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# **HYFUgroup photonics lab**

*Release v0.4*

**Lirong**

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Welcome to HYFUGroup Photonics Lab. We are a group of photonics researchers at Nano-Devices Laboratory, Tsinghua-Berkeley Shenzhen Institute, Tsinghua University. Our research interests include optical wireless communication, silicon photonics and advanced sensing technologies.

Our vision: Enabling people's future life with advanced optical technologies.



### 1.1 Optical Wireless Communication

**Optical Wireless Communication (OWC)** is a short-range wireless access technology and an important supplement to other existing wireless communication systems. Due to the high frequency of light waves, OWC has large information carrying capacity. Light waves also have rich broadband spectrum resources and strong anti-electromagnetic interference capabilities compared with radio frequency. Recently, OWC based on high-bandwidth semiconductor light sources such as lasers and light emitting diodes (LEDs) receives extensive concern. With the development of optoelectronic materials and devices, visible light communication (VLC) will not only break the capacity bottleneck up to Gbps, but also provide indoor illumination and positioning service in the future, which plays a vital role connecting the internet of things (IoT).

### 1.2 Silicon Photonics

**Silicon photonics** is a promising solution to provide low-cost and high-performance integrated chip-based photonic devices and systems. Currently, it is commercially driven by the increasing demand for low-cost short-range optical interconnects in data centers and the computing industry. In the future, it might also be attractive for applications in biosensing and light detection and ranging (LiDAR). Our group focus on design of key passive integrated components including fiber-to-chip interface, waveguide crossings and multiplexing components (polarization, mode and wave-length division multiplexing). Apart from traditional design method based on intuition and physics, we also explore computer-automated design using advanced algorithms and deep neural networks.

### 1.3 Advanced Sensing Technologies

**Ultrafast 3D imaging LiDAR system based on spectral scanning method:** Light detection and ranging (LiDAR), as a 3D sensor, has been applied in various application scenarios, such as autonomous vehicles, augmented reality (AR)/virtual reality (VR), and robots. Traditional methods based on mechanical scanning are inherently slow, bulky and prone to failure and are not well suited for the emerging applications. To adapt ultrafast imaging techniques to an ultrafast 3D imaging platform, spectrum scanning method has been proposed to be employed in LiDAR system.

LiDAR group focuses on developing ultra-fast spectral scanning technology and further improving 3D imaging speed of LiDAR system.

**Microcavity Sensing:** Whispering gallery mode (WGM) resonators, with superior performance compared with other resonators, have emerged in recent years as versatile and ultra-sensitive technology for sensing applications, which is the basis for the development of physical, chemical and biological sensors. In our research group, we use micro-cavity (e.g. Microbubble) to realize different sensing applications, such as ultra-low detection limit sensors.

### **Ultrafast optics:**

(1) **Ultrafast mode-locked fiber lasers** with environmental stability have become powerful tools for numerous applications outside laboratories. We have constructed two novel and simple fiber laser schemes based on nonlinear polarization evolution for ultrashort pulse generation. High stability and high repetition rate are the two most important features of our proposed fiber oscillators.

(2) The build-up process of the ultrashort pulses contains complex dynamics. We have constructed a fiber laser system and employed **time-stretch dispersive Fourier transformation (TS-DFT) technique** to unveil the formation of soliton, dissipative solitons working at different dispersion regions.



## 2.1 Professor

### 2.1.1 EDUCATION

Ph.D. Electrical Engineering, The Hong Kong Polytechnic University  
M.Sc. Electrical Engineering, Royal Institute of Technology (KTH), Sweden  
B.Eng. Information and Electronic Engineering, Zhejiang University

### 2.1.2 RESEARCH INTERESTS

Integrated Photonics and Their Applications for Communications and Sensing, including Optical Wireless Communications, Silicon Photonics, Optical Nonlinearity, Microcavity Sensing, 3D-Sensing (LiDAR, OCT).

### 2.1.3 PROFESSIONAL EXPERIENCES

2017-present, Associate Professor, Nano-Devices Laboratory, Tsinghua-Berkeley Shenzhen Institute, Tsinghua University  
2016-2017, Project Officer, Central Research Institute, Huawei Technologies  
2012-2016, Project Manager, Central Research Institute, Huawei Technologies  
2010-2012, Senior Research Engineer, Central Research Institute, Huawei Technologies  
2009-2010, Research Associate, Photonic Research Centre, The Hong Kong Polytechnic University  
2008-2009, Research Assistant, Photonic Research Centre, The Hong Kong Polytechnic University

### 2.1.4 HONORS AND AWARDS

Best Poster Award, ACP 2019, Student: Alberto Pepe

Best Student Paper Award, IEEE ICOCN 2019, Student: Xin Mu  
The President Commendation (Best Innovation Team), CRI, Huawei, 2015  
The President Commendation (Outstanding Research Contribution Award), CRI, Huawei, 2014  
The President Commendation (Best Innovation Team), CRI, Huawei, 2014  
Overseas High-Caliber Personnel, Shenzhen, 2013

## **2.1.5 AFFILIATIONS AND ACTIVITIES**

Senior Member of Institute of Electrical and Electronics Engineers (IEEE)  
Senior and Life Member of The Optical Society (OPTICA)  
Life Member of Society of Photo-Optical Instrumentation Engineers (SPIE)  
Committee Member of IEEE Photonics Society (IPS) Guangdong Chapter  
Council Member of Shenzhen Society of Micro-Nano Technology  
Founding Advisor of the OPTICA, SPIE, IEEE Student Chapters at Tsinghua SIGS

## **2.2 Students**

### **2.2.1 Current Students**

### **2.2.2 Graduated Students**

### **2.2.3 Visiting Scholars**

Visit our latest publications on [Google Scholar](#)

### 3.1 Book Chapters

[B1] Chun-Liu Zhao, Xinyong Dong, H. Y. Fu, and H. Y. Tam, “Photonic crystal fiber loop mirrors and their applications,” in *Recent Progress in Optical Fiber Research*, ISBN: 978-953-307-823-6, InTech, (2012).

[B2] Qian Li, Xuanyi Liu, Renlai Zhou, M. S. Aruna Gandhi and H. Y. Fu, “Recent Advances and Perspects of Pulsed Fiber Lasers,” in *Optical Fiber Technology and Applications\_Recent Advances*, IOP Publishing, (2021).

[B3] Amjad Ali, Qian Li, H. Y. Fu and Syed Raza Mehdi, “Blue Laser Diode-Based Visible Light Communication and Solid-State Lighting,” in *Antenna Systems*, IntechOpen, (2021).

### 3.2 Invited Talks

[I1] H. Y. Fu and Lirong Cheng “New functionalities and design strategies of passive silicon photonic devices”, The 13th International Conference on Advanced Infocomm Technology (ICAIT), Yanji, China, Oct. 15th -18th, 2021.

[I2] H. Y. Fu, “Optical Wireless Communications for 6G High-speed Transmission”, The 19th International Conference on Optical Communications & Networks (ICOON), Qufu, China, Aug. 23th -27th, 2021.

[I3] H. Y. Fu, “Towards 6G Optical Wireless Communications”, The 4th International Conference on Communication Engineering and Technology (ICCET’2020), Shanghai, China, Feb. 2021.

[I4] H. Y. Fu and Zixian Wei “Optical Wireless Communication Technologies for 6G”, The 12th International Conference on Advanced Infocomm Technology (ICAIT), A003-3, Macau, Nov. 12th -15th, 2020.

[I5] H. Y. Fu, “Key Technologies for Optical Wireless Communications for 6G”, The Asia Communications and Photonics Conference (ACP’2020), M2F.4, Beijing, China, Nov. 2020.

[I6] H. Y. Fu, “Recent Advances on Optical Wireless Communication Technologies for 6G,” The 2020 Optoelectronics Global Conference (OGC), Shenzhen, China, Sep. 7th -11th, 2020.

- [I7] H. Y. Fu, Zixian Wei, Simei Mao, Xin Mu and Alberto Pepe “VCSEL-based Optical Wireless Communications”, The 11th International Conference on Advanced Infocomm Technology (ICAIT), Session on Optical Communications, Jinan, China, Oct. 18th -20th, 2019.
- [I8] H. Y. Fu, and Zixian Wei “Recent Progress on Optical Wireless Communications”, The 12th International Nano-Optoelectronics Workshop (iNOW), Guangzhou/Dongguan/Shenzhen, China, Jul. 21st -28th, 2019.
- [I9] H. Y. Fu, Qian Li and Renlai Zhou “Novel Devices Enabled 3D Sensing Technologies”, The 10th International Conference on Advanced Infocomm Technology (ICAIT), A003-3, Stockholm, Sweden, Aug. 12th -15th, 2018.
- [I10] H. Y. Fu, Qian Li and Renlai Zhou “Fiber Supercontinuum Source for 3D Sensing”, The 12th International Nano-Optoelectronics Workshop (iNOW), Th3, Berkeley, CA, USA, Jul. 21st -28th, 2018.
- [I11] H. Y. Fu, “Silicon Photonic Switches for Data Communications”, The 11th International Nano-Optoelectronics Workshop (iNOW), Tianjin/Qian’an/Chengde, Aug. 4th -12th, 2017.
- [I12] H. Y. Fu, “Silicon Photonic Switches and Their Applications for Data Center”, The 15th International Conference on Optical Communications & Networks (ICOON), Hangzhou, Sep. 24th -27th, 2016.
- [I13] H. Y. Fu, “Next Generation Optical Networking and Driving Beyond 100G, an Optical Internetworking forum (OIF) perspective”, WDM & Next Generation Optical Networking APAC, Singapore, Jan. 29th -31st, 2013.

### 3.3 Review Papers

- [R1] Xin Tu, Chaolong Song, Tianye Huang, Zhenmin Chen and H. Y. Fu, “State of the art and perspectives on silicon photonic switches,” *Micromachines*, Vol. 10, No. 1, p. 51, 2019.
- [R2] Xin Mu, Sailong Wu, Lirong Cheng, and H. Y. Fu\*, “Edge Couplers in Silicon Photonic Integrated Circuits: A Review,” *Applied Science*, Vol. 10, No. 4, pp. 1538, 2020.
- [R3] Sailong Wu, Xin Mu, Lirong Cheng, Simei Mao and H. Y. Fu\*, “State-of-the-Art and Perspectives on Silicon Waveguide Crossings: A Review,” *Micromachines*, Vol. 11, No. 3, pp. 326, 2020.
- [R4] Lirong Cheng, Simei Mao, Zhi Li, Yaqi Han and H. Y. Fu\*, “Grating Couplers on Silicon Photonics: Design Principles, Emerging Trends and Practical Issues,” *Micromachines*, Vol. 11, No. 7, p. 666, 2020.
- [R5] Maolin Dai, Zhenmin Chen, Yuanfang Zhao, Manthangal Sivanesan Aruna Gandhi, Qian Li and H. Y. Fu\*, “State-of-the-Art Optical Microfiber Coupler Sensors for Physical and Biochemical Sensing Applications,” *Biosensors*, Vol. 10, No. 11, p. 179, 2020.
- [R6] Simei Mao, Lirong Cheng, Caiyue Zhao, Faisal Nadeem Khan, Qian Li and H. Y. Fu\*, “Inverse Design for Silicon Photonics: From Iterative Optimization Algorithms to Deep Neural Networks,” *Applied Science*, No. 11, p.3822, 2021.
- [R7] Jiaye Wu, Ze Tao Xie, Yanhua Sha, H. Y. Fu, and Qian Li\*, “Epsilon-near-zero photonics: infinite potentials,” *Photonics Research*, Vol. 9, Issue 8, pp. 1616-1644, 2021.
- [R8] Wei, Zixian, Zhaoming Wang, Jianan Zhang, Qian Li, Junping Zhang, and H. Y. Fu, “Evolution of optical wireless communication for B5G/6G”, *Progress in Quantum Electronics*, vol. 83, pp. 100398, 2022.

### 3.4 Selected Journal Papers

- [J1] H. Y. Fu\* and Qian Li\*, “Light arrays measure up on a chip the size of a fingertip,” *Nature* 603(7900), pp. 232-233, 2022.
- [J2] Yang Luo, Zihan Wang, Jiyu Wang Xiao Xiao, Qian Li, Wenbo Ding\* and H. Y. Fu\*, “Triboelectric Bending Sensor based Smart Glove towards Intuitive Multi-Dimensional Human-Machine Interfaces,” *Nano Energy*, Vol. 89, p.106330, 2021. (Front Cover Paper)

- [J3] Y Luo, X Xiao, J Chen, Q Li, H Fu, “Machine-Learning-Assisted Recognition on Bioinspired Soft Sensor Arrays”, **ACS NANO**, Vol.16, No.4, pp.6734–6743, 2022.
- [J4] Wanqing Cai, Muhammad Umair Ali, Ping Liu, Miao He, Cong Zhao, Ziming Chen, Yue Zang, Man-Chung Tang, Hong Meng, Hongyan Fu\*, Guodan Wei\*, and Hin-Lap Yip\*, “Unravelling Alkali-Metal-Assisted Domain Distribution of Quasi-2D Perovskites for Cascade Energy Transfer towards Efficient Blue Light-Emitting Diodes,” **Advanced Science**, pp. 2200393, 2022.
- [J5] Zhaoming Wang, Zixian Wei, Yuting Cai, Lei Wang, Mutong Li, Siwei Zhang, Rong-Jun Xie, Lai Wang, Guodan Wei \* and H. Y. Fu\*, “Microencapsulation-Enabled Air-stable Perovskite-PMMA Films Combining a Micro-LED for High-speed Visible White Light Communication,” **ACS Applied Materials & Interfaces**, Vol.13, pp. 54143-54151, 2021.
- [J6] Zixian Wei, Lei Wang, Zhongxu Liu, Chao Zhang, Chien-Ju Chen, Meng-Chyi Wu, Yanfu Yang, Changyuan Yu, Lai Wang, and H. Y. Fu, “Multigigabit Visible Light Communication Based on High-Bandwidth InGaN Quantum Dot Green Micro-LED”, **ACS Photonics**.
- [J7] Ping Liu, Wanqing Cai, Cong Zhao, Siwei Zhang, Pengbo Nie, Wenzhan Xu, Hong Meng, Hongyan Fu, and Guodan Wei, “Quasi-2d CsPbBr<sub>3</sub> Composite Thin Films for Efficient and Stable Red Perovskite Light-Emitting Diodes.” **Advanced Optical Materials**, vol. 9, no. 24, p. 2101419, 2021.
- [J8] Jiaye Wu, Ze Tao Xie, Yanhua Sha, H. Y. Fu, and Qian Li\*, “Epsilon-near-zero photonics: infinite potentials,” **Photonics Research**, Vol. 9, No.8, pp. 1616-1644, 2021.
- [J9] Lei Wang, Zixian Wei, Chien-Ju Chen, Lai Wang\*, H. Y. Fu\*, Li Zhang, Kai-Chia Chen, Meng-Chyi Wu\*, Yuhan Dong, Zhibiao Hao, and Yi Luo, “1.3GHz E-O bandwidth GaN-based micro-LED for multi-gigabit visible light communication,” **Photonics Research**, Vol. 9, No. 5, pp.792-802, 2021. (Editor’s Pick, One of the two papers awarded in 2021)
- [J10] Zixian Wei, Mutong Li, Zhongxu Liu, Zhaoming Wang, Chao Zhang, Yanfu Yang, Changyuan Yu and H. Y. Fu\*, “Parallel Mini/Micro-LEDs Transmitter: Size-dependent Effect and Gbps Multi-user Visible Light Communication,” **IEEE Journal of Lightwave Technology**, 40(8), pp.2329-2340, 2022.
- [J11] Zhenmin Chen, Xin Tu, Maolin Dai, Qian Li, and H. Y. Fu\*, “Frequency Comb Generation in Microsphere Resonators with Normal Dispersion,” **IEEE Journal of Lightwave Technology**, Vol.40, No.4, pp.1092-1097, 2022.
- [J12] Xuanyi Liu, Qian Li\*, Denghui Pan, Feng Ye, Boris A. Malomed and H. Y. Fu\*\*, “A robust and novel linear fiber laser mode-locked by nonlinear polarization evolution in all-polarization-maintaining fibers,” **IEEE Journal of Lightwave Technology**, Vol. 39, No. 23, pp. 7509 - 7516, 2021.
- [J13] Lirong Cheng, Simei Mao, Xin Tu and H. Y. Fu\*, “Dual-wavelength-band grating coupler on 220-nm silicon-on-insulator with high numerical aperture fiber placed perfectly-vertically,” **IEEE Journal of Lightwave Technology**, Vol. 39, No. 8, pp. 5902-5909, 2021.
- [J14] Xin Tu, Wansheng Xie, Zhenmin Chen, Ming-Feng Ge, Tianye Huang, Chaolong Song and H. Y. Fu\*, “Analysis of Deep Neural Network Models for Inverse Design of Silicon Photonic Grating Coupler,” **IEEE Journal of Lightwave Technology**, Vol. 39, No. 9, pp. 2790-2799, 2021.
- [J15] Zihan Zang, Zhi Li, Yi Luo, Yanjun Han, Hongtao Li, Xuanyi Liu, and H. Y. Fu, “Ultrafast Parallel Single-Pixel Lidar with All-Optical Spectro-Temporal Encoding.” **APL Photonics**, vol. 7, no. 4, p. 046102, 2022.
- [J16] Cong Zhao, Ping Liu, Wanqing Cai, Wenzhan Xu, Muhammad Umair Ali, Zhuhua Xu, H. Y. Fu, Hong Meng, Jingzhou Li, and Guodan Wei, “Polymer-Assisted Phase Stable  $\Gamma$ -CsPbI<sub>3</sub> Perovskite Film for Self-Powered and Ultrafast Photodiodes.” **Advanced Materials Interfaces**, vol. 9, no. 9, p. 2102212, 2022.
- [J17] MSA Gandhi, Y Zhao, C Huang, Y Zhang, HY Fu, Q Li, ”Highly sensitive refractive index sensor based on plastic optical fiber balloon structure”, **Optics Letters** 47 (7), 1697-1700, 2022.
- [J18] Zhaoming Wang, Li Zhang, Jingzhou Li, Guodan Wei, Yuhan Dong, and H. Y. Fu, “Fluorescent concentrator based MISO-NOMA for visible light communications,” **Opt. Lett.** 47, 902-905, 2022.

- [J19] Zhi Li, Bonan Liu, Changrui Liao, and H. Y. Fu\*, “Solid-state FMCW LiDAR with In-fiber Beam Scanner,” **Optics Letters**, Vol.47, No.3, pp.469-472,2022.
- [J20] Zhaoming Wang, Li Zhang, Jingzhou Li, Guodan Wei, Yuhan Dong\* and H. Y. Fu\*, “Fluorescent Concentrator based MISO-NOMA for Visible Light Communications,” **Optics Letters**, Vol.47, No.4, pp.902-905, 2022.
- [J21] Yuanfang Zhao, M. S. Aruna Gandhi, Zhengyong Liu, Qian Li, and H. Y. Fu\*, “Vernier effect assisted sucrose sensor based on cascaded Sagnac interferometer with no-core fiber,” **Biomedical Optics Express**, Vol.12, No. 12, pp.7338-7347, 2021.
- [J22] Lirong Cheng, Simei Mao, Zhenmin Chen, Yinghui Wang, Caiyue Zhao, and H. Y. Fu\*, “Ultra-compact dual-mode mode-size converter for silicon photonic few-mode fiber interface,” **Optics Express**, Vol.29, Vol.8, pp.28066-28077, 2021.
- [J23] Zixian Wei, Zhongxu Liu, Xin Liu, Lei Wang, Lai Wang\*, Changyuan Yu, and H. Y. Fu\*, “8.75 Gbps visible light communication link using artificial neural network equalizer and single-pixel blue micro-LED,” **Optics Letters**, Vol.46, No.18, pp.4670-4673, 2021.
- [J24] Simei Mao, Lirong Cheng, Caiyue Zhao and H. Y. Fu\*, “Ultra-broadband and ultra-compact polarization beam splitter based on tapered subwavelength-grating waveguide and slot waveguide,” **Optics Express**, Vol.29, Vol.8, pp.28066-28077, 2021.
- [J25] Jiaye Wu, Xuanyi Liu, Haishi Fu, Yingkai Zheng, Kuan-Chang Chang, Shengdong Zhang, H. Y. Fu and Qian Li\*, “Manipulation and enhancement of optical properties in epsilon-near-zero nanolayer by supercritical fluid,” **Scientific Reports**, Vol.11, No.1, pp.1-8, 2021.
- [J26] Lirong Cheng, Simei Mao, Caiyue Zhao, Xin Tu, Qian Li and H. Y. Fu\*, “Highly-efficient dual-wavelength-band-multiplexing three-port grating coupler on 220-nm silicon-on-insulator with 248-nm deep-UV lithography,” **Optics Letters**, Vol. 46, No.13, pp. 3308-3311, 2021.
- [J27] Zhi Li, Zihan Zang, Zixian Wei, Yaqi Han, Lican Wu, Mutong Li, Zhenquan Zhao and H. Y. Fu\*, “Multi-user accessible indoor optical wireless communication systems employing VIPA-based 2D optical beam-steering technique,” **Optics Express**, Vol. 29, No. 13, pp. 20175-20189, 2021.
- [J28] Xin Liu, Zixian Wei, Mutong Li, Lei Wang, Zhongxu Liu, Changyuan Yu, Lai Wang\*, Yi Luo, and H. Y. Fu\*, “16.6 Gbps SDM-CWDM visible light communication using neural network-based receiver and triple color micro-LEDs,” **Optics Letters**, Vol. 46, No.12, pp. 2888-2891,2021.
- [J29] Zhi Li, Zihan Zang, Yaqi Han, Lican Wu and H. Y. Fu\*, “Solid-state FMCW LiDAR with two-dimensional spectral scanning using a virtually imaged phased array,” **Optics Express**, Vol. 29, No. 11, pp. 16547-16562, 2021.
- [J30] Simei Mao, Lirong Cheng, Caiyue Zhao, Faisal Nadeem Khan, Qian Li and H. Y. Fu\*, “Inverse Design for Silicon Photonics: From Iterative Optimization Algorithms to Deep Neural Networks,” **Applied Science**, No. 11, p.3822, 2021.
- [J31] Zixian Wei, Shi Zhang, Simei Mao, Lei Wang, Li Zhang, Chien-ju Chen, Meng-Chyi Wu, Yuhan Dong, Lai Wang\*, Yi Luo and H. Y. Fu\*, “Full-duplex high-speed indoor optical wireless communication system based on a micro-LED and VCSEL array,” **Optics Express**, Vol. 29, No. 3, pp. 3891-3903, 2021.
- [J32] Yuanfang Zhao, Maolin Dai, Zhenmin Chen, Xuanyi Liu, M. S. Aruna Gandhi, Qian Li and H. Y. Fu\*, “Ultra-sensitive temperature fiber sensor with Vernier effect improved Michelson interferometer,” **Optics Express**, Vol. 29, No. 2, pp. 1090-1101, 2021.
- [J33] Zhenmin Chen, Qian Li, and H. Y. Fu\*, “Stimulated Brillouin scattering by dual lasers pumping in WGM microcavities,” **IEEE Photonics Journal**, Vol. 12, No. 6, p. 6101108, 2020.
- [J34] Sailong Wu, Simei Mao, Lidan Zhou, Lin Liu, Yujie Chen\*, Xin Mu, Lirong Cheng, Zhenmin Chen, Xin Tu, and H. Y. Fu\*, “A compact and polarization-insensitive silicon waveguide crossing based on subwavelength grating MMI couplers,” **Optics Express**, Vol. 28, No. 19, pp. 27268-27276, 2020.
- [J35] Zixian Wei, Li Zhang, Lei Wang, Chien-Ju Chen, Zhaoming Wang, Kai-Chia Chen, Meng-Chyi Wu, Yuhan Dong, Lai Wang, Yi Luo and H. Y. Fu\*, “Multi-user high-speed QAM-OFDMA visible light communication system

using a 75- $\mu\text{m}$  single layer quantum dot micro-LED,” **Optics Express**, Vol. 28, No.12, pp. 18332-18342, 2020.

[J36] Zixian Wei, Li Zhang, Lei Wang, Chien-Ju Chen, Alberto Pepe, Xin Liu, Kai-Chia Chen, Meng-Chyi Wu, Yuhan Dong, Lai Wang\*, Yi Luo and H. Y. Fu\*, “2Gbps/3m air-underwater optical wireless communication based on a single-layer quantum dot blue micro-LED,” **Optics Letters**, Vol. 45, No. 9, pp. 2616-2619, 2020.

[J37] Renlai Zhou, Xuanyi Liu, Dan Yu, Qian Li\* and H. Y. Fu\*\*, “Versatile multi-soliton patterns of noise-like pulses in a passively mode-locked fiber laser,” **Optics Express**, Vol. 28, No. 2, pp. 912-923, 2020.

[J38] Zhenmin Chen, Zhihe Guo, Xin Mu, Qian Li, Xiang Wu, and H. Y. Fu\*, “Packaged microbubble resonator optofluidic flow rate sensor based on Bernoulli Effect,” **Optics Express**, Vol. 27, No. 25, pp. 36932-36940, 2019.

[J39] Renlai Zhou, Dan Yu, Xuanyi Liu, Qian Li\* and H. Y. Fu\*\*, “Dark rectangular noise-like pulses in a figure-nine fiber laser based on a nonlinear amplifying loop mirror,” **Optics Letters**, Vol. 44, No. 15, pp. 3717-3720, 2019.

[J40] Renlai Zhou, Rongle Huang, Qian Li\* and H. Y. Fu\*\*, “Raman soliton at 2  $\mu\text{m}$  in picosecond pumped supercontinuum by a weak CW trigger,” **Optics Express**, Vol. 27, No. 9, pp. 12976-12986, 2019.

[J42] H. Y. Fu, Sunil K. Khijwania, H. Y. Tam, P. K. A. Wai and C. Lu, “Polarization-maintaining Photonic Crystal Fiber based All-optical Polarimetric Torsion Sensor,” **Applied Optics**, Vol. 49, No. 31, pp. 5954-5958, 2010.

[J43] H. Y. Fu, Chuang Wu, M. L. V. Tse, Lin Zhang, Kei-Chun Davis Cheng, H. Y. Tam, Bai-Ou Guan, and C. Lu, “High pressure sensor based on photonic crystal fiber for downhole application,” **Applied Optics**, Vol. 49, No. 14, pp. 2639-2643, 2010.

[J44] H. Y. Fu, A. C. L. Wong, P. A. Childs, H. Y. Tam, Y. B. Liao, C. Lu and P. K. A. Wai, “Multiplexing of Polarization-maintaining Photonic Crystal Fiber based Sagnac Interferometric Sensors,” **Optics Express**, Vol. 17, No.21, pp. 18501-18512, 2009.

[J45] H. Y. Fu, H. L. Liu, W. H. Chung, and H. Y. Tam, “A Novel Fiber Bragg Grating Sensor Configuration for Long-distance Quasi-Distributed Measurement,” **IEEE Sensors Journal**, Vol. 8, No. 9, pp. 1598-1602, 2008.

[J46] H. Y. Fu, H. Y. Tam, L. Y. Shao, X. Y. Dong, P. K. A. Wai, C. Lu, and Sunil K. Khijwania, “Pressure Sensor Realized with Polarization-maintaining Photonic Crystal Fiber based Sagnac Interferometer,” **Applied Optics**, Vol. 47, No. 15, pp. 2835-2839, 2008. (Google scholar Citations: >300 Top 20 Most Cited articles on Applied Optics over the last 5 year at 50 Year Anniversary in 2012)

[J47] H. Y. Fu, H. L. Liu, X. Y. Dong, H. Y. Tam, P. K. A. Wai, and C. Lu, “High-speed Fibre Bragg Grating Sensor Interrogation Using Dispersion Compensation Fibre,” **Electronics Letters**, Vol. 44, No. 10, pp. 618-619, 2008.

### 3.5 Selected Recent Conference Papers

[C1] Zhi Li, Bonan Liu, Zihan Zang, Yaqi Han, Lican Wu, Changrui Liao and H. Y. Fu\*, “Compact Solid-state Coherent LiDAR based on In-fiber Beam Scanner,” in Proc. of the Asia Communications and Photonics Conference (ACP’2021), T4D.2, Shanghai, China, Oct. 2021. (Post-deadline Paper)

[C2] Zihan Zang, Yunpeng Xu, Haoqiang Wang, Zhi Li, Yanjun Han, Hongtao Li, H. Y. Fu and Yi Luo\*, “Ultrafast agile optical beam steering based on arrayed diffractive elements,” in Proc. of the Asia Communications and Photonics Conference (ACP’2021), T4D.6, Shanghai, China, Oct. 2021. (Post-deadline Paper)

[C3] Denghui Pan, Xuanyi Liu, Boris Malomed, H. Y. Fu\* and Qian Li\*\* “Build-up Dynamics of Dissipative Solitons in a Nonlinear Polarization Evolution Mode-locked Fiber Laser,” in Proc. of the Asia Communications and Photonics Conference (ACP’2021), T4A.3, Shanghai, China, Oct. 2021. (Best Poster Award)

[C4] Lirong Cheng, Simei Mao and H. Y. Fu\*, “Silicon-on-insulator grating couplers for dual-band and triple-band multiplexing,” in Proc. of the Asia Communications and Photonics Conference (ACP’2021), T1I.3, Shanghai, China, Oct. 2021. (Best Student Paper Award)

- [C5] Renlai Zhou\*, Qian Li\*\* and H. Y. Fu, “Commensalism of quasi-coherent noise-like and conventional soliton pulse in a simplified NPE mode-locked fiber laser”, in Proc. Of the 20th International Conference on Optical Communications & Networks (ICOON), Tai’an, China, Aug. 23rd-27th, 2021. (Young Scientist Award)
- [C6] Zhaoming Wang, Li Zhang, Jingzhou Li, Zixian Wei, Yuhan Dong, Guodan Wei, H. Y. Fu\*, “Wide Field-of-View Color-Converting Concentrator for High-Speed MIMO UV-to-Visible Light Communication,” in Proc. of the 26th Optoelectronics and Communications Conference (OECC), Virtual Conference, Jul. 2021. (Best Student Paper Award)
- [C7] Xuanyi Liu, Zhi Li, Denghui Pan, Qian Li, H. Y. Fu\*, “All-polarization-maintaining Bidirectional Dual-comb Fiber Laser by Nonlinear Polarization Evolution,” in Proc. of the 26th Optoelectronics and Communications Conference (OECC), Virtual Conference, Jul. 2021. (Best Student Paper Award)
- [C8] Zhi Li, Zihan Zang, Xuanyi Liu, Mutong Li and H. Y. Fu\*, “LiDAR integrated high-capacity indoor OWC system with user localization capability,” in Proc. of Optical Fiber Communication Conference (OFC), Tu5E.2, Virtual Conference, June 6th-11th, 2021.
- [C9] Zhi Li, Zihan Zang, Xuanyi Liu, Lican Wu and H. Y. Fu\*, “Solid-state FMCW LiDAR based on a 2D disperser,” in Proc. of The Conference on Lasers and Electro-Optics (CLEO’2021), AW3S.7, Virtual Conference, May 9th-14th, 2021.
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## 4.2 Photographs

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12. ACP2020 Contragulations to OWC group winning best student paper and best poster award in ACP2020, 2020/10

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2. · Research Group Meeting with Alain Aspect, Laureate of Nobel Prize in Physics 2022 2018/12
1. TBSI Retreat conference 2018 VCSEL Kenichi Iga FinFET Communication with Prof. Kenichi Iga and Prof. Zhengming Hu, 2018/03

## CHAPTER 5

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### Resources

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Contact us via e-mail: [admin@hyfu.group](mailto:admin@hyfu.group)

Scan to subscribe our OSA student chapter Wechat account:

See off the 2021 graduates of the research group, 2021/07

Team building with the research group of Prof. Qian Li of Peking University, in Dapeng Peninsula, 2020/11