Assist Prof. Kuei-Lin Chiu

Kuei-Lin Chiu

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Quantum Circuits Laboratory

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Research areas : Quantum transport, superconducting quantum circuits, 2D material devices, quantum information

Education:

●Ph.D., Department of Physics, University of Cambridge (2008 - 2012)

●M.S., Institute of Physics, National Chiao-Tung University (2004 - 2006)

●B.S., Department of Applied Physics, National Chia-Yi University(2000-2004)

Major Experience:

● Assistant Professor, National Sun Yat-sen University, Taiwan(2019/08 - Present)

● Associate Research Fellow (faculty), Key Lab of Quantum Information, University of Science and Technology of China, China (2017/07 – 2018/08)

● Postdoctoral Fellow, Department of Physics, Massachusetts Institute of Technology, USA (2015/01 – 2017/05)

● Research Associate, Cambridge Graphene Centre, Department of Engineering, University of Cambridge, UK (2013/03 – 2014/10)

Specialization

● Quantum transport, superconducting quantum circuits, 2D material devices

Teaching

- Undergraduate courses: Applied mathematics III, General Physics
- Graduate courses: General Seminar, Quantum computing seminar

Research Interests

- 2D material nanostructures
- 2D material based Josephson junctions
- Superconducting quantum circuits
- Quantum computing devices

Research Grant

Superconducting qubits based on topological materials. MOST 109-2112-M-110 -005 -MY3 (2020/08/01 ～ 2023/07/31)

Refereed Papers

- *"A flux tunable superconducting quantum circuit based on Weyl semimetal MoTe2".* ***Kuei-Lin Chiu****, D. G. Qian, J. W. Qiu, W. Y. Liu, D. Tan, V. Mosallanejad, S. Liu, Z. T. Zhang, Y. Zhao, D. P. Yu;* ***Accepted in Nano Letters*** (*corresponding author)

- *"Cryogenic Materials and Circuit Integration for Quantum Computer". Wei-Chen Chien, Shun-Jhou Jhan,* ***Kuei-Lin Chiu****, Yu-xi Liu, Eric Kao, Yu He, Ching-Ray Chang;* ***Journal of Electronic Materials, ISSN 1543-186X, 2020***

- *"The Second Quantum revolution with Quantum Computers"*. Ching-Ray Chang, Yeu-Chung Lin, **Kuei-Lin Chiu**, Tsung-Wei Huang; ***AAPPS Bulletin, Feature Article, Vol. 30, No. 1, 2020***

- *"Design of graphene waveguide: Effect of edge orientation and waveguide configuration".* Nayyar Abbas Shah, Vahid Mosallanejad, **K. L. Chiu***, Guo-ping Guo; ***Phys. Rev. B., 100, 125412, 2019*** (*corresponding author)

- *"Optoelectronic properties of bottom gate-defined in-plane monolayer WSe2 p–n junction".*Di Liu, Xiao-Zhuo Qi, **Kuei-Lin Chiu**, Takashi Taniguchi, Xi-Feng Ren, Guo-Ping Guo; ***Chin. Phys. B 27, 87303, 2018*** (URL: http://cpb.iphy.ac.cn/EN/10.1088/1674-1056/27/8/087303)

- *"Coherent transport in Y-junction graphene waveguide".* Vahid Mosallanejad, **K. L. Chiu** and Guo-Ping Guo; ***J. Phys.: Condensed Matter 30, 445301, 2018***

- *"Single-electron Transport in Graphene-like Nanostructures".***K. L. Chiu***, Y. Xu; ***Physics Reports 669, 1-42, 2017*** (*: first and corresponding author, selected as a highlighted article in Physics Reports; 5-Year Impact Factor: **22.124**)Interview:https://www.journals.elsevier.com/physics-reports/highlighted-articles/layered-materials-could-be-the-future-of-quantum-computing

- *"Magnetic-field-induced charge redistribution in disordered graphene double quantum dots".* **K. L. Chiu**, M. R. Connolly, A. Cresti, J. P. Griffiths, G. A. C. Jones, C. G. Smith; ***Phys. Rev. B., 92, 155408, 2015***

- *"Gigahertz quantized charge pumping in graphene quantum dots".* M. R. Connolly, **K. L. Chiu**, S. P. Giblin, M. Kataoka, J. D. Fletcher, C. Chua, J. Griffiths, G. A. C. Jones, V. I. Fal'ko C. G. Smith, T. J. B. M. Janssen; ***Nature Nanotechnology, 8, 417–420, 2013*** (5-Year Impact Factor: **40.632**;Media coverage: highlighted in Sciencedaily, Physicsworld, Newelectronics, etc)Interview: https://www.sciencedaily.com/releases/2013/05/130512141212.htm

- *"Single-particle probing of edge state formation in a graphene nanoribbon".* **K. L. Chiu**, M. R. Connolly, A. Cresti, C. Chua, S. J. Chorley, F. Sfigakis, S. Milana, A. C. Ferrari, J. P. Griffiths, G. A. C. Jones, C. G. Smith; ***Phys. Rev. B. 85, 205452, 2012***

- *"Tilted potential induced coupling of localized states in a graphene nanoconstriction".*M. R. Connolly, **K. L. Chiu**, A. Lombardo, A. Fasoli, A. C. Ferrari, D. Anderson, G. A. C. Jones, and C. G. Smith; ***Phys. Rev. B. 83, 115441, 2011***

- *"Scanning gate microscopy of current-annealed single layer graphene".*M. R. Connolly, **K. L. Chiu**, C. G. Smith, D. Anderson, G. A. C. Jones, A. Lombardo, A. Fasoli, and A. C. Ferrari; ***Appl. Phys. Lett. 96, 113501, 2010***

- *"Studies on the electronic and vibrational states of colloidal CdSe/ZnS quantum dots under high pressures".* C T Yuan, Y C Lin, Y N Chen, **K L Chiu**, W C Chou, D S Chuu, W H Chang, H S Lin, R C Ruaan and C M Lin; ***Nanotechnology 18, 185402, 2007***

Book chapter

- *"Single electron transport and possible quantum computing in 2D materials"*

Invited chapter in "21st Century Nanoscience – A Handbook: Nanophotonics, Nanoelectronics, and Nanoplasmonics (Volume Six)". ***Kuei-Lin Chiu; Taylor & Francis (CRC Press), ISBN 9780815356417, November 5, 2020***

Invited Seminars and Lectures

1. *"A flux tunable superconducting quantum circuit based on Weyl semimetal".***Department of Physics, National Taiwan university,** 13, December, 2019, Seminar Coordinator: **Prof. Hsi-Sheng Goan**

2. *"A superconducting transmon based on topological materials".***Department of Physics, National Tsing Hua university,** 3, December, 2019, Seminar Coordinator: **Prof. Chung-Yu Mou**

3. *"A superconducting qubit based on topological materials".***Department of Physics, National Cheng Kung University,** 18, November, 2019, Seminar Coordinator: **Prof. Chung-Hsien Chou**

4. *"A superconducting qubit based on topological materials".***Institute of Physics, Academia Sinica (Taiwan),** 11, November, 2019, Seminar Coordinator: **Prof. Chii-Dong Chen**

5. *"A superconducting qubit based on topological materials".***Department of Electronics Engineering, National Chiao Tung University,** 1, November, 2019, Seminar Coordinator: **Prof. Hung-Ming Chen**

6. *"Superconducting Quantum Computing - an Engineering Point of View".***Department of Physics, National Cheng Kung University**; 8, October, 2018; Seminar Coordinator: **Prof. Yueh-Nan Chen**

7. *"Superconducting Quantum Computing - an Engineering Point of View".***Taiwan Semiconductor Manufacturing Company Limited (TSMC)**; 5, October, 2018; Seminar Coordinator: **Dr. William Gallagher**

8. *"Superconducting Quantum Computing - an Engineering Point of View".***Department of Electronics Engineering,, National Chiao Tung University**; 5, October, 2018; Seminar Coordinator: **Prof. Hung-Ming Chen**

9. *"Quantum computing in 2D material platforms".***Department of Physics, Southern University of Science and Technology**; 28, December, 2017; Seminar Coordinator: **Prof. Dapeng Yu**

10. "Spin Qubit coherent Control"Host of session for Prof. Lieven Vanderspyen and Prof. Ferdinand Kuemmeth; **International Workshop on Recent Experimental Progress in Semiconductor Qubits**, University of Science and Technology of China, Hefei, China, 13th - 15th September, 2017

11. *"Quantum computing - a brief overview from algorithms to platforms"* **Advanced Semiconductor and IC Technology Forum, Taiwan**; 15, December, 2017; Seminar Coordinator: **Prof. Wen-Tsuen Chen (Former president of National Tsing-Hua University, Taiwan)**

12. *"Single particle probing in 2D materials".***School of Electronic Science and Engineering, Nanjing University**; 07, July, 2017; Seminar Coordinator: **Prof. Feng-Qiu Wang**

13. *"Single particle probing in 2D materials".***Key Lab of Quantum Information, University of Science and Technology of China (USTC)**; 03, July, 2017; Seminar Coordinator: **Prof. Guo-Ping Guo**

14. "*Single-electron transport in graphene nanostructures*"**School of Physics and Astronomy, University of Manchester**; 17, March, 2014; Seminar Coordinator: **Prof. K. S. Novoselov, Prof. A.C. Ferrari, Prof. V. Fal'ko**

15. *"Probing and control of single-electron transport in graphene nanostructures"***Department of Electrical and Systems Engineering, University of Pennsylvania**; 27, January, 2014; Seminar Coordinator: **Prof. Lee C. Bassett**

16. *"Charge pumping in graphene quantum dot"*. **Institute of Physics, AcademiaSinica, Taiwan**; 01, November, 2012; Seminar Coordinator: **Prof. Chia-Seng Chang**

17. *"Chargepumping in graphene quantum dot".***NationalCenter for Theoretical Sciences(South)**; 15, October, 2012; Seminar Coordinator: **Prof. Yueh-Nan Chen**

18. *"Transport properties of graphene nanodevices- nanoribbons, quantum dots and double quantum dots".***Institute of Atomic and Molecular Sciences, AcademiaSinica, Taiwan**; 3, April, 2012; Seminar Coordinator: **Prof. Yuh-Lin Wang**

19. *"Transport properties of graphene nanodevices- nanoribbons, quantum dots and double quantum dots".***NationalCenter for Theoretical Sciences(South)**; 28, March, 2012; Seminar Coordinator: **Prof. Yueh-Nan Chen**

Group members (updated until 2020)

Post-graduate:

洪立翰 (2nd master)

張有義 (2nd master)

陳泳有 (2nd master)

Undergraduate:

林威辰 (4th year)

簡子翔 (4th year)

謝凱閔 (4th year)

陳永翔 (3rd year)

吳柏鋐 (3rd year)

吳東欣 (3rd year)

廖德瑋 (3rd year)

羅程瀚 (3rd year)

涂榕芳 (3rd year)

Visiting students:

Thomas Kuo (Graduate from Department of Physics, University of Michigan, Ann Arbor)

張瑞霖 (4th year in Kaohsiung Medical University)