Report to IUPAP Council and Commission Chairs Meeting

IUPAP C17: Commission on Laser Physics and Photonics

London, UK, 2 - 3 October 2019

1. ACTIVITIES SINCE THE LAST C&CC MEETING (NOVEMBER 2018)

1.1. First C17-ICO Joint Topical Meeting: OPTISUD

As an IUPAP supported type D conference, the topical meeting on OPTics and applications to SUstainable Development (OPTISUD), jointly organized and supported by IUPAP (C17) and the International Commission for Optics (Affiliated Commission AC1), was held from the 4 – 7 Sep. 2019, in Carthage, Tunis, Tunisia. The chair of the conference was Prof. Mourad Zghal of the École Supérieure des Communications de Tunis (SUP'COM), Université de Carthage. In line with the spirit of this meeting, it welcomed students and researchers from four continents and 19 countries, including 7 from the African continent (Algeria, Cote d'Ivoire, Egypt, Morocco, Senegal, South Africa and Tunisia). From C17, Roberto Pini, Arkadiusz Wójs and Tsuneyuki Ozaki gave invited presentations. The meeting covered various subjects surrounding optics, photonics and laser physics with applications to sustainable development, including quantum information, advanced materials, microscopy and spectroscopy. A round table was held during the conference to discuss how photonics could contribute to economical and sustainable development, especially in developing countries. There were also many oral presentations by students and postdocs, mostly from African countries or of African origin. Student awards were given to the four best oral presentations, and the winners were: First prize, Ms. Maha Bouhadida (U. Paris-Saclay, France); Second Prize, Mr. Amor Gueddana (U. Carthage, Tunisia); Third Prize, Ms. Akoba Rashidah (iThemba Labs, South Africa) and Ms. Zienab Abel Fatah (Cairo U., Egypt).

The joint meeting was also fruitful in that we had the chance to discuss potential collaborations between C17 and ICO. It also gave members of C17 a perspective on ICO and the type of research that its members carry out. We found that research by the members of ICO tend to be more application oriented, while that of C17 leans toward fundamental research. That said, both groups cover both basic and applied physics, and ICO also includes many research involving lasers and photonics, and not just optics. As such, we see strong possibilities of collaborations, such as joint meetings and prizes.

There were interests in continuing the OPTISUD conference series, which both C17 and ICO strongly encouraged. Information was transferred that the deadline for IUPAP support for 2021 conferences is the 1 June 2020.

1.2. Articles to the IUPAP Newsletter

Members of C17 have been actively contributing to IUPAP's newsletter (see Appendix B). These include:

December 2018 Issue:

- "Donna Strickland: A Graduate Student, a Researcher and a Nobel Laureate", by Parinda Vasa, Tsuneyuki Ozaki and Cather Simpson

June 2019 Issue:

- "Nonlinear light generation in topological nanostructures", by Sergey Kruk (2019 – C17 YSP winner)

- “Ultra-fast visualization and ultra-precise modulation of laser pulse/beam profiles”, by Jinyang Liang (2019 – C17 YSP winner)
- “Networks of Optical Parametric Oscillators: From Ising Machines to Quantum Photonic Engineering”, by Alireza Marandi (2019 – C17 YSP winner)

September 2019 Issue:

- “IUPAP Laser Physics and Photonics Young Scientist Prizes 2019”, by Tsuneyuki Ozaki

1.3. International Day of Light

At the end of July 2019, through discussions with Prof. John Dudley, the Steering Committee Chair of the International Day of Light (IDL), it had come to our attention that IUPAP had not been an official sponsor of IDL. After several exchanges, Prof. Dudley proposed that IUPAP become a Gold Sponsor of IDL, without cost, seeing that the IUPAP logo in IDL materials would be an advantage. This proposal was sent out to the members of C17 for their opinion, whose response was overwhelmingly positive. As such, T. Ozaki forwarded this proposal to the Executive Council of IUPAP for consideration. After consultation with C15 (Atomic, Molecular and Optical Physics), the proposal was accepted by the Executive Council in early Sep. 2019. Logos of IUPAP have been sent to the IDL for use in their material.

1.4. Conference Support

This year, C17 has received one application for conference support, from the 11th CIRP Conference on Photonic Technologies (LANE 2020), to be held in Fuerth, Germany in Sep. 2020. T. Ozaki has asked the members of C17 for their opinion, and have received strong support from 11 out of 14 (no response from the other 3). Given this overwhelming approval, C17 has proposed the LANE 2020 conference for Type B support from IUPAP. The main reason for this support is that LANE 2020, unlike many that have been supported from our commission in the past, is especially focused on applied aspects. The LANE conferences series “deals with the latest developments in the field of laser material processing”, as well as emerging light technologies that opens up new processes for manufacturing. Given the current initiatives of IUPAP to increase the participation of researchers in applied physics, we find that the LANE conference series would be an interesting addition to be supported by IUPAP.

1.5. C17 Meeting

On the 5 Sep. 2019, the C17 in-person meeting was held in Carthage, Tunisia, during the OPTISUD topical meeting, to discuss future directions and to exchange ideas. The C17 meeting was attended by John Harvey (Associate member representing ICO), Tsuneyuki Ozaki (Chair), Roberto Pini (Secretary) and Arkadiusz Wójs. We summarize below some outcomes of this C17 Meeting.

1.5.1. C17-ICO Collaborations

J. Harvey explained that the president of ICO, Prof. Roberta Ramponi, has drafted the first version of a Memorandum of Understanding (MoU) that outlines potential areas of collaborations between IUPAP and ICO. This MoU has been presented to the Executive Council of the ICO and has been approved, after which it had been sent by Prof. Ramponi to the Executive Council of IUPAP for consideration. Potential commissions that could be involved are not only C17, but also C13 (Physics of Development) and C15.

1.5.2. International Day of Light

Now that IUPAP is an official sponsor of IDL, it would be important that IUPAP, and especially members of C17, promote and organize IDL events. Looking at least year's IDL map, we notice a significant lack of IDL events in the African continent. It was proposed that we talk with Prof. E. Rohwer of the African Laser Centre (ALC), who was attending OPTISUD, to promote IDL events in Africa. ACL already organizes numerous events, and thus would be a good start to promote IDL in Africa. It was also noted that each country would need to establish an IDL node, who will be the contact that makes the link with IDL.

1.5.3. Preferred Next C17 Chair

Candidates for the next Chair of C17 (mandate for the 2021-2023 triennial) has been solicited among current members, and we have received one application, from Dr. Roberto Pini, the current secretary of C17. This candidacy has been circulated among the members of C17 and has been unanimously approved. To smoothen the transition, T. Ozaki will put R. Pini in cc on exchanges with IUPAP. The next steps would be to decide on the remaining two officers for the next triennial, that is the Vice-Chair and Secretary.

APPENDICES

Appendix A - Officers and Members of C17 (as of September 2019)

Officers:

Chair: Tsuneyuki Ozaki (2014) (2017); Email: ozaki@emt.inrs.ca
Vice-Chair: Qihuang Gong (2011) (2014) (2017); Email: qhgong@pku.edu.cn
Secretary: Roberto Pini (2014) (2017); Email: roberto.pini@cnr.it

Past Chair: Deborah Kane (2011) (2014); Email: deb.kane@mq.edu.au

Members:

Kai-Mei Camilla Fu (2017); Email: kaimeifu@uw.edu
Alexey Kalachev (2017); Email: a.a.kalachev@mail.ru
Kathy Lüdge (2017); Email: kathy.luedge@tu-berlin.de
Andre Luiten (2017); Email: andre.luiten@adelaide.edu.au
Kevin F. MacDonald (2017); Email: kfm@orc.soton.ac.uk
Ci-Ling Pan (2011) (2017); Email: clpan@phys.nthu.edu.tw
M. Cather Simpson (2017); Email: c.simpson@auckland.ac.nz
Yoshiro Takahashi (2017); Email: yitk@scphys.kyoto-u.ac.jp
Gintaras Valušis (2017); Email: gintaras.valusis@ftmc.lt
Parinda Vasa (2017); Email: parinda@iitb.ac.in
Arkadiusz Wójs (2014) (2017); Email: arkadiusz.wojs@pwr.edu.pl

Associate Members (mandate until end of 2021):

Nicholas P. Bigelow (representing the Joint Council on Quantum Electronics)
John Harvey (representing the International Commission for Optics)
John Dudley (representing the International Day of Light)

DONNA STRICKLAND: A GRADUATE STUDENT, A RESEARCHER AND A NOBEL LAUREATE

Parinda Vasa, Tsuneyuki Ozaki and Cather Simpson

The announcement of the 2018 Nobel Prizes have been filled with surprises. Let us catch a glimpse of one of the winners and her research.

The Nobel Prize in Experimental Physics Shared by a Woman for the first time since 1903

The Nobel Prize in Physics was first awarded in 1901. In the last 117 years, it has been awarded almost exclusively to men. In fact there have been only three occasions when it has been shared by women: Marie Curie (experimental physics, 1903), Maria Goeppert-Mayer (theoretical physics, 1963), and Donna Strickland (experimental physics, 2018).

Donna Strickland, a Canadian physicist at the University of Waterloo, received the Prize jointly with Gérard Mourou from France for their work on high-intensity laser pulses. They both shared quarter of the Prize, while the other half was awarded to Arthur Ashkin, an American physicist who demonstrated the use of light beam to manipulate small biological objects without harming them. Donna was a graduate student working under Gérard Mourou at Institute of Optics, University of Rochester, USA when they published their groundbreaking research work on chirped pulse amplification in 1985. Their technique has led to the development of shortest and the most intense laser pulses ever created. These intense laser pulses are finding applications in multitude of applications ranging from eye surgery to nuclear fusion.

Being the only living woman Nobel Laureate in Physics, Donna said that though she was initially surprised, she is honoured to receive the recognition and that achievements of women physicists need to be celebrated. She hopes that there will be many more women physicists receiving the recognition in the future and at a faster rate.

- Parinda Vasa (Department of Physics, Indian Institute of Technology Bombay, Mumbai, India)

Donna Strickland – "laser jock"

Donna is undoubtedly an excellent scientist, in her words, a "laser jock". Her current research focuses on multi-frequency Raman generation and mid-infrared laser generation, as well as the application of ultrafast laser pulses in medicine. Through conferences and workshops, I have had the privilege to discuss with Donna on many topics in laser science and nonlinear optics. From such interactions, I have found that many of her questions and comments are enlightening, providing great insights into some of our experimental observations. The way she poses such questions is also very "Canadian". Polite, but nevertheless getting to the core of the subject, allowing one to look at the results in a different manner, sometimes resulting in interesting turns. At the same time, Donna is very down-to-earth and easy to talk to. We have had multiple discussions on various subjects, from women in physics (of course), to Quebec cuisines, and funding opportunities in Canada. Despite myself not being a chatty person, talk with Donna has always turned out to be lively and fun.

-Tsuneyuki Ozaki (Institut national de la recherche scientifique - Énergie, Matériaux Télécommunications, Quebec, Canada)

Prof. Donna Strickland at the Symposium celebrating the 70th birthday of Prof. Gérard Mourou.

Who'd have thought? 2018 Nobel Prize in science to sort sperm by sex for the dairy industry?

In 2011, a dairy investor brought a challenge to the Photon Factory at the University of Auckland – can you find a better way to sort sperm by sex for the dairy industry? The solution uses the laser innovations of Strickland and Mourou, and the interactions of light with particles, that led to Arthur Ashkin's sharing the 2018 Nobel Prize with them. The idea of using laser light to nudge sperm cells inside of microfluidic channels is being commercialised by Engender Technologies, a company that won the 2016 AgTech medal in Silicon Valley and has just been acquired by a global player in the livestock industry. Key to Engender's success is (1) high-intensity, ultrashort pulse laser micromachining using the clever approach developed by Strickland and Mourou, and (2) the gentle "nudging" moving cells from one laminar flow stream with Ashkin's gradient and scattering forces. Engender's technology is still new. Over the next few years, Engender will develop technology to provide dairy farmers with the tools to grow their productivity without growing their herds, and thereby reducing the impact of dairy on the environment while feeding the world. The proof is in the physics – the path to high-tech, low-impact dairy is the science underpinning the 2018 Nobel Prize in Physics.

-Cather Simpson (The Photon Factory, University of Auckland, Auckland, New Zealand)

for baryon rich QGP remain an outstanding challenge, in spite of recent progress. Along the phenomenology direction, we recently implemented the propagation of net baryon current and its dissipative diffusion in the state-of-the-art relativistic hydrodynamic framework. This advance extended the successful fluid paradigm established at high energy collisions down to RHIC BES and future FAIR experiments. With this dynamical framework, relativistic heavy-ion collisions can be mapped to the nuclear matter phase diagram event-by-event as shown in Fig. 1. The existence of a critical point in a heavy-ion collision should lead to strong correlations and enhanced local fluctuations of conserved densities. By modeling the dynamics of stochastic fluctuations in a realistic expanding medium, we will identify the most relevant experimental observables. This quantitative framework will be indispensable to turn high precision experimental data anticipated in the upcoming years into precise information on the QCD critical point.

Nonlinear light generation in topological nanostructures

Sergey Kruk (2019 – C17 YSP winner)
Research Fellow, Nonlinear Physics Centre, Australian National University

Isaac Asimov once famously wrote that the most exciting phrase to hear in science is not "Eureka!" but "That's funny…" This project started with a bit of a "that's funny…" moment when we performed two seemingly identical experiments in Australia and in Russia, and the opposite results were yielded. Our first explanation was that, geographically speaking, from an Australian perspective, some things in Russia are made upside down. This commonplace joke has turned out to be literally the explanation of our experiments. It became clear that we witnessed an example of optical nonreciprocity at the nanoscale facilitated by topology.

We have been studying topological states of light – peculiar localisations of light that are unusually robust against various perturbations. Being inspired by the recent developments in condensed matter physics, photonic topological states have emerged as a new frontier in optics. Our research was headed towards new horizons in topological optics by introducing strong nonlinear effects in a topological structure. More specifically, we were generating a third-harmonic signal from localised topological edge states of a one-dimensional zigzag array of silicon nanoresonators known to have the Z2 topological invariant.

Our first set of measurements were performed at the Australian National University. We observed the expected effect: a strong third-harmonic signal from the localised mode associated with topological state. Our colleagues then conducted a seemingly identical experiment at the Moscow State University, where an opposite effect was observed. We were cross-checking the experimental arrangements and procedures for a possible fault in one of the experiments and found that the only difference was the direction of propagation of light in the two experiments: light was propagating through the structure from top to bottom in Australia and from bottom to top in Russia. From there we understood that we hit the regime of strong optical nonreciprocity induced by nonlinear interactions.

In the resulting Nature Nanotechnology paper, we demonstrated the nonlinear generation of photons inside a nanoscale topological structure where nonlinearity triggers nonreciprocal response. We revealed that the interplay between topology and nonlinearity makes the third-harmonic generation and light localisation at the edge states dependent on the direction of the optical pump. In addition, we observed that the topological properties enhance substantially the efficiency of the nonlinear effects.

We believe this work will establish valuable cross-disciplinary links and set an important reference point for future studies of topological photonic structures.

Sergey Kruk is thankful to his co-authors. He acknowledges critical contributions of A. Poddubny, D. Smirnova, and Y. Kivshar.

Concept of nonlinear parametric topological edge states as seen from Canberra and from Moscow perspective. Third-harmonic generation from edge states in a zigzag array of silicon nanoresonators depends on the pump direction.

Ultra-fast visualization and ultra-precise modulation of laser pulse/beam profiles

Jinyang Liang (2019 – C17 YSP winner)
Laboratory of Applied Computational Imaging, Institut National de la Recherche Scientifique (INRS)

Prof. Liang's research in the field of coded-aperture imaging is represented by the development of two highly innovative imaging modalities - compressed ultrafast photography and coded aperture band-limited imaging. They have allowed light-speed visualization and ultrahigh-precision control of laser pulse/beam profiles.

Compressed ultrafast photography (CUP), provides the world's fastest camera with an unprecedented imaging speed of 10 trillion frames per second (fps), has allowed real-time imaging of dynamics of single laser pulses for the first time. In ultrafast optical imaging, it is still challenging to measure the spatial and temporal profiles of single laser pulses in real time. This severe limitation prevents us from characterizing high-power, low-repetition laser systems. It also hinders our understanding of many physical, chemical, and biological mechanisms that are manifested in non-repeatable or difficult-to-produce laser-matter interactions. While working as a Postdoctoral Research Associate at Washington University in St. Louis, Prof. Liang co-invented the CUP technique that overcomes these limitations. This novel coded-aperture ultrafast imaging modality uses compressed sensing in the data acquisition to allow spatiotemporal mixing in the temporal shearing direction of the streak camera and then implements an optimization algorithm to reconstruct the movie. The resultant CUP camera, adding another spatial dimension into the streak camera, achieves sling-shot, receive-only femtophotography in real time.

Fig. 1. World's fastest camera captures light refraction (top row), temporal focusing (middle row), and propagation of photonic Mach cone (bottom row) in real time. [Nature 516, 74 (2014), Light: Sci. & Appl. 7, 42 (2018), and Sci. Adv. 3, e1601814 (2017 Prof. Liang has implemented the CUP technique for imaging of dynamics of single laser pulses in real time, including the refraction a single laser pulse [Nature 516, 74 (2014), cover story], the formation and propagation of a scattering-induced photonic Mach cone [Sci. Adv. 3, e1601814 (2017)], and temporal focusing of single femtosecond laser pulses [Light: Sci. & Appl. 7, 42 (2018)] (Fig. 1). The CUP technique has made imaging spatial and temporal profiles of laser pulses—the fastest object in the universe—a new daily routine.

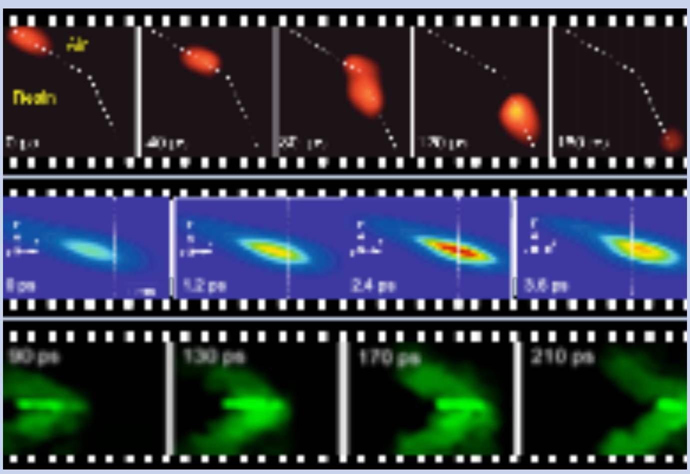


Fig. 1. World's fastest camera captures light refraction (top row), temporal focusing (middle row), and propagation of photonic Mach cone (bottom row) in real time. [Nature 516, 74 (2014), Light: Sci. & Appl. 7, 42 (2018), and Sci. Adv. 3, e1601814 (2017

Prof. Liang has applied CUP to many new applications, including fluorescence lifetime mapping [Nature 516, 74 (2014)], encrypted quantum communication [Adv. Quantum Technol. 2018, 1800034 (2018)], and time-of-flight light radar [Sci. Rep. 5, 15504 (2015)]. Moreover, he has recently extended CUP's concept to electron imaging and diffraction [Micron 117, 47 (2019) and Phys. Rev. Appl. 10, 054061 (2018)] and to other advanced detectors [Opt. Lett 44, 1387 (2019)]. These applications testify that CUP can be readily coupled to different imaging modalities, from microscopes to telescopes, to image numerous ultrafast events occurring at all spatial scales. His ultimate goal is to develop the CUP technique toward a universal, omniscale, ultrafast imaging platform.

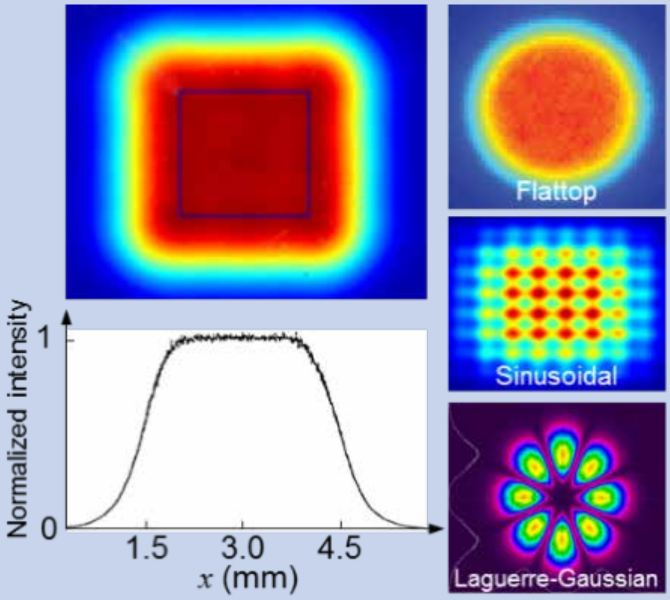


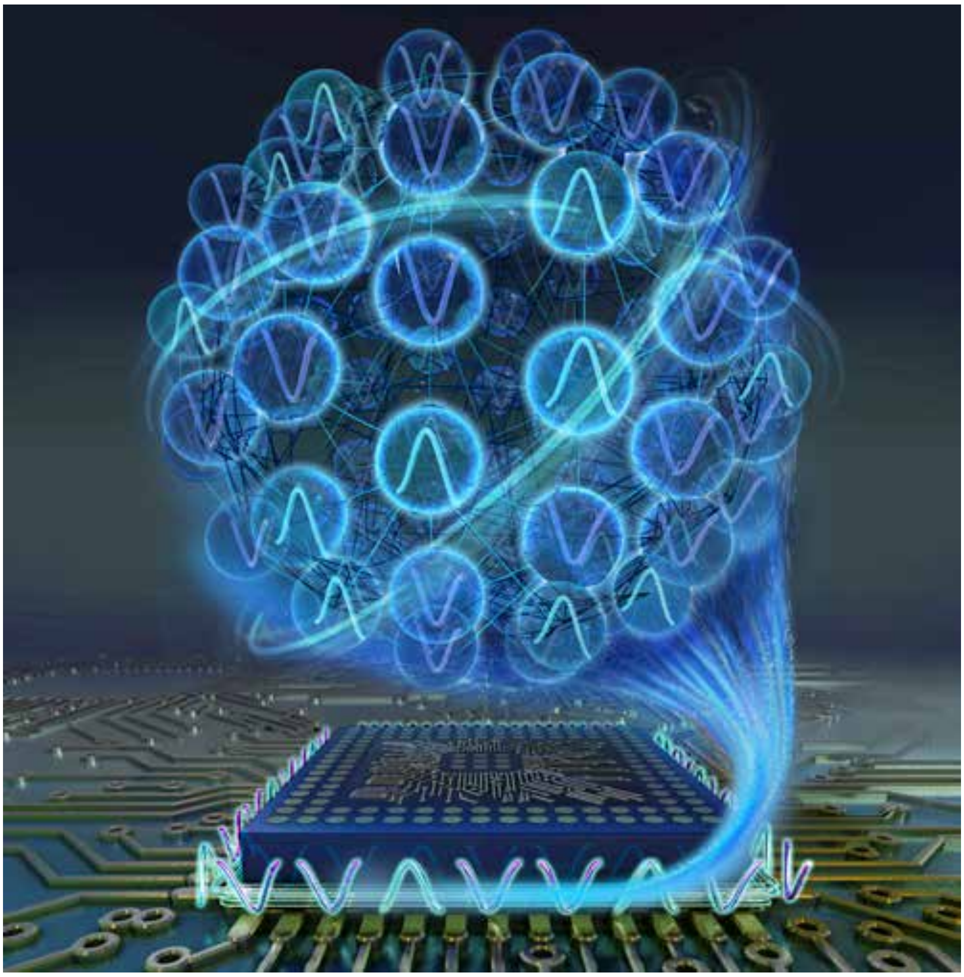
Fig. 2. World's flattest laser beam (left column) and various 2D optical potentials (right column) generated by CABI. [Appl. Opt. 49, 1323 (2010) and Opt. Eng. 51,108201 (2012)]

Coded aperture band-limited imaging (CABI) has enabled controlling laser pulse/beam profiles with unprecedented intensity accuracy and pattern flexibility (Fig. 2). Prof. Liang developed the CABI system by combining dynamic coded-aperture imaging and 4f optical processing. The ability of engineering the desired point spread function endows the CABI system with the accurate intensity controlled by the limited system bandwidth and the arbitrary profiles generated by the spatial light modulator. Using this system, Prof. Liang has demonstrated, by far, the world's flattest laser beam with a >99.7% intensity uniformity, in both visible and near-infrared spectra [Appl. Opt. 49, 1323 (2010) and Opt. Eng. 51,108201 (2012)]. CABI-based high-precision laser beam/pulse shaping has been used in free electron lasers [Opt. Exp. 21, 32013 (2013)] and atomic physics. Currently, Prof. Liang is working on applying CABI in high-speed 3D profilometry and single-pixel cameras.

Networks of Optical Parametric Oscillators: From Ising Machines to Quantum Photonic Engineering

Alireza Marandi (2019 – C17 YSP winner)
California Institute of Technology, marandi@caltech.edu

In the past few years, networks of optical parametric oscillators (OPOs) have been successfully used to simulate the classical Ising Hamiltonian leading to a platform that may be used as a special-purpose computer. Some of the fundamental properties of OPOs at degeneracy that enabled simulation of the Ising Hamiltonian were experimentally demonstrated in 2012 [1, 2]. Later in 2013, numerical investigation of the idea led to promising results [3]. One of the key concepts for successful experimental realization of these networks has been the idea of time-division multiplexing of OPOs which was used in the first demonstration of OPO-based Ising machines in 2014 [4]. Time-division multiplexing in combination with the measurement-feedback architecture and guided-wave implementation of OPOs led to a special implementation of large-scale Ising machines in 2016 [5, 6] that are being studied extensively [7]. Numerical studies suggest that OPO networks have potential in realization of a wide range of quantum states, from the well-known squeezed vacuum and multi-mode entangled states [8] to less-explored highly-desired Cat states [9] and indicate a path toward scalable quantum photonic engineering using them. Recent numerical studies of ultra-short pulse OPOs in the highly-nonlinear quantum regime [10] illustrate some of the practical benefits associated with using them as the building block of a quantum photonic platform. These theoretical studies and experimental demonstrations promise that OPO networks can potentially be useful for a broad range of applications.



An artistic illustration of optical Ising machine

[1] A. Marandi et al., "Coherence properties of a broadband femtosecond mid-IR optical parametric oscillator operating at degeneracy," Optics Express 20.7 (2012): 7255-7262.

[2] A. Marandi et al., "All-optical quantum random bit generation from intrinsically binary phase of parametric oscillators," Optics Express 20.17 (2012) 19322-19330.

[3] Z. Wang et al., "Coherent Ising machine based on degenerate optical parametric oscillators," Physical Review A 88.6 (2013): 063853.

[4] A. Marandi et al., "Network of time-multiplexed optical parametric oscillators as a coherent Ising machine," Nature Photonics 8.12 (2014): 937-942.

[5] P. McMahon*, A. Marandi* et al., "A fully programmable 100-spin coherent Ising machine with all-to-all connections," Science 354.6312 (2016): 614-617.

[6] T. Inagaki et al., "A coherent Ising machine for 2000-node optimization problems," Science 354.6312 (2016): 603-606.

[7] R. Hamerly*, T. Inagaki*, P.L. McMahon*, et al., "Experimental investigation of performance differences between Coherent Ising Machines and a quantum annealer," arXiv:1805.05217 (2018).

[8] K. Takata et al., "Quantum correlation in degenerate optical parametric oscillators with mutual injections." hysical Review A 92.4 (2015): 043821.

[9] M. Wolinsky, H. J. Carmichael, "Quantum noise in the parametric oscillator: from squeezed states to coherent-state superpositions," Physical Review Letters 60(18):1836 (1988).

[10] T. Onodera*, E. Ng*, et al.,"Nonlinear quantum behavior of ultrashort-pulse\ optical parametric oscillators," arXiv:1811.10583 (2018).

IUPAP Laser Physics and Photonics Young Scientist Prizes 2019

Tsuneyuki Ozaki, Chair, C17

The IUPAP Commission on Laser Physics and Photonics runs its Young Scientist Prizes every two years, recognizing early-career researchers of the very highest level of achievements in fundamental and applied research. The 2019 prizes attracted multiple nominations from Australia, Canada, China, Germany, Ireland, United Kingdom and the USA.

The 2019 IUPAP Young Scientist Prize in Laser Physics and Photonics (Fundamental Aspects) was awarded to Dr. Sergey Kruk, Nonlinear Physics Centre, Australian National University, Australia. Dr. Kruk was awarded the prize “for his ground breaking contributions to the study of topological states of light at the nanoscale, particularly for his pioneering work on nonlinear and nonreciprocal effects in photonic nanostructures”. Dr. Kruk received his Diploma in Physics with High Distinction from the Belarusian State University in 2011, and his PhD in Physics from the Australian National University in 2015. Subsequently, he held a postdoctoral fellow position at the Australian National University until 2015, and is currently Research Fellow at the Australian National University, as well as Visiting Researcher at Oak Ridge National Laboratory.

Dr. Sergey Kruk receiving his award

The 2019 IUPAP Young Scientist Prize in Laser Physics and Photonics (Applied Aspects) is shared by Dr. Alireza Marandi, Department of Electrical Engineering and Applied Physics, California Institute of Technology, USA, and Dr. Jinyang Liang, Institut national de la recherche scientifique – Centre Énergie, Matériaux, Télécommunication (INRS-EMT), Canada.

Dr. Marandi was awarded “for contributions to nonlinear photonics, particularly his pioneering work on computing with networks of OPOs and demonstration of optical Ising machines, as well as half-harmonic generation of mid-infrared frequency combs.” Dr. Marandi received his PhD from Stanford University in 2013, and went on to hold various positions at the National Institute of Informatics (Japan), Stanford University and Dolby Laboratories Inc. (USA). He is currently Assistant Professor of Electrical Engineering and Applied Physics at the California Institute of Technology, Visiting Scholar at the E. L. Ginzton Laboratory, Stanford University and Visiting Professor at the National Institute of Informatics.

Dr Alireza Marandi receiving his award

Dr. Jinyang Liang was awarded, “for his outstanding contributions that apply coded-aperture optical imaging to ultrafast visualization and ultra-precise modulation of laser beam/pulse profiles”. Dr. Liang received his PhD from the University of Texas at Austin in 2012 under the supervision of Prof. Michael F. Becker. He then took on post-doctoral positions with Prof. Lihong V. Wang, first at Washington University in St. Louis and later at the California Institute of Technology. He is currently Assistant Professor at the INRS-EMT near Montreal, Canada.

An awards ceremony was held during CLEO-Europe on 25 June 2019 in Munich, Germany. Our heartfelt congratulations to the winners of the C17 Young Scientist Prizes 2019!

Dr Jinyang Liang receiving his award