ADVANCE PROGRAM

International Workshop on Holography and Related Technologies 2017

I.W.H

November 22 to 24, 2017

Plaza Verde, 1-1-4 Otemachi, Numazu City, Shizuoka, 410-0801, Japan

COSPONSORED BY

- Optical Society of Japan (OSJ)
- International Workshop on Holography
- Center for Optical Research and Education (CORE), Utsunomiya University. ; in corporate with the following societies
- Research Group on Volume Holographic Memory Technology (VHM), OSJ
- Holographic Display Artists and Engineers Club (HODIC), OSJ
- Group of Information Photonics, OSJ
- Digital Optics Research Group, OSJ
- The Institute of Electronics, Information and Communication Engineers
- The Institute of Image and Television Engineers
- Tochigi Optoelectronic Industry Promotion Conference.

SUBJECT AREAS

- Holographic Memory
- Holographic Optical Elements
- Computer Generated Holography
- Digital Holography
- Holographic Display
- Holography Arts and Design
- Recording Materials
- Signal Processing for Holography
- Devices for Holography
- Simulation for Holography
- AR, MR, HUD and HMD with Holography
- Applications
- Others

Wednesday 22-Nov-17

13:00	Opening				
13:20	22p1	Shinji Hayashi	Microsoft Japan	Japan	Microsoft HoloLens in the Modern Workplace
14:00	22p2	Yoshio Hayasaki	Utsunomiya Univ.	Japan	Volumetric bubble display
14:30	22p3	Tomoyasu Saigo	Nagoya Inst. of Tech.	Japan	Holographic Optical Elements in Machine Vision Lighting
14:45	22p4	Yuki Nagahama	Chiba Univ.	Japan	Development of Auto-focus System of Holographic Projector Using RGB-D Camera
15:00	Break				
15:30	22p5	Yutaro Katano	NHK	Japan	Deep-Learning Based Data Demodulation for High Density Holographic Data Storage
16:00	22p6	Po-Kai Hsieh	National Central Univ.	Taiwan	Servo Compensation method of position error on Volume Holographic Disc
16:15	22p7	Yusuke Saita	Wakayama Univ.	Japan	Simultaneous Recording and Reading of Multiple Data Pages for Coaxial Holographic Data Storage Using Computer-Generated Hologram
16:30	22p8	Tsutomu Shimura	Univ. Tokyo	Japan	Tutorial : Multiplexed volume holography and polarization
17:00	Break				
18:00	Banquet				

Thursday 23-Nov-17

09:30	23a1	Takanori Nomura	Wakayama Univ.	Japan	Computational Optical Sensing and Imaging Based on Information Photonics
10:00	23a2	Daisuke Barada	Utsunomiya Univ.	Japan	Spatial Sampling Theory for Holographic Data Storage with Low-Spatial Frequency Data Page Pattern under Nyquist Frequency
10:30	23a3	Shimpei Shimizu	Hokkaido Univ.	Japan	Optimization of Volume Holographic Spatial Mode Demultiplexer with a Phase Plate Using Simulated Annealing
10:45	23a4	Yuji Sakamoto	Hokkaido Univ.	Japan	Development of Holo-HMD and remaining issue
11:15	Break				
11:30	23a5	Hiroshi Yoshikawa	Nihon Univ.	Japan	A Study on Objective Image Quality Evaluation of Computer-Generated Hologram
12:00	23a6	Yih-Shyang Cheng	National Central Univ.	Taiwan	Transmission Spherical-Type Multiplex Holography: Theory
12:15	23a7	Yu-Hsin Tu	National Central Univ.	Taiwan	Reconstruction Reference Wave Design for the Copying System in Normal Viewing Disk-type Multiplex Holography
12:30	Lunch				
14:00	23p1	Liangcai Cao	Tsinghua Univ.	China	Block-wise Compressive Digital Holography
14:30	23p2	Nobukazu Yoshikawa	Saitama Univ.	Japan	Object wave reconstruction by generalized phase-shifting digital holography using normalized interference fringe
14:45	23p3	Qiyue Yu	Qingdao Univ.	China	Development of color digital holographic microscope system using multiple light sources
15:00	23p4	Masahiro Yamaguchi	Tokyo Inst. Tech.	Japan	Full-parallax light-field and holographic displays for enriched 3D visual experience
15:30	Poster session				
	P1	Ching-Cherng Sun	National Central Univ.	Taiwan	A Comparison of Beam Shaping by DOE and ROE

	P2	Fumiya Mizukawa	Hokkaido Univ.	Japan	Improvement of Conversion Accuracy in Volume Holographic Mode-Demultiplexing Converter Using Shaped Beams
	P3	Hiroshi Tabuchi	Okamoto Glass Co., Ltd.	Japan	Photopolymer Film, FIGURA : Contribution of Development of High Holographic Technologies.
	P4	Kazusa Oe	Wakayama Univ.	Japan	Experimental demonstration of twin-image reduction method using a diffuser for in-line digital holography.
	P5	Ryo Omori	Tokyo Univ.	Japan	Principle and characteristics of phase modulated time series collinear holographic memory
	P6	Satoshi Tagami	Utsunomiya Univ.	Japan	Vectorial Light Propagation Analysis of Scalar Holographic Data Storage Using a Vector Diffraction method
	P7	Siti Nabilah Hassan	Utsunomiya Univ.	Japan	Hyperspectral digital holography for observing biological stained sample
	P8	Takemitsu Mizuki	Hokkaido Univ.	Japan	Analysis of Transient Visual Evoked Potential on Electro-holographic Image
	P9	Tomohiro Maeda	Hokkaido Univ.	Japan	Design of Complex Amplitude Modulation for Suppressing Optical Loss in Mode Conversion by Considering Radiation Modes
	P10	Yuta Goto	Hokkaido Univ.	Japan	Multiplexing and Demultiplexing of Digital Images using Virtual Phase Conjugation for High-Density Holographic Data Storage
	P11	Yuya Nakamura	Utsunomiya Univ.	Japan	Improvement of Signal to Noise Ratio in Phase-multivalued Holographic Data Storage by Limiting Aperture Opening of Imager Pixels
	P12	Zehao He	Tsinghua Univ.	China	Design of Color LED Holographic Display System Based on DMD
	P13	Yuki Kunii	Utsunomiya Univ.	Japan	Phase-encoded signal detection by using inter-pixel crosstalk
17:00	End of session				

Friday 24-Nov-17

09:30	24a1	Yuan Luo	National Taiwan Univ.	Taiwan	Engineered Volume Holographic Pupil for Imaging and Manipulation" with authorship of Yuan Luo, Chen Yen Lin, and Sunil Vyas.
10:00	24a2	Osamu Matoba	Kobe Univ.	Japan	Fluorescence imaging by common-path off-axis digital holography
10:30	Break				
11:00	24a3	Toshihiro Kasezawa	Egarim Co., Ltd.	Japan	1mm-thick Holographic Polarized Beam Splitter ~Ega-rim PBS~
11:30	24a4	Yusuke Sando	Osaka Res. Inst. of Ind. Sci. and Tech.	Japan	Calculation method for computer-generated hologram considering parabolic mirror reflection for viewing zone enlargement
11:45	24a5	Yuki Oguro	Hokkaido Univ.	Japan	Automatic Lens Distortion Correction Method for Compact Holographic HMD
12:00	24a6	Yeh-Wei Yu	National Central Univ.	Taiwan	Producing Opposite Virtual Objective inside Mimic Bio-tissue using Holography-based optical phase conjugation
12:30	Lunch				
14:00	24p1	Yuichi Nakamura	Toyohashi Univ. of Tech.	Japan	Development of Heat Sink Multi-Layered Media for Magnetic Hologram with Errorless Reconstruction
14:30	24p2	Ryushi Fujimura	Utsunomiya Univ.	Japan	Influence of Media Shrinkage in Phase Encoded Holographic Memory
15:00	24p3	Xiaodi Tan	Beijing Inst. of Tech.	China	Dual-channel Holographic Recording with Orthogonal Linear Polarization Holography
15:30	Award ＆ Closing				

WELCOME TO IWH2017

Advanced optical technology brings us many optical devices and systems in our information age. Optical memory and display are most significantly developing areas in optical technology closely related to our life. Because of the growth in demand of information capacity in optical memory, holographic technologies are again in the spotlight. In the display technology, holography is going to be of importance. This technology is expected as a key in virtual reality and augmented reality display.

The International Workshop on Holography in 2017(IWH2017) is the eleventh workshop which covers all the aspects on holographic memories and display ranging from their fundamental physics and technologies to practical systems. The goals of this workshop are three-fold. First it should provide a forum for the exchange of information between participants in this interdisciplinary meeting. This workshop series have also served excellently in strengthening the optical imaging, material and devices. Second, it should be provide an opportunity to establish and renew old friendship and make new acquaintances. And finally, it should stimulate the interest and ambition of participants to cooperate in their efforts.

IWH2017 is jointly organized by Center for Optical Research and Education (CORE), Utsunomiya University and Optical Society of Japan. I would like to express sincere thanks to Research Group on Volume Holographic Memory Technology (VHM), Holographic Display Artists and Engineers Club (HODIC), Group of Information Photonics, Group of Digital Optics, and Tochigi Optoelectronic Industry Promotion Conference for their support to our activities.

Toyohiko Yatagai

Toyohiko Yatagai
Chair of Organizing Committee

INTRODUCTION

International Workshop on Holography and related technologies (IWH2017) will be held in Plaza Verde, Numazu City, Shizuoka, Japan, from November 22 to 24, 2017. This is the eleventh workshop which covers overall aspects on holography and related technologies, holographic memories, displays, holographic measurement, computer generated holograms and digital holography, ranging from their fundamental physics and technologies to practical systems. The first International Workshop on Holographic Memories (IWHM2007) was held in Penang, Malaysia. IWHM2008, IWHM&D2009-2010 were successfully held in Japan, which includes overall aspects on holographic memories and display. Since 2011, this workshop have extend the scope furthermore, IWH covers the holographic display as well as holographic memory. Last year, IWH2016 was held at Jiaoxi, Yilan, Taiwan with great success. IWH2017 is jointly organized by the following associations in Japan:

- Optical Society of Japan (OSJ)
- International Workshop on Holography
- Center for Optical Research and Education (CORE), Utsunomiya University.

; in corporate with the following societies

- Research Group on Volume Holographic Memory Technology (VHM), OSJ
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- Digital Optics Research Group, OSJ
- The Institute of Electronics, Information and Communication Engineers
- The Institute of Image and Television Engineers
- Tochigi Optoelectronic Industry Promotion Conference.

SCOPE

All topics related to holography including memories, displays, digital holography, computer generated holography, and holographic optical elements are going to be discussed, ranging from their basic physics and technologies to practical applications, such as materials, components, measurements, basic theory and physics, system design, simulations and devices. In what follows is the list of subject areas, which are not restrictive but suggestive:

1. Holographic Memory
2. Holographic Optical Elements
3. Computer Generated Holography
4. Digital Holography
5. Holographic Display
6. Holography Arts and Design
7. Recording Materials
8. Signal Processing for Holography
9. Devices for Holography
10. Simulation for Holography
11. AR, MR, HUD and HMD with Holography
12. Applications
13. Others

REGISTRATION FEES

Before November 10 : 35,000 yen
On site : 45,000 yen
Student : 20,000 yen

All payments, should be made in Japanese Yen and only by bank transfer, and are non-refundable. On-site registration should be made with cash in Japanese Yen. The detail of which will be informed to the pre-registered participants through e-mail.
For details of the transfer account, please see the registration form.

URGENT ANNOUNCEMENT!! to the participant from abroad.
Due to the handling commission is considerably high because of the revision of the Japanese bank, please stop the remittance from abroad.
Instead, the participant from abroad are recommended to registrate by e-mail to IWH, and pay the registration fees, determined by registrated date, by only cash (Japanese Yen) at Conference Site on conference date.

Instructions for the presentation

- Invited presentation: Presentation: 25 min. Discussions: 5 min.
- Contributed oral presentation: Presentation: 12 min. Discussions: 3 min.
- Poster presentation: The size of a poster board is Height: 210 cm Width: 120 cm

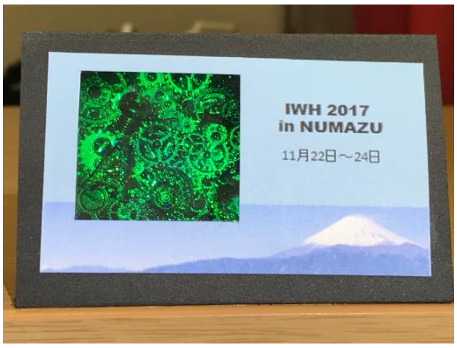
Hands-On Event of Microsoft HoloLens

Experience of HoloLens from Microsoft is scheduled on 22 November.

- 22 Wed. Nov., 2017
- 10 am – 4:30 pm
- Conference room 403 in Plaza Verde, Numazu

We look forward to your participation.

Free Event for Hologram Exposure



We will hold an event of exposure experience of hologram in this conference so as to spread around its fascination, targeting at general visitors in addition to conference participants.
Recorded hologram could be brought with you after the exposure event. We look forward to your participation.

- 23 Thu. – 24 Fri. Nov., 2017
- 10 am - 4 pm for each date
- Conference room 403 in Plaza Verde, Numazu
- Free for participation of this event

For application, kindly send an e-mail; **iwh2017@i-w-holography.org**

VENUE

Plaza Verde, 1-1-4 Otemachi, Numazu City, Shizuoka, 410-0801, Japan

13:20 22p1 Microsoft HoloLens in the Modern Workplace

Shinji Hayashi

Microsoft Japan

Microsoft HoloLens is changing the way how people interact with computers and each other. This session will share how HoloLens is used by commercial customers in their business as part of their digital transformation.

14:00 22p2 Volumetric bubble display

Yoshio Hayasaki and Kota Kumagai

Center for Optical Research and Education (CORE), Utsunomiya University 7-1-2 Yoto, Utsunomiya 321-8585, Japan

Volumetric display with microbubble voxels was developed. The microbubbles were formed by focused femtosecond laser pulses. The three-dimensional bubble graphics was erased by ultrasonic.

14:30 22p3 Holographic Optical Elements in Machine Vision Lighting

Tomoyasu Saigo1)2), Susumu Shibata2), Koosuke Hattori3), Hideyoshi Horimai4) and Taizo Umezaki1)4)5)

1)Nagoya Institute of Technology, Gokiso-cho, Showa-ku, Aichi 466-8555, Japan, 2)Maxis Engineering Inc., 2-13 Tashiro-Hondori, Chikusa-ku, Nagoya City, Aichi 464-0827, Japan, 3)Chubu University, 1200 Matsumoto-cho, Kasygai City, Aichi 487-0027, Japan, 4)3Dragons LCC, 2-13 Tashiro-Hondori, Chikusa-ku, Aichi 464-0827, Japan, 5)The University of tokyo, 7-3-1 Hongo, Bunkyo-ku, Tokyo 113-8656, Japan

We propose a new machine vision lighting system with a holographic diffractive optical element (HOE). We show result for defect on glossy surface by prism layout HOE and show the HOE layout for edge inspection.

14:45 22p4 Development of Auto-focus System of Holographic Projector Using RGB-D Camera

Yuki Nagahama1), Tomoyoshi Shimobaba1), Takashi Kakue1) and Tomoyoshi Ito1)

1) Graduate School of Engineering, Chiba University 1-33 Yayoi-cho, Inage-ku, Chiba, Chiba, 263-8522, Japan

In this research, using a RGB-D camera, kinoform and spherical wave illumination, we developed the auto-focus system of the holographic projector with increasing the projective area.

15:00 Break

15:30 22p5 Deep-Learning Based Data Demodulation for High Density Holographic Data Storage

Yutaro Katano, Tetsuhiko Muroi, Nobuhiro Kinoshita, and Norihiko Ishii

Japan Broadcasting Corporation (NHK), 1-10-11 Kinuta, Setagaya-ku, Tokyo, 157–8510 Japan

We present our investigation of the applicability of a deep-learning based data modulation method to a high density holographic data storage system with a recording density of 1 Tbit/inch2.

16:00 22p6 Servo Compensation method of position error on Volume Holographic Disc

Po-Kai Hsieh[1], Yeh-Wei Yu[2], and Ching-Cherng Sun[1]

[1] Department of Optics and Photonics, National Central University, Chung-Li, Taoyuan City 32001, Taiwan, [2]Optical Science Center, National Central University, Chung-Li, Taoyuan City 32001, Taiwan

In this paper, we propose a scheme to compensate the position error so that the reading of the holographic disc can be on the correct position and to prevent from large decay of the signal.

16:15 22p7 Simultaneous Recording and Reading of Multiple Data Pages for Coaxial Holographic Data Storage Using Computer-Generated Hologram

Yusuke Saita[1], Masahiro Karaike[2] and Takanori Nomura[1]

[1]Faculty of Systems Engineering, Wakayama University, 930 Sakaedani, Wakayama, 640-8510, Japan, [2]Graduate School of Systems Engineering, Wakayama University, 930 Sakaedani, Wakayama, 640-8510, Japan

The method to record and read multiple data pages simultaneously using a computer-generated hologram technique is proposed in a coaxial holographic data storage. The feasibility of the proposed method is confirmed by numerical simulations.

16:30 22p8 Tutorial : Multiplexed volume holography and polarization

Tsutomu Shimura

The University of Tokyo, 4-6-1 Komaba, Meguro-ku, Tokyo 153-8505

Light wave diffraction for vector waves and multiplexed gratings are summarized. The diffraction for p- and s-polarized light is quite different. Also, we must be careful to consider the diffraction efficiencies for the multiplexed gratings.

17:00 Break

18:00 Banquet

Thursday 23-Nov-17

09:30 23a1 Computational Optical Sensing and Imaging Based on Information Photonics

Takanori Nomura

Faculty of Systems Engineering, Wakayama University, 930 Sakaedani, Wakayama, 640-8510, Japan

Some methods to realize computational optical sensing and imaging based on information photonics are introduced. Digital holography, transport of intensity equation, refractive index tomography, and computational ghost imaging are applied.

10:00 23a2 Spatial Sampling Theory for Holographic Data Storage with Low-Spatial Frequency Data Page Pattern under Nyquist Frequency

Daisuke Barada1)2) Shaqueeb Sarwar1) and ToyohikoYatagai2)

1) Graduate School of Engineering, Utsunomiya University, Japan, 2) Center for Optical Research and Education (CORE), Utsunomiya University, Japan

In our recent study, it was numerically verified that the data page pattern could be restored although the aperture size is much smaller than Nyquist size. In this paper, the reason is explained.

10:30 23a3 Optimization of Volume Holographic Spatial Mode Demultiplexer with a Phase Plate Using Simulated Annealing

Shimpei Shimizu1), Atsushi Okamoto1)4), Fumiya Mizukawa1), Kazuhisa Ogawa1), Akihisa Tomita1), Taketoshi Takahata2)4), Satoshi Shinada3) and Naoya Wada3)

1) Graduate School of Information Science and Technology, Hokkaido University, N14-W9 Kita-ku, Sapporo, 060-0814, Japan, 2) OPTOQUEST Co., Ltd., 1335 Haraichi, Ageo-city, Saitama, 362-0021, Japan, 3)National Institute of Information and Communications Technology (NICT), 4-2-1 Nukuikitamachi, Koganei, Tokyo, 184-8795, Japan, 4)OPTOQUEST Advanced Optical Device Development Research Division, Hokkaido University, N21-W11 Kita-ku, Sapporo, 001-0021, Japan

We have proposed the mode demultiplexing technique using multiplexed volume holograms and a phase plate. In this work, we drastically improved mode-separation characteristics by making use of simulated annealing for optimizing the phase plate.

10:45 23a4 Development of Holo-HMD and Remaining Issue

Yuji Sakamoto

Graduate School of Information Science and Technology, Hokkaido University, Sapporo, 060-0814, Japan

Some holographic head mounted displays (holo-MHDs) have been developed in our lab. This paper introduces our developed holo-MHDs and explains what we have revealed. Moreover, remained issues are described to realize holo-HMDs.

11:15 Break

11:30 23a5 A Study on Objective Image Quality Evaluation of Computer-Generated Hologram

Hiroshi Yoshikawa, Hiroki Uetake, and Takeshi Yamaguchi

Dept. Computer Engineering, Nihon University, 7-24-1 Narashinodai, Funabashi, Chiba 274-8501, Japan

Reconstructed image quality of computer-generated hologram is evaluated objectively by structural similarity index (SSIM). Since SSIM shows good agreement with the subjective evaluation results, the proposed objective evaluation can replace the subjective evaluation.

12:00 23a6 Transmission Spherical-Type Multiplex Holography: Theory

Yih-Shyang Cheng and Yuan-PingSung

Department of Optics and Photonics, National Central University, Chungli, Taiwan 32001, R.O.C.

Using a diverging object wave and a converging reference wave, a model of spherical multiplex holography is proposed. Image blur and spectral bandwidth under white-light illumination are simulated.

12:15 23a7 Reconstruction Reference Wave Design for the Copying System in Normal Viewing Disk-type Multiplex Holography

Chih-Hung Chen, Yih-Shyang Cheng and Yu-Hsin Tu

Department of Optics and Photonics, National Central University, Chungli, Taiwan 32001, R.O.C.

In this paper, design of the optical setups for replication of the normal-viewing IPDTMH is introduced. A simple optical replication system for real-image generation is then described.

12:30 Lunch

14:00 23p1 Block-wise Compressive Digital Holography

Liangcai Cao, Hao Zhang, and Guofan Jin

State Key Laboratory of Precision Measurement Technology and Instruments. Department of Precision Instruments, Tsinghua University, 100084, Beijing, P. R. China

An effective block-wise compressive holography is proposed to locate the precise search space and reduce the calculation time while keeping the reconstruction quality

14:30 23p2 Object wave reconstruction by generalized phase-shifting digital holography using normalized interference fringe

Nobukazu Yoshikawa, Syouma Namiki and Atsushi Uoya

Graduate School of Science and Engineering, Saitama University, 255 Shimo-Okubo, Sakura-Ku, Saitama, 338-8570, Japan

We propose an object wave retrieval method by the normalization method. We show that the norm approximate condition can be satisfied using the phase randomness condition used in the statistical generalized phase-shifting method.

14:45 23p3 Development of color digital holographic microscope system using multiple light sources

Qiyue Yu[1], Tomoyasu Saigo[2], Katsunori Nakagawa[2], IchirouKoike[2], Hideyoshi Horimai,[3] and Taizou Umezaki[3]

[1]Qingdao University, 308 Ningxia Road, Shinan District,Qingdao,Shangdong, 266071, China, [2]MAXIS-Engineering Inc., 2-13 Tashiro-hondori, Chikusa-ku, Nagoya-city, Aichi, 464-0827, Japan, [3]3Dragons LLC, Nagoya Institute of Technology, Gokiso-chou, Syouwa-ku, Nagoya-city, Aichi, 466-8555, Japan

A new a new color single-shot phase-shift digital holographic microscope equipping an additive white light source is proposed. Using two light sources high-speed switching, real time digital holographic 3D measurement with color texture is realized.

15:00 23p4 Full-parallax light-field and holographic displays for enriched 3D visual experience

Masahiro Yamaguchi[1], Tomoya Nakamura[1] [2] and Shunsuke Igarashi[1]

[1]School of Engineering, Tokyo Institute of Technology, 4259-G2-28 Nagatsuta, Midori-ku, Yokohama 226-8503, Japan, [2]JST PRESTO

Integrating holography and light-field enables enriched 3D visual experience. In computational holography, a high-resolution and deep 3D image with enriched material appearance is reproduced. An interactive light-field display with 3D touch interface is also demonstrated.

15:30 Poster session

P1 A Comparison of Beam Shaping by DOE and ROE

Xuan-Hao Lee[1], Yeh-Wei Yu[1], Tung Wu[2], Wei-Jeh Kao[2] and Ching-Cherng Sun[1]

[1]Optical Science Center, National Central University, Chung-Li 32054, Taiwan, [2]Department of Optics and Photonics, National Central University, Chung-Li 32054, Taiwan

Optical projection technology becomes more and more important because of its impact on 3D imaging. In this paper, we present a study of comparison for beam shaping characteristic through refractive optical element (ROE), and DOE.

P2 Improvement of Conversion Accuracy in Volume Holographic Mode-Demultiplexing Converter Using Shaped Beams

Fumiya Mizukawa, Atushi Okamoto, Yuta Goto, Shimpei Shimizu, Kazuhisa Ogawa, and Akihisa Tomita

Graduate school of Information Science and Technology, Hokkaido University, N14-W9, Kita-ku, Sapporo, 060-0814, Japan

We propose an improvement method of conversion accuracy in volume holographic mode-demultiplexing converter using shaped beams. In a numerical simulation, we achieved great improvement of both the conversion fidelity and the modal crosstalk.

P3 Photopolymer Film, FIGURA: Contribution of Development of High Holographic Technologies.

Hiroshi Tabuchi1), Toshitaka Nara1), Haruka Kojima1), Toshihiro Kasezawa2), Hideyoshi Horimai2) and Tsutomu Shimura3)

1) Okamoto Glass Co., Ltd., 380, Toyofuta, Kashiwa-shi, Chiba 277-0872, Japan, 2) Egarim Co., Ltd., 330 Shibukawa, Shimizu-ku, Shizuoka City, Shizuoka, 424-0053, Japan, 3) The University of Tokyo, 4-6-1 Komaba, Meguro-ku, Tokyo 153-8505, Japan

The existence of recording media is indispensable for the development of high holographic technologies. We will introduce a new photopolymer film under development, called “FIGURA”.

P4 Experimental demonstration of twin-image reduction method using a diffuser for in-line digital holography

Kazusa Oe1) and Takanori Nomura2)

1)Graduate School of Systems Engineering, Wakayama University, 930 Sakaedani, Wakayama, 640-8510, Japan, 2)Faculty of Systems Engineering, Wakayama University, 930 Sakaedani, Wakayama, 640-8510, Japan

Twin-image reduction method using a diffuser is proposed for in-line digital holography. A preliminary experimental result using a specimen and a diffuser which are realized by spatial light modulators confirms the proposed method.

P5 Principle and characteristics of phase modulated time series collinear holographic memory

Ryo Omori1), Hajimu Nishimoto1), Xiao Lin2), Yoshito Tanaka1)3), Ryushi Fujimura4), Masao Endo1) and Tsutomu Shimura1)

1)Institute of Industrial Science, the University of Tokyo, 4-6-1Komaba, Meguro-ku, Tokyo153-8505, Japan, 2)School of Optoelectronics, Beijing Institute of Technology, 5 South Zhongguancun Street, Haidian District, Beijing 100081, China, 3)Japan Science and Technology Agency, PRESTO, 4-1-8 Honcho, Kawaguchi, Saitama 332-0012,Japan, 4)Department of Optical Engineering, Graduate School of Engineering, Utsunomiya University,7-1-2 Yoto, Utsunomiya, Tochigi 321-8585, Japan

We propose phase modulated time series collinear holographic memory (PTCH). We investigate the characteristics of PTCH by numerical simulation and do experiment to confirm the possibility of PTCH.

P6 Vectorial Light Propagation Analysis of Scalar Holographic Data Storage Using a Vector Diffraction method

Satoshi Tagami1), Daisuke Barada1)2) and ToyohikoYatagai2)

1)Graduate School of Engineering, Utsunomiya University, Japan, 2)Center for Optical Research and Education (CORE), Utsunomiya University, Japan

In this study, we express vectorial light propagation in holographic data storage analytically using a parameter. It could be realized by solving the vector wave equation in hologram using power series.

P7 Hyperspectral digital holography for observing biological stained sample

Siti Nabilah Hassan[1], Misato Okamoto-Miyakawa[2], Yoshio Hayasaki[1]

[1]Center for Optical Research and Education (CORE), Utsunomiya University, [2]Graduate School of Applied Biological Sciences and Faculty of Applied Biological Sciences, Gifu University

Some biological applications are required to specify a three-dimensional structure of the sample. To speed up the observation, the structure of stained biological sample is observed using the digital holography with the hyperspectral imaging.

P8 Analysis of Transient Visual Evoked Potential on Electro-holographic Image

Takemitsu Mizuki[1], Masataka Fujiwara[1] and Yuji Sakamoto[1]

[1]Graduate School of Information Science and Technology, Hokkaido University, Sapporo, 060-0814, Japan,

We measured the Transient Visual Evoked Potential (TRVEP) with normal monitor and electro-holography to examine whether EEG is effective in electro-holography. As a result, measurement of the TRVEP was possible in electro-holography.

P9 Design of Complex Amplitude Modulation for Suppressing Optical Loss in Mode Conversion by Considering Radiation Modes

Tomohiro Maeda, Atsushi Okamoto, Kazuhisa Ogawa, and Akihisa Tomita

Graduate School of Information Science and Technology, Hokkaido University, Kita 14, Nishi 9, Kita-ku, Sapporo, Hokkaido, 060-0814, Japan

We propose a new design of the complex amplitude modulation for the mode conversion. In a numerical simulation, we confirmed that the designed modulation suppressed the optical loss while maintaining the conversion accuracy.

P10 Multiplexing and Demultiplexing of Digital Images using Virtual Phase Conjugation for High-Density Holographic Data Storage

Yuta Goto, Atsushi Okamoto, Kazuhisa Ogawa and Akihisa Tomita

Graduate School of Information Science and Technology, Hokkaido University, N14-W9, Kita-ku, Sapporo 060-0814, Japan

For realizing the high density holographic memory, digital image multiplexing/demultiplexing method using virtual phase conjugation has been proposed. In this paper, we experimentally verified that multiplexed digital images can be independently and correctly reconstructed.

P11 Improvement of Signal to Noise Ratio in Phase-multivalued Holographic Data Storage by Limiting Aperture Opening of Imager Pixels

Yuya Nakamura1), Anna Odanaga3), Ryushi Fujimura1)2)

1)Department of Optical Engineering, Graduate school of Engineering, Utsunomiya University, 2)Center for Optical Research and Education (CORE), Utsunomiya University, 3)Faculty of Engineering, Utsunomiya University,7-1-2 Yoto, Utsunomiya, Tochigi 321-8585, Japan

We numerically and experimentally investigate influence of limiting aperture of Imager Pixels on the signal to noise ratio (SNR) degraded by Nyquist aperture in the phase-encoded signal and discuss its effectiveness.

P12 Design of Color LED Holographic Display System Based on DMD

Zehao He1), Liangcai Cao1), Ping Su2) and Guofan Jin1)

1)State Key Laboratory of Precision Measurement Technology and Instruments, Department of Precision Instruments, Tsinghua University, Beijing 10084, China, 2)Graduate School at Shenzhen, Tsinghua University, Shenzhen 518055, China

A simple and low-cost color display system based on DMD with RGB LEDs is proposed. Properties of DMD are considered and desired effects are obtained by holographic coding and filtering.

P13 Phase-encoded signal detection by using inter-pixel crosstalk

Yuki Kunii1), Tsutomu Shimura2), Yuya Nakamura1) and Ryushi Fujimura1)3)

1)Department of Optical Engineering, Graduate school of Engineering, Utsunomiya University, 7-1-2 Yoto, Utsunomiya, Tochigi321-8585, Japan, 2)Institute of Industrial Science, TheUniversityof Tokyo,4-6-1 Komaba, Meguro, Tokyo 153-8505, Japan, 3)Center for Optical Research and Education (CORE), Utsunomiya University

We propose a method to detect the phase of signal beam with single shot without using phase-detection reference beam by using inter-pixel crosstalk and discuss its effectiveness.

17:00 End of Session

Friday 24-Nov-17

09:30 24a1 Engineered Volume Holographic Pupil for Imaging and Manipulation

Yuan Luo1)2)3), Chen Yen Lin1)2) and Sunil Vyas1)2)

1)Institute of Medical Device and Imaging, National Taiwan University College of Medicine, Taipei, Taiwan,10051, 2)Molecular Imaging Center, National Taiwan University, Taipei, Taiwan,10055, 3)YongLin Institute of Health, National Taiwan University, Taipei, Taiwan,10087

Volume holographic gratings incorporating multiplexing methods to better manipulate light for state-of-the-art imaging as well as orbital angular moment for beam shaping will be addressed.

10:00 24a2 Fluorescence imaging by common-path off-axis digital holography

Osamu Matoba1), Xiangyu Quan1), and Yasuhiro Awatsuji2)

1) Graudate School of System Informatics, Kobe University, Rokkodai 1-1, Nada, Kobe 657-8501, Japan, 2) Graduate School of Science and Technology, Kyoto Institute of Technology, Matsugasaki, Sakyo-ku, Kyoto 606-8585, Japan

We have presented a method of common-path off-axis digital holography and preliminary experiment. The results are promising to observe the fluorescence light even for biological tissues.

10:30 Break

11:00 24a3 1mm-thick Holographic Polarized Beam Splitter ~Ega-rim PBS~

Toshihiro Kasezawa1), Hideyoshi Horimai1) 2), Shinobu Yamamoto2) and Tsutomu Shimura3)

1)Egarim Co. Ltd., 330 Shibukawa, Shimizu-ku, Shizuoka-shi, Shizuoka 424-0533, Japan, 2)HOLOMEDIA LLC, B-2, 725-1 Okaisshiki, Numazu-shi, Shizuoka 410-0012, Japan, 3)The University of Tokyo, 4-6-1 Komaba, Meguro-ku, Tokyo 153-8505, Japan

1mm thick Ega-rim PBS was proposed and its characteristics was investigated by experimentally. Extinction ratio was over 100: 1. Ega-rim PBS was applied to the LCOS Display Device and sufficient color image was observed.

11:30 24a4 Calculation method for computer-generated hologram considering parabolic mirror reflection for viewing zone enlargement

Yusuke Sando3), Daisuke Barada1)2) and Toyohiko Yatagai1)

1)Center for Optical Research & Education, Utsunomiya University, 7-1-2 Yoto, Utsunomiya, Tochigi 321-8585, Japan, 2)Graduate School of Engineering, Utsunomiya University, 7-1-2 Yoto, Utsunomiya, Tochigi 321-8585, Japan, 3)Osaka Research Institute of Industrial Science and Technology, 2-7-1 Ayumino, Izumi, Osaka 594-1157, Japan

This study presents a method to enlarge both the horizontal and vertical viewing zone by using a convex parabolic mirror and an efficient and fast calculation method considering the parabolic mirror reflection.

11:45 24a5 Automatic Lens Distortion Correction Method for Compact Holographic HMD

Yuki Oguro1), Yuji Sakamoto1)

1)Graduate School of Information Science and Technology, Hokkaido University, Sapporo, 060-0814, Japan

We proposed the method of automatically correcting lens distortion for compact holographic HMD. We conducted experiments comparing reconstructed images with real objects and confirmed the corrective effect.

12:00 24a6 Producing Opposite Virtual Objective inside Mimic Bio-tissue using Holography-based optical phase conjugation

Yeh-Wei Yu1)2), Szu-Yu Chen1), Che-Chu Lin1), Ching-Cherng Sun1)

1)Department of Optics and Photonics, National Central University, Chung-Li, Taoyuan City, 32001 Taiwan, 2)Optical Science Center, National Central University, Chung-Li, Taoyuan City, 32001 Taiwan

A method for creating an opposite virtual objective (OV-Obj) inside optically thick turbid media through holography-based optical phase conjugation mirror (HOPCM) was proposed and demonstrated in this research.

12:30 Lunch

14:00 24p1 Development of Heat Sink Multi-Layered Media for Magnetic Hologram with Errorless Reconstruction

Yuichi Nakamura1), Zen Shirakashi1), Naoki Hoshiba1), Taichi Goto1)2), Hiroyuki Takagi1), Pang Boey Lim1), Hironaga Uchida1) and Mitsuteru Inoue 1)

1) Toyohashi University of Technology, 1-1 Tempaku-cho, Toyohashi, Aichi, 441-8580, Japan, 2) JST PRESTO, 4-1-8 Honcho, Kawaguchi, Saitama, 332-0012, Japan

We designed and fabricated magnetic garnet/SiO2 multilayered media. This showed diffraction efficiencies higher than that of the single layer medium, and non-error recording and reconstruction was achieved using collinear system with magnetic assist technique.

14:30 24p2 Influence of Media Shrinkage in Phase Encoded Holographic Memory

Ryushi Fujimura1)2) and Kenta Fukura1)

1)Department of Optical Engineering, Graduate school of Engineering, Utsunomiya University, 2)Center for Optical Research and Education (CORE), Utsunomiya University 7-1-2 Yoto, Utsunomiya, Tochigi 321-8585, Japan

The influence of the media shrinkage on phase-encoded signals was numerically investigated. The media shrinkage considerably affects the diffracted phases as well as the intensity. To recover the deteriorated signals, a correction method was proposed.

15:00 24p3 Dual-channel Holographic Recording with Orthogonal Linear Polarization Holography

Jinliang Zang1), Fenglan Fan1), Ying Liu1), Long Shao1), Xiaodi Tan1), Tsutomu Shimura2) and Kazuo Kuroda1)3)

1)School of Optoelectronics, Beijing Institute of Technology,5 South Zhongguancun Street,Haidian District, Beijing 100081, China, 2)Institute of Industrial Science, The university of Tokyo, 4-6-1 Komaba, Meguro-ku, Tokyo 153-8505, Japan, 3)Center for Optical Research and Education (CORE), Utsunomiya University, 7-1-2 Yoto, Utsunomiya, Tochigi 321-8585, Japan

We report a dual-channel holographic recording method with orthogonal linear polarization holography based on null reconstruction effect. Two polarization encoded holograms were recorded in dual-channel recording system with negligible inter-channel crosstalk. The two polarization multiplexed holograms could then be sequentially or simultaneously readout by shifting the polarization state of reference wave.

15:30 Award ＆ Closing

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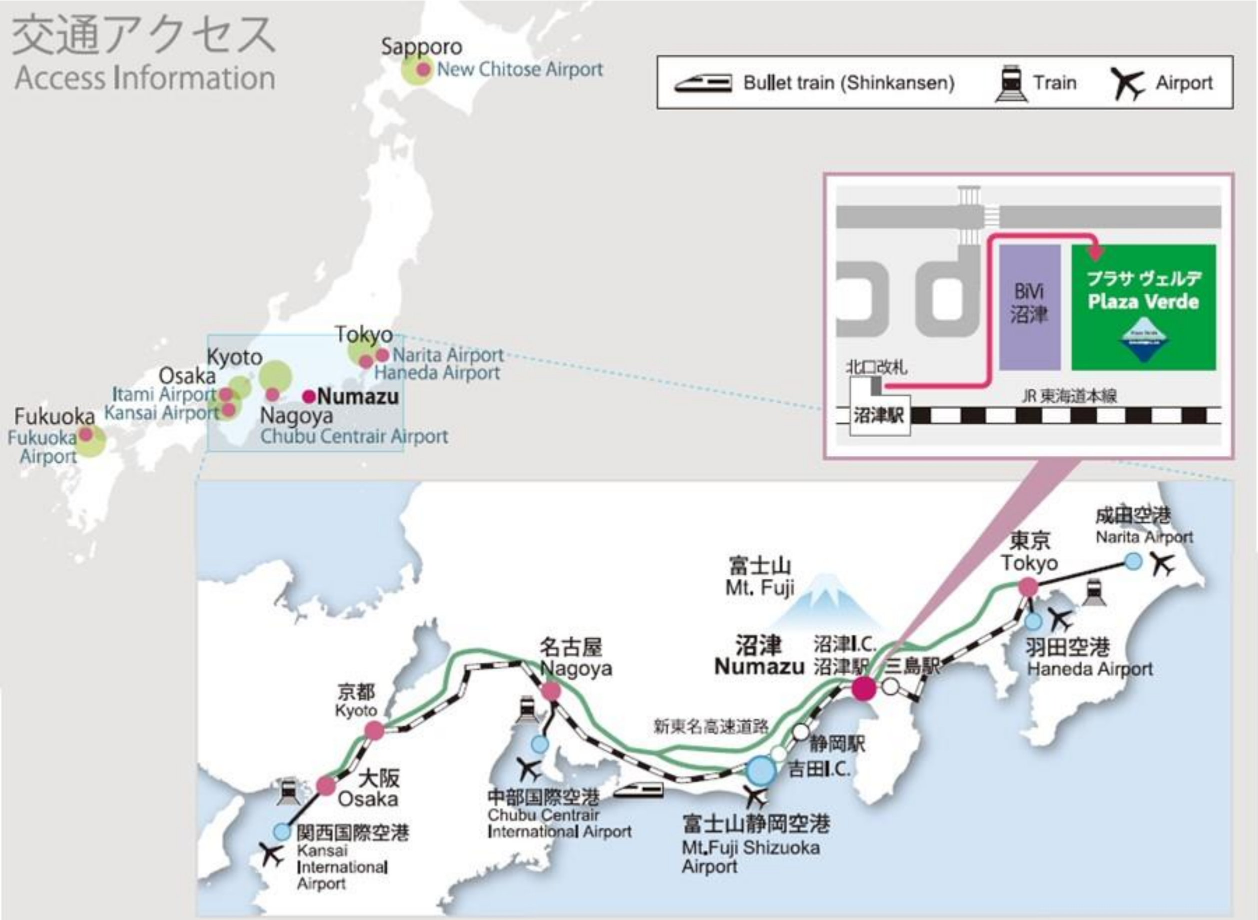
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JR 東京駅 JR Tokyo Sta. — 新幹線 約 45 分 About 45 minutes by JR Shinkansen — JR 三島駅 JR Mishima Sta. — 東海道本線 約 6 分 About 6 minutes by JR Tokaido Line — JR 沼津駅 JR Numazu Sta. — 北口より 徒歩 3 分 3 minutes walk from the north exit

東京 IC Tokyo I.C. — 東名高速道路 約 70 分 About 70 minutes on the Tomei Expressway — 沼津 IC Numazu I.C. — 一般道約 15 分 About 15 minutes on surface streets

名古屋から From Nagoya

JR 名古屋駅 JR Nagoya Sta. — 新幹線 約 80 分 About 80 minutes by JR Shinkansen — JR 三島駅 JR Mishima Sta. — 東海道本線 約 6 分 About 6 minutes by JR Tokaido Line — JR 沼津駅 JR Numazu Sta. — 北口より 徒歩 3 分 3 minutes walk from the north exit

名古屋 IC Nagoya I.C. — 東名高速道路 約 150 分 About 150 minutes on the Tomei Expressway — 沼津 IC Numazu I.C. — 一般道約 15 分 About 15 minutes on surface streets

大阪から From Osaka

JR 新大阪駅 JR Shin-Osaka Sta. — 新幹線 約 50 分 About 50 minutes by JR Shinkansen — JR 名古屋駅 JR Nagoya Sta. — 新幹線 約 80 分 About 80 minutes by JR Shinkansen — JR 三島駅 JR Mishima Sta. — 東海道本線 約 6 分 About 6 minutes by JR Tokaido Line — JR 沼津駅 JR Numazu Sta. — 北口より 徒歩 3 分 3 minutes walk from the north exit

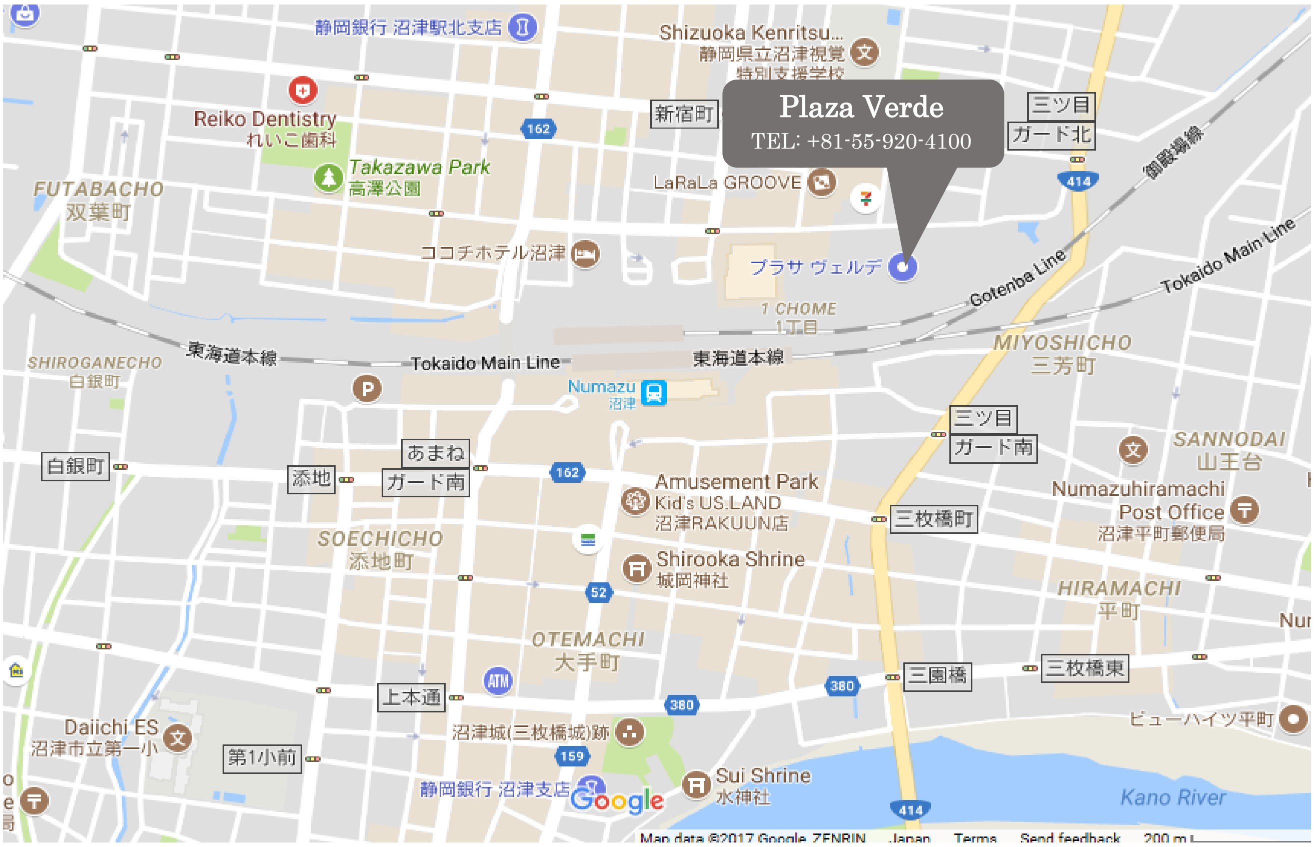
富士山静岡 空港から From Mt. Fuji Shizuoka Airport

富士山静岡空港 Mt. Fuji Shizuoka Airport — バス 約 50 分 About 50 minutes by bus — JR 静岡駅 JR Shizuoka Sta. — 新幹線 約 20 分 About 20 minutes by JR Shinkansen — JR 三島駅 JR Mishima Sta. — 東海道本線 約 6 分 About 6 minutes by JR Tokaido Line — JR 沼津駅 JR Numazu Sta. — 北口より 徒歩 3 分 3 minutes walk from the north exit

富士山静岡空港 Mt. Fuji Shizuoka Airport — 一般道 約 15 分 About 15 minutes on surface streets — 吉田 IC Yoshida I.C. — 東名高速道路 約 55 分 About 55 minutes on the Tomei Expressway — 沼津 IC Numazu I.C. — 一般道約 15 分 About 15 minutes on surface streets

Plaza verde

NUMAZU CITY MAP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プラザ ヴェルデ
1 CHOME
1丁目
Gotenba Line
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Sui Shrine
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Kano River
162
414
52
380
159
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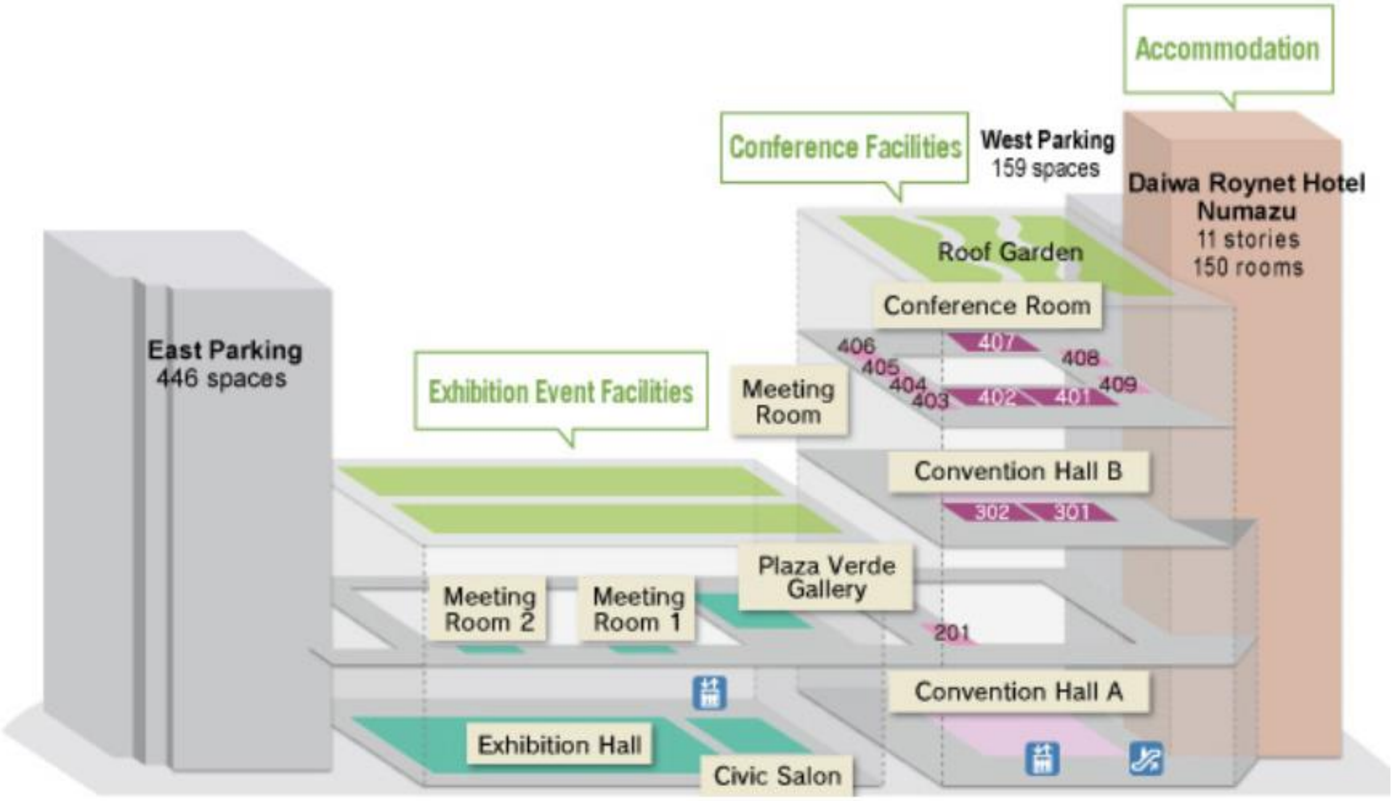
CONFERENCE SITE FLOOR

Plaza Verde Floor Map


Accommodation
Conference Facilities
West Parking
159 spaces
Daiwa Roynet Hotel
Numazu
11 stories
150 rooms
Roof Garden
Conference Room
406
405
404
403
407
408
409
402
401
Meeting Room
Convention Hall B
302
301
Exhibition Event Facilities
East Parking
446 spaces
Meeting Room 2
Meeting Room 1
Plaza Verde Gallery
201
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