Grant-in-Aid for Transformative Research Areas (A) 2022-2027

Revolution ofChiral Materials Science using Helical Light Fields

NEWSLETTER Vol. 2

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CONTENTS

Event report

Workshop on Structured Laser and Matter 2023 & 2024

Takashige Omatsu (C01, Chiba University)

Structured light fields, which possess tailored amplitude, phase, and polarization, have been widely studied. Optical vortices are the most well-known structured light fields, and they carry an annular spatial form and orbital angular momentum (OAM).

These structured light fields have enabled many advanced applications, such as optical manipulation with the freedom of orbital motion, chiral materials fabrication on a micro- and nanoscale, classical and quantum communication with high data capacity and super-resolution microscopy with spatial resolution beyond the diffraction limit.

Further, modern structured light fields with exotic topological textures are an emerging research topic as two- or three-dimensional (2D or 3D) quasiparticles of light. For instance, optical skyrmions, optical counterparts of magnetic skyrmions, are structured light fields that possess 2D topological polarization textures.

The workshop on 'Structured Laser and Matter' (SLM) aims to present and discuss up-to-date scientific subjects, technologies, and applications related to the structured light fields and their satellite topics. The SLM was co-sponsored by JSPS KAKENHI transformative research areas (A) "Revolution of chiral materials science using helical light fields".

The 1st SLM was held in National Yang Ming Chiao Tung University (NYCU), Taiwan (organizers: Prof. Yung-Fu Chen, NYCU, and Prof. Takashige Omatsu, Chiba University) during June 16-17, 2023, and it successfully collected more than 40 participants from Taiwan and Japan. 4 academics and 2 students attended from Japan.

The 2nd SLM was hosted in Osaka Metropolitan University, Japan during October 24-25, 2024, and it was also successful to collect wonderful speakers from China, India, and UK beyond Taiwan and Japan.

We hope that this SLM will facilitate scientific and professional networking as well as scientific inspiration through discussions at a global level. We are planning to organize the 3rd SLM in National Taipei University of Technology, Taiwan.

Event report

Young Researchers' Workshop Report

Akihito Kato (A01, Osaka Metropolitan University, Special Research Fellow)

On May 18-19, 2024, a Young Researchers' Workshop entitled "Towards Understanding Interactions between Optical Vortices and Matter" was held at Osaka Metropolitan University, I-site Namba. This workshop, part of the Young Researchers' Division activities within Transformative Research Areas (A) "Chiral Optical Materials Science," was attended by 13 young researchers. The workshop was organized by Shun Hashiyada (Hokkaido University), Akihito Kato (Osaka Metropolitan University), and Takafumi Shiraogawa (Institute for Molecular Science). Each organizer presented their latest research findings, with presentation titles as follows: Shun Hashiyada: "Contribution of Spin and Orbital Angular Momentum of Light in Optical Torque", Akihito Kato: "Angular Momentum and Pseudo Angular Momentum of Phonons in Chiral Crystals", Takafumi Shiraogawa: "Time-Dependent Density Functional Theory Simulations of Molecular Interactions with Optical Vortices".

Each presentation was allotted two hours, with much of that time reserved for questions and discussion by participants, aiming at in-depth discussions on fundamental theories and challenges related to optical vortex-matter interaction. These discussions helped the participants with different backgrounds in physics, applied physics, and chemistry to share and deepen their knowledge in order to develop fundamental theories. The workshop received positive feedback from participants regarding both its organization and objectives, and many expressed hopes for similar workshops to continue in the future. Lastly, we would like to express our gratitude to Professor Nobuhiko Yokoshi (Osaka Metropolitan University) and Professor Yoshito Tanaka (Hokkaido University) for their invaluable support for this workshop.

Event report

Summer Camp at Hara village

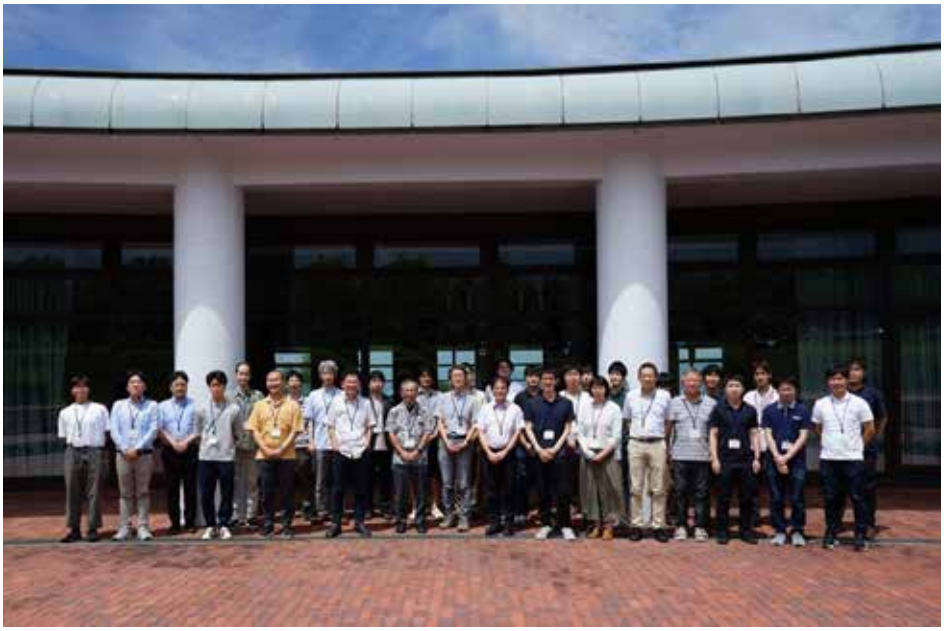
Hiromi Okamoto (B01, Institute for Molecular Science)

A workshop was held to get future perspectives for research involving strong chiral interaction between light and matter, from August 12th to 14th, 2024. We conducted mainly free discussion and brainstorming sessions. The workshop took place in the highland area near Yatsugatake mountains in central Nagano Prefecture (Hara Village, Suwa District, altitude ~1,200 meters). The place is an area with limited access, yet around 40 project members attended.

As a special lecture from a different field, Professor Emeritus Masanori Iye of the National Astronomical Observatory of Japan, an authority in observational astronomy and galactic physics, gave a talk titled "On the Parity Distribution of Galactic Spirals." Additionally, from the project members, Mr. Rihito Tamura (Chiba Univ.) discussed "Direct Imprinting of Skyrmion Structures onto Matter by Light," and Dr. Kenta Honma (Osaka Univ.) presented on "The Significance of Chirality in Biotechnology." These topics were followed by free discussions relevant to the presentations.

Furthermore, discussions were held in groups on the three Applied/Development Research themes of the project, and brainstorming sessions explored the near-future prospects for the project's further development. This meeting did not prioritize individual research presentations but emphasized open discussion. Participants ranging from younger to senior members were equally involved actively, fostering meaningful discussions across their expertise that could result in flourishing future directions.

Held in a refreshing environment far from the intensely hot city area, the workshop allowed for enjoyable meals, walking around, and, of course, discussions during free time. This atmosphere helped deepen mutual communications among participants and perhaps sparked the beginning of collaborative research efforts.



Collaborative research list within this Transformative Research Areas

In the Transformative Research Areas (A) "Chiral Optical Materials Science", 10 teams are conducting planned researches and 21 teams are conducting publicly offered researches. In addition, collaborative researches involving different teams and evaluation committees are actively conducted. Here, we introduce a list of collaborative researches published from the inception of this Research Areas to 2024.

Yokoshi (A01) & Sugawara (publicly offered research B)

H. Yamane, N. Yokoshi, H. Oka, Y. Sugawara, H. Ishihara, Opt. Exp., 31, 3415 (2023)
"Near-field circular dichroism of single molecules"

Yokoshi (A01) & Sugawara (publicly offered research B)

T. Yamamoto, H. Yamane, N. Yokoshi, H. Oka, H. Ishihara, Y. Sugawara, ACS Nano, 18, 1724, (2024)
"Optical Imaging of a Single Molecule with Subnanometer Resolution by Photoinduced Force Microscopy"

Yokoshi (A01) & Omatsu (C01)

T. Matsumoto, S. Sato, S. Akei, Y. Nakano, S. Iba, J. Ishihara, K. Miyamoto, N. Yokoshi, T. Omatsu, K. Morita, Optica Quantum 2, 245 (2024)
"Coherent transfer of the higher-order polarization state of photons to the spin structure state of electrons in a semiconductor"

Tanaka(A01) & Sugiyama (C01)

H.-T. Su, S.-Y. Liu, M. Fujii, H. Sugimoto, Y. Y. Tanaka, T. Sugiyama, Photochem. Photobiol. Sci. 23, 1697 (2024)
"Optical trapping-induced crystallization promoted by gold and silicon nanoparticles"

Tanaka (A01) & Sugiyama (C01) & Niinomi (publicly offered research C) & Sasaki (evaluation committee)

H. Su, H. Niinomi, A. Cheng, Y. Y. Tanaka, K. Sasaki, T. Sugiyama, Cell Rep. Phys. Sci. in press (2024)
"Enantioselectivity switch in chiral crystallization using optical trapping with gold nanoparticles"

Oshikiri (B02) & Setoura (publicly offered research B) & Tamura (publicly offered research C)

K. Setoura, M. Tamura, T. Oshikiri, T. Iida, RSC Advances, 13, 34489. (2023)
"Switching nanoscale temperature fields with high-order plasmonic modes in transition metal nanorods"

Oshikiri (B02) & Sasaki (evaluation committee)

Y.-E. Liu, X. Shi, T. Yokoyama, S. Inoue, Y. Sunaba, T. Oshikiri, Q. Sun, M. Tamura, H. Ishihara, K. Sasaki, H. Misawa, ACS Nano 17, 8315.(2023)
"Quantum-Coherence-Enhanced Hot-Electron Injection under Modal Strong Coupling"

Collaborative research list within this Transformative Research Areas

Oshikiri (B02) & Niinomi (publicly offered research C)

H. Niinomi, T. Yamazaki, H. Nada, T. Hama, A. Kouchi, T. Oshikiri, M. Nakagawa, Y. Kimura, J. Phys. Chem. Lett., 15, 659 (2024)
"Chiral Spinodal-like Ordering of Homoimmiscible Water at Interface between Water and Chiral Ice III"

Oshikiri (B02) & Niinomi (publicly offered research C)

H. Niinomi, K. Gotoh, N. Takano, M. Tagawa, I. Morita, A. Onuma, H. Y Yoshikawa, R. Kawamura, T. Oshikiri, M. Nakagawa, J. Phys. Chem. Lett., 15, 1564 (2024)
"Mie-Resonant Nanophotonic-Enhancement of Asymmetry in Sodium Chlorate Chiral Crystallization"

Oshikiri (B02) & Niinomi (publicly offered research C)

T. Oshikiri, T. Hayakawa, H. Niinomi, M. Nakagawa, J. Phys. Chem. C, 128, 5271 (2024)
"Strong Light Confinement by a Plasmon-Coupled Parabolic Nanoresonator Array"

Oshikiri (B02) & Niinomi (publicly offered research C)

H. Niinomi, H. Y Yoshikawa, R. Kawamura, T. Yamazaki, T. Oshikiri, M. Nakagawa, Chem. Lett., 53, upae100 (2024)
"In-situ observation of DL-alanine crystallization from a laser-trapped dense liquid droplet as a heterogeneous nucleation site"

Oshikiri (B02) & Sasaki (evaluation committee)

Y. Suganami, T. Oshikiri, H. Mitomo, K. Sasaki, Y.-E. Liu, X. Shi, Y. Matsuo, K. Ijiro, H. Misawa, ACS Nano 18, 4993 (2024)
"Spatially Uniform and Quantitative Surface-Enhanced Raman Scattering under Modal Ultrastrong Coupling Beyond Nanostructure Homogeneity Limits"

Oshikiri (B02) & Niinomi (publicly offered research C)

T. Oshikiri, Y. Matsuo, H. Niinomi, M. Nakagawa, Photochem. Photobiol. Sci. in press (2024)
"Chiroptical response of an array of isotopic plasmonic particles having a chiral arrangement under coherent interaction"

Sugiyama (C01) & Masuhara (evaluation committee)

S. Hirota, C.-L. Chiu, C.-J. Chang, P.-H. Lo, T. Chen, H. Yang, M. Yamanaka, T. Mashima, C. Xie, H. Masuhara, T. Sugiyama, Chem. Commun. 58, 12839 (2022)
"Structural region essential for amyloid fibril formation in cytochrome c elucidated by optical trapping"

Omatsu (C01) & Yuyama (publicly offered research C)

A. Kaneko, M. Iwata, R. Wei, U, K. Yuyama, T. Omatsu, APL Mater., 12, 061116 (2024)
"Using optical vortex laser induced forward transfer to fabricate a twisted ferrite microcrystal array"

Collaborative research list within this Transformative Research Areas

Omatsu (C01) & Yuyama (publicly offered research C)

R. Wei, H. Kawaguchi, K. Sato, S. Kai, K. Yamane, R. Morita, K. Yuyama, S. Kawano, K. Miyamoto, N. Aoki, T. Omatsu, APL Photon., 9, 036108 (2024)
"High-definition direct-print of metallic microdots with optical vortex induced forward transfer"

Omatsu (C01) & Yuyama (publicly offered research C)

K. Yuyama, H. Kawaguchi, R. Wei, T. Omatsu, ACS Photon., 10, 4045 (2023)
"Fabrication of an Array of Hemispherical Microlasers Using Optical Vortex Laser-Induced Forward Transfer"

Sugiyama (C01) & Masuhara (evaluation committee)

C.-H. Huang, Y.-C. Lee, T. Kudo, T. Sugiyama, H. Masuhara, Applied Physics Express 16, 092003 (2023)
"Two co-propagating trapping laser beams control optical swarming morphology of gold nanoparticles"

Sugiyama (C01) & Masuhara (evaluation committee)

B. Louis, C.-H. Huang, R. Camacho, I. G. Scheblykin, T. Sugiyama, T. Kudo, M. Meléndez, R. Delgado-Buscalioni, H. Masuhara, J. Hofkens, R. Bresolí-Obach, ACS Nano 17, 3797 (2023)
"Unravelling the 3D dynamics and hydrodynamics during incorporation of dielectric particles to an optical trapping site"

Sugiyama (C01) & Masuhara (evaluation committee)

P.-W. Yi, W.-H. Chiu, S. Toyouchi, R. Bresolí-Obach, J. Hofkens, E. Chatani, Y. Hosokawa, T. Sugiyama, H. Masuhara, Appl. Phys. Exp. 16, 025501 (2023)
"Two-stage optical trapping and assembling of protein at air/solution interface"

Sugiyama (C01) & Masuhara (evaluation committee)

C.-H. Huang, Y.-C. Lee, T. Kudo, X. Shi, K. Ueno, T. Sugiyama, H. Misawa, H. Masuhara, J. Phys. Chem. C 127, 19044 (2023)
"Unidirectional optical swarming of gold nanoparticles on lithographically fabricated gold nanopatterns"

Sugiyama (C01) & Pin (publicly offered research A) & Sasaki (evaluation committee)

A.-C. Cheng, C. Pin, Y. Sunaba, T. Sugiyama, K. Sasaki, Small 20, 2312174 (2024)
"Nanoscale helical optical force for determining crystal chirality"

Sugiyama (C01) & Pin (publicly offered research A) & Sasaki (evaluation committee)

A.-C. Cheng, C. Pin, T. Sugiyama, K. Sasaki, J. Phys. Chem. C 128, 4314 (2024)
"Enantioselectivity in chiral crystallization driven by the canonical and spin momentum forces of optical vortex beams"

Sugiyama (C01) & Sasaki (evaluation committee)

T. Sugiyama, T.-M. Lin, H.-T. Su, A.-C. Cheng, K. Sasaki, J. Chem. Phys. 160, 064502 (2024)
"Enantioselective control in chiral crystallization of ethylenediamine sulfate using optical trapping with circularly polarized laser beams"

Collaborative research list within this Transformative Research Areas

Imura (publicly offered research B) & Tamura (publicly offered research C)

S. Hasegawa, M. Kanoda, M. Tamura, K. Hayashi, S. Tokonami, T. Iida, K. Imura, J. Chem. Phys. 161, 054713 (2024)
"Plasmon dephasing time and optical field enhancement in a plasmonic nanobowl substrate studied by scanning near-field optical microscopy"

Tsuboi (publicly offered research B) & Yuyama (publicly offered research C)

T. Shoji, M. Iida, M. Matsumoto, K. Yuyama, Y. Tsuboi, Anal. Chem., 96, 12957 (2024)
"Measurements of spontaneous and external stimuli molecular release processes from a single optically trapped poly(lactic-co-glycolic) acid microparticle and a liposome containing gold nanospheres"

Tsuboi (publicly offered research B) & Yuyama (publicly offered research C)

M. Tanaka, R. Kobayashi, Y. Tsuboi, K. Yuyama, Phys. Chem. Chem. Phys., 26, 19083 (2024)
"Optical trapping of nanoclusters formed in a temperature-responsive ionic liquid aqueous solution under focused near-infrared laser irradiation"

Tsuboi (publicly offered research B) & Yuyama (publicly offered research C)

T. Nagai, L. Jie, S. Teranishi, K. Yuyama, T. Shoji, Y. Matsumura, Y. Tsuboi , Adv. Opt. Mater., 12, 2400302 (2024)
"Förster Resonance Energy Transfer Control by Means of an Optical Force"

Recent Research Results

A wide variety of research has been carried out in these Transformative Research Areas since its inception. Here, Prof. Teruki Sugiyama (C01, Nara Institute of Science and Technology) and Dr. Koichiro Saito (publicly offered research C, National Institute of Advanced Industrial Science and Technology) will introduce their latest results.
Prof. Sugiyama and his team achieved enantioselective chiral crystallization of ethylenediamine sulfate by irradiating its solution with light with orbital angular momentum. Dr. Saito and his team created left-handed and right-handed chiral nanostructures by irradiating rod-shaped colloidal plasmonic particles with circularly polarized lights. Both results are groundbreaking achievements in controlling chiral material structures by helicity of light.

Enantioselectivity in Chiral Crystallization Driven by Optical Vortex Beams

A.-C. Cheng, C. Pin, T. Sugiyama, and K. Sasaki, *J. Phys. Chem. C 128, 4314-4320* (2024)

This article investigates the enantioselective control in chiral crystallization of ethylenediamine sulfate (EDS) using a focused Laguerre-Gaussian (LG) beam with orbital angular momentum (OAM). A key finding is that the enantioselectivity in the chiral crystallization is dependent on the handedness of the OAM and the polarization modes of the LG beam (Figure). Furthermore, the highest crystal enantiomeric excess (CEE) is achieved with a linearly polarized LG beam. The specific enantiomorph preferentially crystallized was found to vary with the combination of OAM handedness and circular polarization of the LG beam. The "twist" in the optical force, arising from the helicity of the canonical and spin momenta of the LG beam, is proposed to explain the observed enantioselectivity. The ability to selectively crystallize a desired enantiomorph has significant implications for the synthesis of chiral materials with specific properties. This could impact various fields, including pharmaceuticals, agrochemicals, and materials science, where chirality plays a critical role in the functionality of molecules. This study also contributes to a deeper understanding of chiral crystallization mechanisms and offers new possibilities for manipulating and controlling chirality at the molecular level. This study was a collaborative effort with Professor Pan and Professor Sasaki within Transformative Research Areas (A) “Revolution of Chiral Materials Science using Helical Light Fields”.

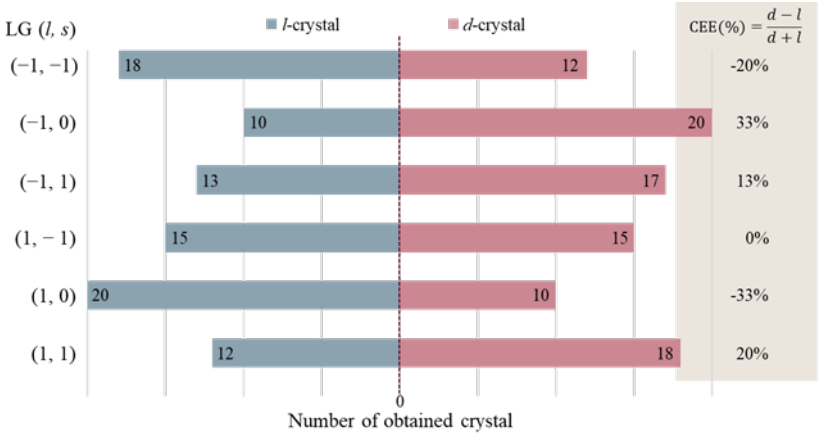


Figure. Summary of the number of generated d- and l-crystals of EDS induced by different combinations of the LG beam at 1.0 W, along with the corresponding CEE values.

Recent Research Results

Circularly Polarized Light-Induced Chiral Growth of Achiral Plasmonic Nanoparticles Dispersed in a Solution

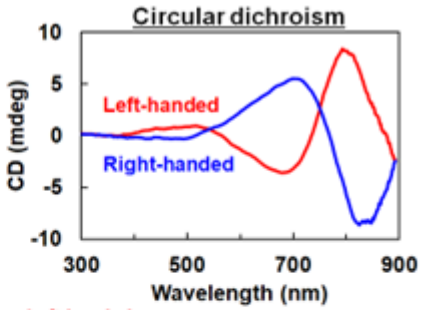
K. Saito, Y. Nemoto, Y. Ishikawa, *Nano Lett. 24, 12840-12848* (2024)

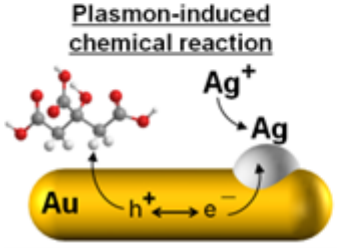
Gold and silver nanoparticles are called plasmonic particles because of their strong light absorption and scattering based on plasmon resonance. In recent years, the synthesis of plasmonic particles with chiral morphorogy has attracted much attention. Chiral plasmonic particles interact strongly with the chirality of matter and light. Various applications such as chiral sensing, metabolic system control, asymmetric catalysis, and optical metamaterials has been reported.

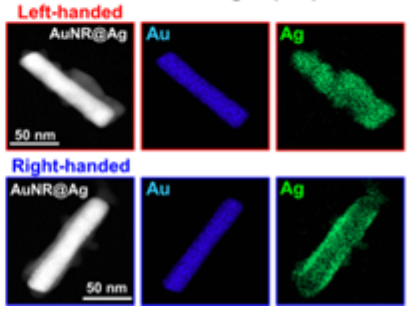
In our previous report, we successfully fabricated chiral plasmonic nanostructures from achiral gold nanorods under circularly polarized light (CPL) irradiation using plasmon-induced chemical reaction [Nano Lett., 18, 3209 (2018)]. In other words, it was demonstrated that left-handed and right-handed chiral nanostructures can be easily created using only the chirality of light. However, this reaction system required the gold nanorods to be immobilized on a substrate. For various applications, it is necessary to realize the synthesis of chiral plasmonic particles in a colloidal state.

Here, colloidal gold nanorods protected by anionic polymer were used for synthesis of silver-coated gold nanorods (AuNR@Ag) under CPL irradiation. The AuNR@Ag exhibited different circular dichroism (CD) spectra depending on the handedness of the CPL. Furthermore, the wavelength of the CPL also had a clear effect on the CD spectra. These results indicate that the colloidal plasmonic particles were grown into a chiral morphology by CPL irradiation. However, when spherical gold nanoparticles were used, silver-coated gold nanospheres did not exhibit circular dichroism. To induce chiral growth by CPL, the shape of the gold nanoparticles need to be anisotropic.

In this study, "chiral ordering" of colloidal nanoparticles was successfully achieved by utilizing the helicity of light. Colloidal solutions of chiral plasmonic particles synthesized using this facile method could lead to various applications.







Press Releases

- Hiromi Okamoto (B01, Institute of Molecular Science) has published a research article in Nature. https://www.nature.com/articles/s41586-022-05589-x
- Takashige Omatsu (C01, Chiba University) and Teruki Sugiyama (Nara Institute of Science and Technology) have published a collaborative research article in Optica. https://doi.org/10.1364/OPTICA.478042
- Atsushi Kubo (publicly offered research B, Tsukuba University) has published a research article in Phys. Rev. A. https://doi.org/10.1103/PhysRevA.107.063517
- Takashige Omatsu (C01, Chiba University) and Ken-ichi Yuyama (publicly offered research C, Osaka Metropolitan University) have published a collaborative research article from ACS Photonics. https://doi.org/10.1021/acsphotonics.3c01005
- Hiromi Okamoto (B01, Institute of Molecular Science) has published a research article in Nano Letters. https://doi.org/10.1021/acs.nanolett.3c02534
- Masahiro Ehara (A02, National Institute of Natural Science) has published a collaborative research article in Science Advances. https://www.science.org/doi/10.1126/sciadv.adj5536
- Makoto Tsubota (C02, Osaka Metropolitan University) has published a research article in Nature Communications. https://www.nature.com/articles/s41467-023-38787-w
- Hiromasa Niinomi (publicly offered research C, Tohoku University) has published a research article in The Journal of Physical Chemistry Letters. https://pubs.acs.org/doi/abs/10.1021/acs.jpclett.3c03006
- Tomoya Oshikiri (B02, Tohoku University) has published a research article in ACS Nano. https://pubs.acs.org/doi/10.1021/acsnano.2c12670
- Yasuhiro Sugawara (publicly offered research B, Osaka University) and Nobuhiko Yokoshi (A01, Osaka Metropolitan University) has published a collaborative research article in ACS Nano. https://doi.org/10.1021/acsnano.3c10924
- Kentaro Doi (C03, Toyohashi University of Technology) has published a research article in J. Phys. Chem. C. https://doi.org/10.1021/acs.jpcc.3c05351
- Teruki Sugiyama (C01, Nara Institute of Science and Technology) has published a research article in The Journal of Chemical Physics. https://doi.org/10.1063/5.0186018
- Takayuki Umakoshi (publicly offered research B, Osaka University) has published a research article in Nano Letters. https://doi.org/10.1021/acs.nanolett.3c04877

Press Releases

- Takashige Omatsu (C01, Chiba University) and Ken-ichi Yuyama (publicly offered research C, Osaka Metropolitan University) have published a collaborative research article from APL Photonics. https://doi.org/10.1063/5.0187189
- Takashige Omatsu (C01, Chiba University) has published a research article from APL Photonics. https://doi.org/10.1063/5.0192239
- Hiromi Okamoto (B01, Institute for Molecular Science) has published a research article in The Journal of Physical Chemistry C. https://doi.org/10.1021/acs.jpcc.3c08473
- Yoshito Tanaka and Shun Hashiyada (A01, Hokkaido University) has published a research article in Review of Scientific Instruments. https://pubs.aip.org/aip/rsi/article/95/5/053101/3286924/
- Takashige Omatsu (C01, Chiba University) has published a research article in Optica. https://doi.org/10.1364/OPTICA.521901
- Hiromi Okamoto (B01, Institute for Molecular Science) has published a research article in Advanced Optical Materials. https://doi.org/10.1002/adom.202400699
- Yasuyuki Tsuboi (publicly offered research B, Osaka Metropolitan University) and Ken-ichi Yuyama (publicly offered research C, Osaka Metropolitan University) has published a research article in Advanced Optical Materials. https://onlinelibrary.wiley.com/doi/10.1002/adom.202400302
- Takashige Omatsu (C01, Chiba University) and Ken-ichi Yuyama (publicly offered research C, Osaka Metropolitan University) have published a collaborative research article in APL Materials. https://doi.org/10.1063/5.0209114
- Akihito Kato and Nobuhiko Yokoshi (A01, Osaka Metropolitan University) have published a research article in Physical Review B. https://doi.org/10.1103/PhysRevB.110.085308
- Hiromasa Niinomi (publicly offered research C, Tohoku University) and Tomoya Oshikiri (B02, Tohoku University) has published a collaborative research article in The Journal of Physical Chemistry Letters. https://pubs.acs.org/doi/abs/10.1021/acs.jpclett.3c03303
- Koichiro Saito (publicly offered research C, National Institute of Advanced Industrial Science and Technology) has published a research article in Nano Lettes. https://pubs.acs.org/doi/10.1021/acs.nanolett.4c03183
- Ryusei Oketani (publicly offered research C, Osaka University) has published a research artcle in Crystal Growth & Design. https://pubs.acs.org/doi/10.1021/acs.cgd.4c00604
- Takashige Omatsu (C01, Chiba University) has published a research article in APL Photonics. https://doi.org/10.1063/5.0235638

Press Releases

- Yasuyuki Tsuboi (publicly offered research B, Osaka Metropolitan University) and Ken-ichi Yuyama (publicly offered research B, Osaka Metropolitan University) have published a research article in Analytical Chemistry. https://doi.org/10.1021/acs.analchem.3c05950
- Koichi Matsuo (publicly offered research A, Hiroshima University) has published a research article in Analytical Chemistry. https://pubs.acs.org/doi/abs/10.1021/acs.analchem.4c00556
- Takashige Omatsu (C01, Chiba University), and Nobuhiko Yokoshi (A01, Osaka Metropolitan University) has published a collaborative research article in Optica Quantum. https://doi.org/10.1364/OPTICAQ.527615
- Takuya Nakashima (A03, Osaka Metropolitan University) have published a research article in Nanoscale. https://doi.org/10.1039/D4NR03810J
- Takashige Omatsu (C01, Chiba University) has published a research article in ACS Photonics. https://doi.org/10.1021/acsphotonics.4c01547

Awards, etc.

- Mr. Rihito Tamura (Chiba University; C01 Omatsu group) received the CLEO-PR Best Student Paper Award (1st prize) in the international conference CLEO Pacific-Rim 2024 (Incheon, Republic of Korea).
- Mr. Yuto Yoneda (Chiba University; C01 Omatsu group) received Nanophotonics Best Student Paper Awards (silver prize) in the international conference CLEO Pacific-Rim 2024 (Incheon, Republic of Korea).
- Prof. Takashige Omatsu (C01, Chiba University) was appointed as a visiting professor of Tianjin (China), Fujian Normal (China), and National Yang Ming Chiao Tung (Taiwan) Universities.
- Prof. Takashige Omatsu (C01, Chiba University) has been appointed as an Editor-in-Chief of Journal of Nanophotonics, SPIE.
- Dr. Junsuke Yamanishi (Institute for Molecular Science, B01 Okamoto group) and Mr. Rihito Tamura (Chiba University, C01 Omatsu group) received the excellent presentation award from Japan Society of Applied Physics.
- Prof. Ryusei Oketani (Publicly offered research C, Osaka University) received JACG Young Researcher Award from Japanese Association for Crystal Growth.
- Prof. Yasuyuki Tsuboi (Publicly offered research B, Osaka Metropolitan University) received Award of the Japan Society of Analytical Chemistry (JSAC).
- A Special Topics issue of J. Chem. Phys., entitled “Chirality of Plasmonic Structures and Materials”, for which Prof. Hiromi Okamoto (B01, Institute for Molecular Science) engaged as a guest editor, was published.

NewsLetter Vol.3 2024.12
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Revolution of Chiral Materials Science using Helical Light Fields
Chair : Takashige Omatsu, Chiba University