Zheng Sun

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Personal Description

I'm a professor in physics and my interest field can be best summarized as exploration of light-matter interaction at the nanoscale. The main research focus areas are development of: photonic structures that confine light and artificially engineered optical materials such as metamaterials, optical microcavities and hybrid excitonic materials display optical properties that surpass naturally occurring materials. These focus areas are motivated by the quest to develop next generation computing technologies including those that exploit the quantum property of light, ultrasensitive sensors for chemical and biological detection, and high efficiency energy transfer systems.

Education

Ph.D. Physics, The Graduate Center, City University of New York, 2017. **Advisor: Prof. Vinod Menon**

M.A. Physics, Fudan University, 2012. **Advisor: Prof. Zhenghai Chen & Xuechu Shen**

B.S. Applied Physics, Zhejiang Normal University, 2008. **Advisor: Prof. Sheng Li**

Employment

Professor, East China Normal University 2020/12/01–Now.

Postdoc Fellow, University of Pittsburgh 2017/11/01–2020/11/01.

Research Interest

Excitons in two-dimensional Semiconductors of transition metal dichalchogenides (TMDs)

Cavity quantum electrodynamics using inorganic and hybrid microcavities

Engineered nonlinear optical materials based on hybrid nanocomposites

Optical electro control of the polaritons and related applications

Quantum optics using metamaterials

Transportation of polaritons in GaAs quantum wells based microcavity

Selected Rewards and Honors

2023	IOP Trusted Reviewer Status, IOP Publishing
2021	Bringing In Overseas Young Talents, China
2021	Pujiang Talent Program, Shanghai, China
2020	Bringing In Overseas Talents, Shanghai, China
2020	RECOGNIZES for peer review, OSA Publishing
2016	Nanophotonics Technical Group Outstanding Student Poster Award at CLEO, USA
2012	CUNY Science Scholarship, USA
2011	Graduation with Highest Honor, Shanghai, China
2008	Graduation with Highest Honor, Zhejiang Normal University, Zhejiang, China

Publications

Journal Articles (**Corresponding author, # Co-first author)*

Citation: **More than 1800 times** according to **My Google Scholar**

1. Yongsheng Hu, Danqun Mao, Linqi Chen, Yuanjun Guan, Long Zhang, Hongxing, Dong*, Hongxing Xu, Wei Xie*, **Zheng Sun***, "Cavity-enhanced superfluorescence induced stimulated energy transfer in perovskite quantum dot supperlattice", ***Laser & Photonics Rev.***, 2400650 (2024)

2. Yuening Fan[#], Qiaochu Wan[#], Qi Yao, Xingzhou Chen, Yuanjun Guan, Hassan Alnatah, Daniel Vaz, Jonathan Beaumariadge, Kenji Watanabe, Takashi Taniguchi, Jian Wu*, **Zheng Sun**[*] and David Snoke*, "High efficiency of exciton-polariton lasing in a 2D multi-layer structure" ***ACS Photonics***, 11 (7), 2722-2728 (2024)

3. Danqun Mao, Linqi Chen, **Zheng Sun**[*], Min Zhang, Zhe-yu Shi, Yongsheng, Hu, Long Zhang, Jian Wu, Hongxing Dong[*], Wei Xie[*], Hongxing Xu, "Observation of transition from superfluorescence to polariton condensation in perovskite quantum dots", ***Light Sci. & Appl.***, 13 (1), 34 (2024)

4. Xingzhou Chen[#], Hassan Alnatah[#], Danqun Mao, Mengyao Xu, Qiaochu Wan, Jonathan Beaumariage, Wei Xie, Hongxing Xu, Zhe-Yu Shi, David Snoke[*], **Zheng Sun**[*], Jian Wu[*], "Bose condensation of upper-branch exciton-polaritons in a transferrable microcavity" , ***Nano Lett.***, 20 (23), 9538-9546 (2023)

5. Min Zhang[#], Yuan Tian[#], Xingzhou Chen, **Zheng Sun***, Xiaolong Zhu*, Jian Wu*, "Ultra-large Rabi splitting in the plasmon-exciton polaritons at room temperature", ***Nanophotonics***, 12 (16), 3267-3275 (2023)

6. Xingzhou Chen, **Zheng Sun***, Ming Zhang, Ming Li, Zhigao Hu, Kenji Watanabe, Takashi Taniguchi, David Snoke, Zhe-Yu Shi, Jian Wu, "Broadband enhancement of absorption by two-dimensional atomic crystals modeled as non-Hermitian photonics scattering", ***Appl. Phys. Lett.,*** 122, 0411105 (2023)

7. D. W. Snoke, V. Hartwell, J. Beaumariage, S. Mukherjee, Y. Yoon, D. M. Myers, M. Steger, **Z. Sun**, K. A. Nelson, L. N. Pfeiffe, "Experimental determinations of polariton-polariton interactions in microcavities", ***Phys. Rev. B,*** 107, 165302 (2023)

8. Jingyan Feng, Hui Li, **Z. Sun**, Tim Byrnes, "Entanglement generation and detection in split exciton-polariton condensates", ***Phys. Rev. A***, 108 053301 (2023)

9. Fei Chen, Hui Li, Hang Zhou, Song Luo, **Zheng Sun**, Ziyu Ye, Fenghao Sun, Jiawei Wang, Yuanlin Zheng, Xianfeng Chen, Hongxing Xu, Hongxing Xu, Tim Byrnes, Zhanghai Chen, Jian Wu, "Optically Controlled Femtosecond Polariton Switch at Room Temperature", ***Phys. Rev. Lett.,*** 129, 057402 (2022)

10. Fei Chen, Hang Zhou, Hui Li, Song Luo, **Zheng Sun**, Zhe Zhang, Fenghao Sun, Beier Zhou, Hongxing Dong, Huailiang Xu, Hongxing Xu, Alexey Kavokin, Zhanghai Chen, Jian Wu, "Femtosecond dynamics of a polariton bosonic cascade at room temperature", ***Nano Lett.,*** 22 (5), 2023-2029 (2022)

11. Fei Chen, Hang Zhou, Ziyu Ye, Song Luo, **Zheng Sun**, Yuanlin Zheng, Xianfeng Chen, Huailiang Xu, Hongxing Xu, Tim Byrnes, Hui Li, Zhanghai Chen, Jian Wu, "Buildup dynamics of room-temperature polariton condensation", ***Phys. Rev. B***, 106 (2), L020301 (2022)

12. Ziyu Ye, Fei Chen, Hang Zhou, Song Luo, Fenghao Sun, **Zheng Sun**, Yuanlin Zheng, Xianfeng Chen, Huailiang Xu, Zhanghai, Chen, Hui Li, Jian Wu, "Exciton-Polarization-dependent dynamics of polariton condensates at room temperature" ***Journal of Physics: Condensed Matter***, 34 (22) (2022)

13. **Z. Sun**$^{*\#}$, Ke Xu$^{\#}$, Chang Liu$^{\#}$, Jonathan Beaumariage, Jierui Liang, Susan K Fullerton-Shirey, Zhe-Yu Shi, Jian Wu, David Snoke, "Photoluminescence switching in a two-dimensional atomic crystal", ***ACS Nano*** 15 (12), 19439-19445 (2021)

14. **Z. Sun***, J. Beaumariage, Q.Wan, H. Alnatah, N. Hougland, J. Chisholm, Q. Cao, K. Watanabe, T. Taniguchi, B. Hunt, I. V. Bondarev*, D. W. Snoke*, "Charged bosons made of fermions in a solid state system without Cooper pairing," ***Nano Lett.***, 21 (18), 7669-7675 (2021)

15. Xu Wang, Lishu Wu, Xuewen Zhang, Weihuang Yang, Zheng Sun, Jingzhi Shang, Wei Huang and Ting Yu, "Observation of Bragg Polariton in Monolayer Tungsten Disulphide", ***Nano Research*** 15, 1479-1485 (2021)

16. S Mukherjee, V. K. Kozin, A. V. Nalitov, I. A. Shelykh, **Z. Sun**, DM Myers, B Ozden, J Beaumariage, M Steger, LN Pfeiffer, K West, DW Snoke, "Dynamics of spin polarization in tilted polariton rings," ***Phys. Rev. B* 103 (16), 165306** (2021)

17. Fei Chen, Hui Li, Hang Zhou, Ziyu Ye, Song Luo, **Zheng Sun**, Fenghao Sun, Jiawei Wang, Huailiang Xu, Hongxing Xu, Zhanghai Chen, Jian Wu, "Ultrafast Dynamics of Exciton- Polariton in Optically Tailored Potential Landscapes at Room Temperature" ***Journal of Physics: Condensed Matter***, 34, 024001 (2021)

18. **Zheng Sun***, Jonathan Beaumariage, Qingrui Cao, Benjamin Hunt, Kenji Watanabe, Takashi Taniguchi, David W. Snoke*, "Observation of the Interlayer Exciton Gases in WSe_2- p: WSe_2 Heterostructures," ***ACS Photonics***, 7 (7), 1622-1627 (2020)

19. **Zheng Sun**$^{*\#}$, Jonathan Beaumariage$^{\#}$, Ke Xu, Jierui Liang, Shaocong Hou, Stephen R. Forrest, Susan K Fullerton-Shirey, David W. Snoke, "Electric-field-induced optical hysteresis in single-layer WSe_2," ***Appl.Phys.Lett.***, 115, 161103 (2019)

20. S Mukherjee, DM Myers, RG Lena, B Ozden, J Beaumariage, **Z. Sun**, M Steger, LN Pfeiffer, K West, AJ Daley, DW Snoke, "Natural Oscillations of a Polariton Condensate in a Ring," ***Phys. Rev. B***, 100 (24), 245304 (2019) (**Kaleidoscope**)

21. **Zheng Sun***, David W Snoke, "Optical switching with organics," ***Nat. Photonics***, 13, 370-371, (2019)

22. **Zheng Sun***, Jonathan Beaumariage, Hema C P Movva, Sayema Chowdhury, Anupam Roy, Sanjay K Banerjee, David W Snoke, "Stress-induced bandgap renormalization in atomic crystals," ***Solid State Communications***, 288, 18-21, (2019)

23. Biswanath Chakraborty, Jie Gu, **Zheng Sun**, Mandeep Khatoniar, Rezlind Bushati, Alexandra L Boehmke, Rian Koots, Vinod M Menon, "Control of Strong Light-matter Interaction in Monolayer WS_2 Through Electric Field Gating," ***Nano Lett.***, 18 (10), 6455-6460, (2018)

24. **Zheng Sun**, Jie Gu, Areg Ghazryan, Zav Shotan, Christopher R. Considine, Michael Dollar, Biswanath Chakraborty, Xiaoze Liu, Pouyan Ghaemi, S. Kéna-Cohen, Vinod M. Menon, "Optical Control of Room Temperature Valley Polaritons," ***Nat. Photonics***, 11, 491-496 (2017)

25. T Galfsky$^{\#}$, **Zheng Sun**$^{*\#}$, CR Considinel, CT Chou, WC Ko, YH Lee, E Narimanov, "Broadband enhancement of light-matter interaction in 2D semiconductors by photonic hypercrystals," ***Nano Lett.*** 16 (8), 4940-4945 (2016)

26. T. Galfsky, **Z. Sun**, Z. Jacob, V. M. Menon, "Preferential emission into epsilon-near-zero metamaterial ,"**[Invited]**, ***Opt. Mater. Express***, 5(12), 2878-2883 (2015)

27. X. Liu, T. Galfsky, **Z. Sun**, F. Xia, E. Lin, Y.-H. Lee, S. Kéna-Cohen, and V. M. Menon,"Strong light–matter coupling in two-dimensional atomic crystals," ***Nat. Photonics*** 9, 30–34 (2014)

28. **Zheng Sun**, LinHong Yang, XueChu Shen, ZhangHai Chen, "Anisotropic Raman spectroscopy of a single β-Ga_2O_3 nanobelt," ***Science Bulletin***, 57(6) (2012) **(Cover Story)**

29. Qijun Ren, Jian Lu, H H Tan, Shan Wu, Liaoxin Sun, Weihang Zhou, Wei Xie, **Zheng Sun**, Yongyuan Zhu, C Jagadish, S C Shen, Zhanghai Chen, "Spin-Resolved Purcell Effect in a Quantum Dot Microcavity System,"***Nano Lett.***, 12 (7), 3455-3459 (2012)

30. Lin-Hong Yang, Hong-Xing Dong, **Zheng Sun**, Liao-Xin Sun, Xue-Chu Shen, Zhang-Hai Chen, "Temperature-Induced Phase Transition of In_2O_3 from a Rhombohedral Structure to a Body-Centered Cubic Structure." ***Chinese Physics Letters***, 28(8) (2011)

31. **Zheng Sun**, Yuan-Ping Xu, Sheng Li, Thomas F George, "Forbidden Singlet Exciton Transitions Induced by Localization in Polymer Light-Emitting Diodes in a Strong Electric Field," ***Journal of Physical Chemistry B***, 115(5) 869-73 (2011)

Conference Proceedings

Invited Talk

1. The 15th International Conference on Information Optics and Photonics **(CIOP)**, **Xi'an, China**, Aug 11-15, 2024

2. The conference on Optical Properties of Condensaed Matter **(CIOP 2024)**, **Henan, China**, Aug 5-9, 2024

3. Chinese Materials Conference 2024 & The 2nd World Materials Conference **(CMC 2024)**, **Guangzhou, China**, Jul 8-12, 2024

4. 3rd National Conference on Electronic Information Materials and Devices, **Hangzhou, China**, Apr 12-15, 2024

5. Excitonics and Polaritonics International Conference (EPIC2023), **Singapore**, Nov 27 - Dec 1, 2023

6. 2023 Nano + International Summit, **Suzhou, China**, Nov 23-25, 2023 **(Invited Talk)**

7. Chinese Materials Conference 2023 & The 2nd World Materials Conference **(CMC 2023)**, **Shenzhen, China**, Jul 8-12, 2024

8. The 3rd International Symposium on Advanced Laser Spectroscopy & Applications, **Chongqing, China**, Feb 24-27, 2023

Contributed Talk

1. The Finite Temperature and Non-Equilibrium Superfluid Systems workshop **FINESS2024**, **Queensland, Australia**, Sep 1-5, 2024

2. American Physical Society **(APS)**, **Minneapolis, MN, USA**, Mar 4-8, 2024

3. American Physical Society **(APS)**, **Chicago IL, USA**, Mar 14-18, 2022

4. American Physical Society **(APS)** March Meeting, **Denver, CO, USA**, Mar 2- 6, 2020

5. Conference on Lasers and Electro-Optics and Quantum Electronics and Laser Science **(CLEO/QELS)**, **San Jose, CA, USA**, May 14-19, 2017

6. Emerging Researchers National **(ERN)** in STEM, **Washington DC, USA**, Mar 2-4, 2017

7. American Physical Society **(APS)** March Meeting, **New Orleans, LA, USA**, Mar 13-17, 2017

8. Material Research Science and Engineering Centers **(MRSEC)**, **New York, NY, USA**, Nov 17, 2016

9. Conference on Lasers and Electro-Optics and Quantum Electronics and Laser Science **(CLEO/QELS)**, **San Jose, CA, USA**, Jun 6-9, 2016

10. Conference on Lasers and Electro-Optics and Quantum Electronics and Laser Science **(CLEO/QELS)**, **San Jose, CA, USA**, Jun 10-14, 2015

Professional Services

Served as Reviewer for the following journals and peer review metrics refer to **Web of Science**:

• Nature • Nature Nanotechnology • Nature Photonics • Nature Communications • Physical Review Letters • Physical Review X • ACS Nano • Nano Letters • Optica • Light Science &Applications • Physical Review B • Physical Review Materials • Physical Review Applied • Optica • 2D Materials • Scientific Report • Optics Letters• Optical Express • Nanotechnology • Journal of Physics: Condensed Matter • Journal of Physics D: Applied Physics• Physica Scripta• Solid State Communications • Semiconductor Science and Technology • Materials Research Express • Applied Physics Express • Nanotechnology

Media Coverage

•"Photonic hypercrystals drastically enhance light emission in 2D materials", **Phys. org**, Aug 2016

•"Study unveils new half-light half-matter quantum particles", **National Science Foundation**, **Phys. org**, **Nanotechnology Now**, **Science Daily**, and more, Dec 2014.