the reference wave correlation. In this presentation, details and evaluations of respective approaches are introduced.

Mo-F-02

17:45 Convolutional Neural Network Based Demodulation for Constant-Weight Codes in Holographic Data Storage

Kurokawa Shinya, Shuhei Yoshida

Kindai University (Japan)

We systematically examined the improvement effect of CNN based demodulation method for constant-weight codes and analyzed the types of salient errors.

Mo-F-03

18:00 Transport of Intensity Phase Data-Page Acquisition with Polarization Directed Flat Lens in Coaxial Holographic Data Storage

Yuta Takahashi, Yusuke Saita, Naru Yoneda, Takanori Nomura

Wakayama University (Japan)

Storage capacity of coaxial holographic data storage can be increased by using phase information. A polarization directed flat lens is introduced to system for phase measurement based on transport of intensity equation. Simulation results confirm the feasibility of the proposed method.

Mo-F-04

18:15 CNN Demodulation for Complex Amplitude Modulation Code in Holographic Data Storage

Yutaro Katano, Teruyoshi Nobukawa, Tetsuhiko Muroi, Nobuhiro Kinoshita, Norihiko Ishii

Japan Broadcasting Corporation (NHK) (Japan)

We have proposed a demodulation method using two convolutional neural networks (CNNs) for complex amplitude modulation code in holographic data storage. Our compact CNNs individually and accurately demodulate the symbol position in modulation block and complex amplitude signal without the four-step phase-shift method, respectively.

December 1, 2020 (Tuesday)

Tu-A: Special Invited

Presider: Takanori Nomura (Wakayama University, Japan)

Tu-A-01 Special Invited

9:00 Development of remote sensing methods in vegetation area

Kazuo Oki

Kyoto University of Advanced Science (Japan)

The use of remote sensing is useful to manage large scale vegetation area. However, there are limitations such as lack of the spatial resolution and high operative cost in remote sensing technologies using satellite sensors and airborne platforms respectively. Here, I introduce remote sensing methods to solve these problems.

09:30 - 09:45 Break

Tu-B: Sensing II

Presider: Takayuki Shima (AIST, Japan)

Tu-B-01 Invited

9:45 Laser Gas Sensing for Inspecting Cashmere Place of Origin

Souichi Oka, Yuuichi Akage, Yurina Tanaka

NTT Device Innovation Center (Japan)

The aim of this study is to identify cashmere place of origin using a laser of two micrometer wavelength in order to measure the stable isotope ratios of carbon and deuterium. Experimental results showed that cashmere place of origin could be identified with an accuracy of 90 percent.

Tu-B-02 Invited

10:10 Beans-size mid-infrared (LWIR: Longwave Infrared) hyperspectral camera

Ichiro Ishimaru, Natsumi Kawashima

Kagawa University (Japan)

We proposed the point-one-shot mid-infrared Fourier spectroscopic imager composed of only one Ge lens (diameter: 6 mm, thickness: 5 mm) and a two-dimensional array device. The lens is a non-spherical lens at the front side and a dual-axis inclined wedge prism at the back side.

Tu-B-03

10:35 Localized Scattering Estimation In Turbid Medium Using Backscattered Light From Surface - For Noninvasive Sensing of Blood Turbidity -

Shiyang Liang, Koichi Shimizu

Waseda University (Japan)

To realize a noninvasive turbidity measurement in the blood vessel, a technique to estimate the reduced scattering coefficient from backscattered NIR light was developed. Using a differential principle, we can measure the scattering in the localized position in the medium. In the Monte Carlo simulation, its validity was verified.

10:50 - 11:05 Break

Tu-C: Digital Holography III

Presider: Takanori Nomura (Wakayama University, Japan)

Tu-C-01 Invited

11:05 Space-Bandwidth Product Extension with Compressed Sensing for Off-Axis Digital Holography

Shuhei Yoshida

Kindai University (Japan)

We propose a wavefront reconstruction method with a high SBP that can be applied to conventional off-axis DH without any alteration. The proposed method can reconstruct a high-SBP wavefront by solving the hologram recording model via compressed sensing (CS) with total variation (TV) regularization.

Tu-C-02

11:30 In-situ Calibration for a Spatial Light Modulator Based On Digital Holography

Rujia Li, Liangcai Cao

Tsinghua University (P.R.China)

We proposed an in-situ phase-SLM's calibration method based on digital holography. The differential phase on hundreds of blocks that include multiple pixels can be reconstructed through the holograms. The spatial nonuniformity of the modulation on the panel can be measured for calibration with high efficiency.

Tu-C-03

11:45 Detection of positional error due to hardening process of UV curable adhesive by using digital holography

Kakeru Inagaki¹, Masayuki Yokota¹, Katsuhiro Iwasaki², Katuya Kito²

¹Shimane University (Japan), ²Kohoku Kogyo Company Limited (Japan)

The temporal displacement of a mirror cube in the adhesion process of the UV adhesive is evaluated by using digital holographic interferometry. This method can detect three-dimensional displacement with high sensitivity. In addition, the relationship between the orientation of displacement and the degree of hardening in adhesive is investigated.

12:00 - 12:05 ISOM'21 Announcement

12:05 - 13:00 Lunch

Tu-D1: Special Session 3D Imaging/Sensing, Display

Presider: Yusuke Nakamura (Hitachi, Ltd., Japan)

Tu-D1-01 Invited

13:00 Light ray direction identification imaging system to obtain physical property of object

Hiroshi Ohno

Toshiba Corporation (Japan)

A direction of a light ray coming from an object is affected by physical properties of the object such as shape, surface roughness, and refractive index distribution that cause reflection, scattering, and refraction. Optical imaging system that can identify light ray direction to obtain physical properties is described here.

Tu-D1-02 Invited

13:25 Recent developments in our 3D displays - Non-overlapped DFD display & Arc 3D display -

Shiro Suyama, Haruki Mizushima

Tokushima University (Japan)

We have proposed Non-overlapped DFD display and Arc 3D display, which satisfy all the features required for large & long-viewing distance 3D display. Our 3D displays have wide viewing zone in horizontal and depth directions, large image depth and simple structure. Moreover, we propose rewriting method for Arc 3D display.

Tu-D1-03

13:50 Depth estimation in 2D transillumination image using focus-stacking method

Sihan Xian, Yingdong Chen, Koichi Shimizu

Waseda University (Japan)

Transillumination imaging with near-infrared (NIR) light is a useful noninvasive technique to visualize the blood vessel network of a living animal. However, the depth of the internal structure cannot be known from the two dimensional image. To solve this problem, we applied a technique of focus-stacking.

Tu-D1-04

14:05 Simulator for System Verification of 3D Shape Measurement Using Fringe Projection Profilometry Based on Game Engine

Kazumasa Ueda, Kanami Ikeda, Osanori Koyama, Makoto Yamada

Osaka Prefecture University (Japan)

A Game-engine-based simulator for verifying a 3D shape measurement system using fringe projection profilometry is proposed. The simulator can import objects and measurement device modules in a virtual 3D space via GUI. A measurement simulation of the shape of a 3D CAD object is shown.

14:20 - 14:30 Break

Tu-D2: Special Session 3D Imaging/Sensing, Display

Presider: Koichi Iiyama (Kanazawa University, Japan)

Tu-D2-01 Invited

14:30 Improvement of Binocular Depth Perception in 3D Displays by Motion Parallax

Haruki Mizushina, Yoko Awata, Yusuke Fukuta, Shiro Suyama

Tokushima University (Japan)

We introduce our recent studies related to improving binocular depth perception in 3D displays by motion parallax. Motion parallax can resolve various perceptual problem in conventional stereoscopic display including depth degradation with unbalance in visual acuity between left and right eyes, and depth degradation in 3D display with vertical disparity.

Tu-D2-02 Invited

14:55 Human-Friendly Communication Media and Its Applications

Hideaki Takada

Nagasaki University (Japan)

Tele-communication service has been progressing from telephone to high-reality communication systems that are based on evolution of network and audio-visual media. Using 3D display and 3D sound effects, we will realize the ultimate communication that goes beyond reality and naturally connects people by the expressing intention, mind and sympathetic response.

Tu-D2-03

15:20 Line symmetric image input technique of volumetric hologram waveguide for wide field of view head mounted displays

Toshiteru Nakamura, Ryushi Fujimura

Utsunomiya University (Japan)

We propose a FOV enlargement method by using a line symmetric image input in the single layer volumetric holographic waveguide. The proposed method achieves 500 times improvement in uniformity of luminance and twice FOV as large as conventional surface relief grating waveguide.

Tu-D2-04

15:35 Scanning Fiber Based Ultra-compact Near-eye Display with a Narrow Beam Waveguiding Technique

Takuma Kuno, Toshiteru Nakamura, Takahiro Matsuda, Shinsuke Onoe, Yoshiho Seo, Satoshi Ouchi

Hitachi, Ltd. (Japan)

We developed a new waveguide configuration that enables achieving a uniform image with a fiber scanning projector. We found that a uniform image could be achieved using our prototype and demonstrated that our proposed optical system enables designing ultra-compact near-eye displays.

15:50 - 16:05 Break

Tu-E: Advanced Optics and Device II

President: Kimihiro Saito (Kindai University Technical College, Japan)

Tu-E-01

16:05 Narrowband Focusing Mirror Based on Cavity-resonator-integrated Guided-mode Resonance Filter

Ryohei Ueda¹, Toshiki Kusuura¹, Junichi Inoue¹, Kenji Kintaka², Shogo Ura¹

¹KIT (Japan), ²NAIST (Japan)

A mirror constructed by a focusing grating coupler in a waveguide resonator on a reflective substrate is proposed for retroreflection of a diverging wave. A 21- μ m-aperture mirror is fabricated for operation of a 1540-nm wavelength and a 10.6° divergence angle. A 4-nm-width spectrum with the 80% maximum is experimentally confirmed.

Tu-E-02 Invited

16:20 On the Problem of Total Internal Reflection from a Semi-infinite Gain Medium

Masud Mansuripur¹, Per K. Jakobsen²

¹University of Arizona (U.S.A.), ²UIT The Arctic University of Norway (Norway)

The problem of Fresnel reflection from the flat interface between a transparent dielectric and a semi-infinite gain medium will be discussed. Special attention will be paid to the case where the incidence angle exceeds the critical angle for total internal reflection.

Tu-E-03

16:45 Numerical simulation of switching of signal path of FM-MCFs by SLM

Yuta Abe¹, Atushi Okamoto¹, Kazuhisa Ogawa¹, Akihisa Tomita¹, Daiki Soma², Yuta Wakayama², Takehiro Tsuritani²

¹Hokkaido University (Japan), ²KDDI Research, Inc. (Japan)

We conducted a numerical analysis to evaluate the coupling efficiency of the signals path-switched using the spatial light modulator (SLM) in the few mode multi core fiber (FM-MCF). Simulation results showed that the spatial mode distributions through the 6-mode 19-core fiber were retained after switching by SLM.

Tu-E-04

17:00 Cross-talk reduction between layers based on Gaussian distribution in optical tomographic imaging using virtual phase conjugation

Jiang Mengying, Atsushi Okamoto, Kazuhisa Ogawa, Akihisa Tomita

Hokkaido University (Japan)

To achieve a higher resolution performance in virtual phase conjugation-optical tomography, we proposed an algorithm based on assuming the z axle pixel intensity flows Gaussian distribution and carried out it in simulation. The result shows the cross-talk between two layers was suppressed, which indicates the system resolution was improved.

17:15 - 17:30 Break

Tu-F: Biological and Life Application I

Presider: Minoru Takeda (Kyoto Institute of Technology, Japan)

Tu-F-01 Invited

17:30 Extremely Weak Lighting that Brings Out the Potential of Plant

Yuta Kimura, Kohei Miwa, Koji Tanigawa, Atsushi Maeda, Kazunori Matsuda, Hiroshi Kajiyama

Tokushima Bunri University (Japan)

Light is an essential element in growing plants. This paper demonstrates that the extremely weak pulsed lighting doubles photosynthetic products and controls the distribution of them into biomass and secondary metabolite pathways. The property of pulsed light and the growth promotion effect are presented.

Tu-F-02

17:55 Extended depth of light-field microscopy

Ryo Shinke, Xiangyu Quan, Sudheesh K. Rajput, Osamu Matoba

Kobe University (Japan)

Extended depth of light-field microscopy is presented. We introduce an electrically focus tunable lens in a light-field microscope with a lenslet array for extending the depth of field in the reconstruction calculation.

Tu-F-03

18:10 Noise Analysis for Sitting person using Electro-optical Tool in Intra-body Communication

Haruomi Hanazawa¹, Koki Yoshioka¹, Mitsuru Shinagawa¹, Naohiro Itoh², Kohji Kawahata², Nobunari Tsukamoto², Syuji Kubota², Masaaki Tsuji²

¹Hosei University (Japan), ²RICOH Co., LTD. (Japan)

Intra-body communication uses human body as a transmission path for electric signals. Noise with the sitting person is measured using an electro-optical tool. We verified that the difference between the standing and sitting models is merely a difference in the capacitance values between the human body and the floor.

Tu-F-04

18:25 Improvement of Holographic Multi-spot Pattern with Feedback Optimization for Cell Manipulation

Ryo Ihara¹, Xiangyu Quan¹, Yasuhiro Awatsuji², Osamu Matoba¹

¹Kobe University (Japan), ²Kyoto Institute of Technology (Japan)

Quality of holographic multi-spot pattern is improved by feedback optimization using direct observation. In the biological applications, the number of multi-spots with the same intensity will be controlled, and small intensity deviation and three-dimensional property are required. We present the preliminary experimental results.

December 2, 2020 (Wednesday)

We-A: Sensing III

Presider: Takayuki Shima (AIST, Japan)

We-A-01 Invited

9:00 Silicon-plasmonic-integrated sensors for Lab-on-Chip application

Masanobu Haraguchi¹, Shun Kamada¹, Salah E. El-Zohary², Hiroyuki Okamoto³, Toshihiro Okamoto¹

¹Tokushima University (Japan), ²Tanta University (Egypt), ³National Institute of Technology, Anan College (Japan)

We proposed a Silicon-plasmonic-integrated sensors for Lab-on-Chip application. We numerically and experimentally observed the optical characteristics of surface plasmon polariton (SPP) rectangular resonator connected SPP waveguides. Simple rectangular resonator providing two types of SPP resonance modes enable high sensitivity of molecular detection for Lab-on-Chip application.

We-A-02 Invited

9:25 Velocity distribution measurements based on differential laser Doppler velocimetry

Koichi Maru

Kagawa University (Japan)

Velocity distribution measurement techniques using differential laser Doppler velocimetry are presented. The principle is based on non-mechanical scanning and simultaneous multipoint measurement using spatial encoding. Several methods for measuring 1-dimensional and 2-dimensional velocity distributions are described.

We-A-03

9:50 Detection of Pitch Uniformity of Microstructure using Simple Light Illumination

Toshiki Azuma, Kanami Ikeda, Osanori Koyama, Makoto Yamada

Osaka Prefecture University (Japan)

The pitch of the grating structures may not be uniform. It could lead to equipment malfunction. In this study, we simulate reflected light from grating

structures to investigate the possibility of detecting grating pitch uniformity using a simple system configuration.

We-A-04

10:05 Electro-Optic Probe Using $\text{KTa}_{1-x}\text{Nb}_x\text{O}_3$ for Low-Frequency Measurement

Keita Takano¹, Mitsuru Shinagawa¹, Jun Katsuyama², Yoshinori Matsumoto², Shogo Yagi³, Takafumi Ogawa³

¹Hosei University (Japan), ²Yokogawa Electric Corporation (Japan), ³NTT Advanced Technology Corporation (Japan)

This paper describes the feasibility of an EO probe using a KTN crystal for measuring low frequency signals. The experimental results shows that the KTN crystal increases the sensitivity of the EO probe and enables measurement of low frequency signals.

10:20 - 10:35 Break

We-B: Nanophotonics and Plasmonics

Presider: Ryuichi Katayama (Fukuoka Institute of Technology, Japan)

We-B-01 Invited

10:35 High Dimensional Quantum Entanglement Meta-lens Array Optical Chip

L. Li¹, Z. Liu², X. Ren³, S. Wang², M.-K. Chen¹, V.-C. Su⁴, C. H. Chu⁵, H. Y. Kuo⁶, B. Liu³, W. Zang², G. Guo³, L. Zhang², Z. Wang², S. Zhu², D. P. Tsai¹

¹The Hong Kong Polytechnic University (Hong Kong), ²Nanjing University (P.R.China), ³University of Science and Technology of China (P.R.China), ⁴National United University, Miaoli (R.O.C.), ⁵Academia Sinica (R.O.C.), ⁶National Taiwan University (R.O.C.)

By integrating a meta-lens array with a nonlinear crystal, we demonstrate a 100-path spontaneous parametric down-conversion photon-pair optical chip, which is promising for high-dimensional quantum entanglement and multi-photon state generations.

We-B-02

11:00 The Correlation between Electrical Properties and Surface Plasmonic Properties on ITO Films with diffraction grating

Nobutoshi Miyamoto, Kohei Funahashi, Noriyuki Hasuike, Minoru Takeda

Kyoto Institute of Technology (Japan)

SPP mode along the ITO/air interface were discussed for ITO films with different electric properties by using diffraction grating structure.

We-B-03

11:15 Significant enhancement of magneto-optical effect at ultraviolet wavelength using Ni-subwavelength grating on SiO₂/Ni structure

Yuusuke Takashima, Masanobu Haraguchi, Yoshiki Naoi

Tokushima University (Japan)

Significant enhancement of magneto-optical (MO) effect was theoretically demonstrated using Ni-subwavelength grating on SiO₂/Ni. Electromagnetic field simulated indicates that the concentrated electric field at SiO₂-Ni interface assisted interaction between magnetized matter and light, and our structure achieved 224 times greater polarization rotation MO effect than that of bulk Ni.

We-B-04

11:30 Dimensional Characteristics of Guided-mode Resonant Nanostructures

Akari Watanabe¹, Junichi Inoue¹, Kenji Kintaka², Shanwen Zhang³, Shogo Ura¹, Robert Magnusson⁴

¹Kyoto Institute of Technology (Japan), ²National Institute of Advanced Industrial Science and Technology (AIST) (Japan), ³Chinese Academy of Sciences (P.R.China), ⁴University of Texas (U.S.A.)

Guided-mode resonance shows different filtering behaviors between one- and two-dimensional grating structures. Reflection spectra are simulated and discussed with dimensional transformation between them by introducing intermediate structures consisting of vertically-stacked different-dimensional gratings.

We-B-05

11:45 Transmission and Reflection Coherent Diffraction for High-accuracy Cross-sectional Measurement by Soft X-rays

Tetsuya Hoshino¹, Sadao Aoki¹, Masahide Itoh¹, Motoharu Shichiri², Hiroshi Itoh²

¹University of Tsukuba (Japan), ²National Institute of Advanced Industrial Science and Technology (AIST) (Japan)

This study is a cross-sectional shape measurement with high accuracy in the plane including the optical axis in soft X-rays. Conventionally, only a periodic structure can be observed with the accuracy of a few wavelengths. Our aim is an isolated structure measurement and it has wide applications including optical memory.

We-B-06

12:00 Evaluation of the Plasmon Resonance Antenna with Bulls-eye Structures

Masahiro Deguchi, Genta Yonezawa, Minoru Takeda, Noriyuki Hasuike

Kyoto Institute of Technology (Japan)

We designed and fabricated bulls-eye plasmonic structures that efficiently enhance the electric field in the central part by exciting surface plasmons in the visible regions, and emitting light of the resonant wavelength from the central aperture with high directionality. We experimentally evaluated the characteristics and compared with FDTD simulation results.

12:15 - 12:20 ISOM'20 Commemorative Photo

12:20 - 13:15 Lunch

We-C: Biological and Life Application II

President: Masanori Takabayashi (Kyushu Institute of Technology, Japan)

We-C-01 Invited

13:15 Securing IoT Sensor Networks Based on LoRa

Shoichiro Seno, Akinori Furuya, Hiroyuki Nakayama

Tokushima Bunri University (Japan)

IoT sensor networks based on LoRa are being deployed increasingly thanks to its relatively wide range. As LoRa becomes popular, security threats like traffic analysis and localization will impose a major issue. This paper proposes a new security measure called address randomization in addition to standardized encryption and message authentication.

We-C-02

13:40 Wearable broadband photo-thermoelectric sensor sheet with flexible carbon nanotube thin channel films for passive liquidity monitoring

Kou Li, Yukio Kawano

Tokyo Institute of Technology (Japan)

This paper reports wearable passive liquidity monitoring with freely attachable broadband sensitive photo-thermoelectric thin-film sensor sheets. The device consists of bendable carbon nanotube films, and can be smoothly patched on sterically curved liquid pipes. The proposed sensor demonstrates label-free photo-sourceless inspections of the glucose solution concentration based on black-body radiation.

We-C-03

13:55 Dynamic Signal Sensing of Intra-body Communication in Three Walking Persons

Sotaro Sawa, Mitsuru Shinagawa, Rikuma Ashizawa

Hosei University (Japan)

This paper describes a signal sensing for three walking persons in intra-body communication by using a dynamic signal sensing system. The power margin is proposed in a situation of three walking persons for preventing the system from wrong authentication caused by unintentional signal.

14:10 - 14:25 Break

We-D: Optical Memory III

Presider: Osamu Matoba (Kobe University, Japan)

We-D-01 Invited

14:25 All-optical quantum memories towards photonic quantum information processing

Mamoru Endo, Jun-ichi Yoshikawa, Akira Furusawa

The University of Tokyo (Japan)

One of the most promising approaches to realize fault-tolerant universal quantum computation is the use of a travelling electromagnetic field of light. We review how to implement an optical quantum computer with all-optical quantum memories.

We-D-02 Invited

14:50 Dynamic sampling iterative phase reconstruction for holographic data storage

Xiao Lin, Ruixian Chen, Jianying Hao, Changyu Yu, Qijing Zheng, Xianying Qiu, Suping Wang, Kun Wang, Xiaodi Tan

Fujian Normal University (P.R.China)

We proposed a method of dynamic sampling iterative phase reconstruction for holographic data storage. Compared with traditional method that using same Fourier intensity pattern in every iteration, the bit-error-rate is lower and the iteration number is fewer by using the dynamic sampling method.

We-D-03 Invited

15:15 A recording method for SQAM signal in holographic memories and improvement of areal information density

Satoshi Honma, Haruki Watanabe, Yugo Nakajima

University of Yamanashi (Japan)

A two-step exposure method and interleaved phase pages are investigated for recording SQAM with multi-level phase and amplitude in holographic storage. This paper clarifies the relationship between the number of pixels of SLM used to represent a symbol, the amount of information per page, and the areal recording density.

We-D-04 Invited

15:40 Recording Strategies of Self-Referential Holography Toward More Flexible Inter-Pixel Interactions

Masanori Takabayashi

Kyushu Institute of Technology (Japan)

Self-referential holography is a holographic data recording method based on inter-pixel interactions of reading beam which can be controlled by recording conditions. We present some recording strategies, which will lead to multi-level datapage recording and clarification of recording conditions for high quality readout etc.

16:05 - 16:20 Break

We-PD: Post Deadline Papers

President: Shinya Hasegawa (Hiroshima Institute of Technology, Japan)

We-PD-01

16:20 High-Speed Three-Dimensional Object Profiling Using FMCW Optical Ranging System by Continuous Scanning of Laser Beam

Tomoharu Konishi, Koichi Iiyama

Kanazawa University (Japan)

High-speed object profiling is realized by using the FMCW optical ranging system. The Galvano scanner for laser beam scan is continuously scanned to avoid response delay of the Galvano scanner. As a result, the profiling time is 3 times faster than the system using a step-scanned Galvano scanner.

We-PD-02

16:35 Spatially varying polarization fringe projection method for three-dimensional shape measurement

Nobukazu Yoshikawa, Naoya Hasegawa, Shusuke Kobayashi

Saitama University (Japan)

We propose a fringe projection 3D measurement system using a spatially varying polarization fringe pattern. We develop a 4-step phase-shifting method using the phase-shifted angle of polarization maps to reconstruct the object phase.

We-PD-03

16:50 Effect of Fiber Profile Parameters on Sensitivity of the Tapered Optical Fiber Sensors

Behnaz Fatehi Raviz, Mohammad Vahedi

Iran University of Science and Technology (Iran)

We have proposed a study on the effect of the fiber profile parameters on the sensitivity of the tapered optical fiber sensors. We believe that by increasing the taper angle and waist-length, the sensitivity of the sensor can be improved. The effect of angle is 23.3 times greater than the effect of length, based on our experimental tests.

17:05 - 17:25 Awards & Closing Remarks

Takanori Nomura (Wakayama University, Japan)

Akinori Furuya (Tokushima Bunri University, Japan)

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Zhang, Shanwen	We-B-04
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