Shao-Yu Chen 陳劭宇

Project Assistant Research Fellow in Center of Atomic Initiative for New Materials (AI-MAT)
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Personal Info

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Expertise

- Transition Metal Dichalcogenides
- 2D Materials Devices
- Rydberg Excitons
- Raman Spectroscopy
- Excitonic Many-body Interactions
- Magneto-optical Spectroscopy
- Ultrafast Spectroscopy
- THz Spectroscopy

Education

2013 – 2018 **PhD in Physics**
Department of Physics
University of Massachusetts Amherst, United States
Dissertation Title: "Probing Quantized Excitations and Many-body Correlations in Transition Metal Dichalcogenides with optical Spectroscopy."
Supervisor: Prof. Jun Yan

2007 – 2009 **Master of Science**
Graduate Institute of Photonics and Optoelectronics
National Taiwan University, Taiwan
Thesis Title: "Degradation Mechanisms of InGaN-based high power LEDs."
Supervisor: Prof. Yun-Li Li

2003 – 2007 **Bachelor of Science in Engineering**
Department of Electrical Engineering
National Taiwan University, Taiwan

Professional Appointments

2021 – present **Project Assistant Research Fellow**
Center of Atomic Initiative for New Materials
National Taiwan University, Taiwan

2019 – 2021 **Postdoctoral Research Fellow**
ARC CoE in Future Low-Energy Electronics Technologies
School of Physics and Astronomy
Monash University, Australia
Supervisor: Prof. Michael S Fuhrer
- Investigating Bose-Einstein condensation of the exciton in monolayer TMDs.
- Studying the dynamics of the indirect excitons in TMDs-based 2D heterostructures.

2018 – 2019 **Postdoctoral Researcher**
Institute of Atomic and Molecular Sciences
Academia Sinica, Taiwan
Supervisor: Dr. Wei-Hua Wang
- Developed optical spectroscopic techniques to probe the signatures of high-quality atomic layered InSe.
- Studied the electron-phonon interactions in ultrathin InSe.

2010 – 2013 **Research Assistant**
Institute of Atomic and Molecular Sciences
Academia Sinica, Taiwan
Supervisor: Dr. Wei-Hua Wang
- Studied transport and optoelectronic properties of graphene and graphene/molecule composite devices.

Honours and Awards

1. Kandula Sastry Dissertation Award (2020)
2. Best Poster Award, FLEET Annual Workshop (2019)
3. IAMS Publication Award for Junior Researchers (1st place), IAMS, Academia Sinica (2012)
4. Studying Abroad Scholarship, Minister of Education, Taiwan (2012)

Supervision, Mentoring, and Teaching Experience

Supervision of Graduate Students

- One PhD student at School of Physics and Astronomy, Monash University (2019 − present)
- One Honour student at School of Physics and Astronomy, Monash University (2019 – 2020)

Supervision of Undergraduate Students

- Three First-year Summer Students in Science Major, Monash University (2020)

Mentoring of Graduate Students

- One Mentee in FLEET ECR Mentoring program (2019 − 2021)
- LGBTIQ Ally Network (2019 − present)

Teaching Assistant of Undergraduate-level Courses (Fall 2013 —Spring 2015)

- PHY 115: Physics of Music (Lecture)
  Physics 115 covers the fundamental physics of sound production, propagation and perception.
- PHY 131: Intro Physics I (Lecture & Laboratory)
  Physics 131 covers the fundamental physics of mechanics, thermal dynamics, and sound for biology and pre-health care professionals major.
- PHY 132: Intro Physics II (Lecture & Laboratory)
  Physics 132 covers the fundamental physical concepts of optics, E&M, and modern physics for biology and pre-health care professionals major.
- PHY 151: General Physics I (Lecture)
  Physics 151 covers the fundamental physical concepts to deal with the mechanics for engineering and mathematics major.
- PHY 181: Physics I — Mechanics (Lecture)
  Physics 181 covers the fundamental physical concepts of mechanics for students of physics major.
- PHY 553: Optics (Lecture & Laboratory)
  Physics 553 covers the advanced physics of the modern optics and laboratory projects

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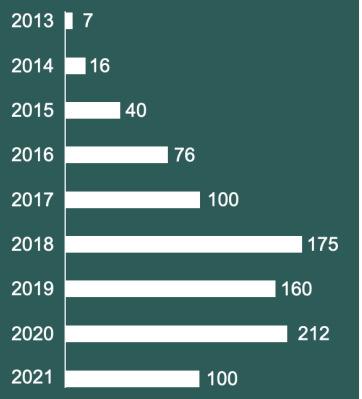
Citation Statistics

Cited by

	all	since 2016
citations	900	825
h-index	11	11
i10-index	12	12



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Project Assistant Research Fellow in Center of Atomic Initiative for New Materials (AI-MAT)

Publication list

1. **Shao-Yu Chen,** Maciej Pieczarka, Matthias Wurdack, Eliezer Estrecho, Takashi Taniguchi, Kenji Watanabe, Jun Yan, Elena A Ostrovskaya, Michael S Fuhrer. Long-lived populations of momentum- and spin- indirect excitons in monolayer WSe_2. **2020**, under review. Preprint available at arXiv: 2009.09602.

2. Matthias Wurdack, Tinghe Yun, Eliezer Estrecho, Nitu Syed, Semonti Bhattacharyya, Maciej Pieczarka, Ali Zavabeti, **Shao-Yu Chen**, Benedikt Haas, Johannes Mueller, Qiaoliang Bao, Christian Schneider, Yuerui Lu, Michael S Fuhrer, Andrew G Truscott, Torben Daeneke, Elena A Ostrovskaya. Ultrathin Ga_2O_3 glass: a large scale passivation and protection material for monolayer WS_2. *Advanced Materials* **2021**, 33, 2005732

3. Thomas Goldstein, Yueh-Chun Wu, **Shao-Yu Chen**, Takashi Taniguchi, Kenji Watanabe, Kalman Varga, Jun Yan. Ground and Excited Exciton Polarons in Monolayer $MoSe_2$. *The Journal of Chemical Physics* **2020**, *153*, 071101.

4. Yi-Hsun Chen, Chih-Yi Cheng, **Shao-Yu Chen,** Jan Sebastian Dominic Rodriguez, Han-Ting Liao, Kenji Watanabe, Takashi Taniguchi, Chun-Wei Chen, Raman Sankar, Fang-Cheng Chou, Hsiang-Chih Chiu, Wei-Hua Wang. Oxidized-monolayer tunneling barrier for strong Fermi-level depinning in layered InSe transistors. *npj 2D Materials and Applications* **2019**, *3* (1), 1−7.

5. **Shao-Yu Chen**, Zhengguang Lu, Thomas Goldstein, Jiayue Tong, Andrey Chaves, Jens Kunstmann, L. S. R. Cavalcante, Tomasz Woźniak, Gotthard Seifert, D. R. Reichman, Takashi Taniguchi, Kenji Watanabe, Dmitry Smirnov, Jun Yan. Luminescent Emission of Excited Rydberg Excitons from Monolayer WSe_2. *Nano Letters* **2019**, *19* (4), 2464−2471.

6. **Shao-Yu Chen**, Thomas Goldstein, Takashi Taniguchi, Kenji Watanabe, Jun Yan. Coulomb-bound four-and five-particle intervalley states in an atomically-thin semiconductor. *Nature Communication* **2018**, *9*:3717.

7. **Shao-Yu Chen**, Thomas Goldstein, Jiayue Tong, Takashi Taniguchi, Kenji Watanabe, Jun Yan. Superior valley polarization and coherence of 2s excitons in monolayer WSe_2. *Physical Review Letters* **2018**, *120*, 046402.

8. **Shao-Yu Chen**, Carl H Naylor, Thomas Goldstein, AT Charlie Johnson, Jun Yan. Intrinsic phonon bands in high-quality monolayer T′ molybdenum ditelluride. *ACS Nano* **2016**, *11* (1), 814−820.

9. Thomas Goldstein*, **Shao-Yu Chen***, Di Xiao, Ashwin Ramasubramaniam, Jun Yan. Raman scattering and anomalous Stokes anti-Stokes ratio in $MoTe_2$ atomic layers. *Scientific Reports* **2016**, *6*, 28024.

10. **Shao-Yu Chen**, Thomas Goldstein, Dhandapani Venkataraman, Ashwin Ramasubramaniam, Jun Yan. Activation of new Raman modes by inversion symmetry breaking in Type II Weyl semimetal candidate *T′*-$MoTe_2$. *Nano Letters* **2016**, *16* (9), 5852−5860.

11. Po-Hsiang Wang, Fu-Yu Shih, **Shao-Yu Chen**, Alvin B Hernandez, Po-Hsun Ho, Lo-Yueh Chang, Chia-Hao Chen, Hsiang-Chih Chiu, Chun-Wei Chen, Wei-Hua Wang. Demonstration of distinct semiconducting transport characteristics of monolayer graphene functionalized via plasma activation of substrate surfaces. *Carbon* **2015**, *93*, 353−360.

12. Yueh-Chun Wu, Cheng-Hua Liu, **Shao-Yu Chen**, Fu-Yu Shih, Po-Hsun Ho, Chun-Wei Chen, Chi-Te Liang, Wei-Hua Wang. Extrinsic origin of persistent photoconductivity in monolayer MoS_2 field effect transistors. *Scientific Reports* **2015**, *5*, 11472.

13. Jiayue Tong, Martin Muthee, **Shao-Yu Chen**, Sigfrid K. Yngvesson, Jun Yan. Antenna enhanced graphene THz emitter and detector. *Nano Letters* **2015**, *15* (8), 5295−5301.

14. **Shao-Yu Chen**, Changxi Zheng, Michael S Fuhrer, Jun Yan. Helicity-resolved Raman scattering of MoS_2, $MoSe_2$, WS_2, and WSe_2 atomic layers. *Nano Letters* **2015**, *15* (4), 2526−2532.

15. *Fu-Yu Shih, ***Shao-Yu Chen**, Cheng-Hua Liu, Po-Hsun Ho, Tsuei-Shin Wu, Chun-Wei Chen, Yang-Fang Chen, Wei-Hua Wang. Residue-free fabrication of high-performance graphene devices by patterned PMMA stencil mask. *AIP Advances* **2014**, *4* (6), 067129.

16. **Shao-Yu Chen**, Yi-Ying Lu, Fu-Yu Shih, Po-Hsun Ho, Yang-Fang Chen, Chun-Wei Chen, Yit-Tsong Chen, Wei-Hua Wang. Biologically inspired graphene-chlorophyll phototransistors with high gain. *Carbon* **2013**, *63*, 23−29.

17. **Shao-Yu Chen**, Po-Hsun Ho, Ren-Jye Shiue, Chun-Wei Chen, Wei-Hua Wang. Transport/magnetotransport of high-performance graphene transistors on organic molecule-functionalized substrates. *Nano Letters* **2012**, *12* (2), 964−969.

*equal contribution

Presentations

1. Long-lived populations of the dark excitons in 1L-WSe_2. Oral Presentation at **2021** *APS March Meeting.*
2. Long-lived populations of momentum- and spin-indirect excitons in 1L-WSe_2. Oral Presentation at *FLEET Annual Workshop* **2020**.
3. Many-body correlations of the excitonic bound-state in high-quality monolayer tungsten diselenide. Oral presentation at *Recent Progress in Graphene & 2D Materials Research* **2019**.
4. Introduction of Atomic-layered thin Materials. *Introductory Speech at John Monash Science School Immersion Day,* **2019**.
5. Luminescent Emission from 1s, 2s, 3s and 4s Excitons of Monolayer WSe_2 in High Magnetic Fields. Oral presentation at **2018** *APS March Meeting*.
6. The impact of inversion and mirror reflection symmetry on Raman scattering of *T'* transition metal dichalcogenides. Oral presentation at **2017** *APS March Meeting*.
7. Intrinsic phonon bands in high-quality monolayer *T'* molybdenum ditelluride. Oral presentation at **2016** *APS March Meeting*.
8. Explore the world of 2D materials. Present in tasty talk seminar, Department of Physics. The University of Massachusetts Amherst. Oct. 21, **2015**
9. Helicity resolved Raman scattering of atomic layers of transition metal dichalcogenides. Present at the biweekly seminar, Center of Hierarchical Manufacturing. May. 6, **2015**
10. Helicity resolved Raman scattering of atomic layers of transition metal dichalcogenides. Oral presentation at **2015** *APS March Meeting*.
11. Hybrid graphene-organic molecule transistors with large photoresponse. Oral presentation at **2013** *APS March Meeting*.
12. High-performance graphene device on OTS-functionalized substrate. Oral presentation at *Annual Meeting of the Physical Society of the Republic of China*. Jan. 30, **2013**
13. Transport/magnetotransport of high-performance graphene transistors on organic molecule-functionalized substrates. Oral presentation at **2012** *APS March Meeting*.
14. Mechanism of metal contact induced degradation in high-power LEDs. Oral presentation at the *International Conference on Optics and Photonics in Taiwan* **2009**.