Jie Shen（沈洁）

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Gender: Female Date of Birth: 06/10/1986 Citizenship: P. R. China

Personal Google Scholar:
https://scholar.google.com/citations?user=aOZ9xvgAAAAJ&hl=zh-CN
My group website
沈洁课题组 ShenGroup (iphy.ac.cn)
My introduction on website of IOP, CAS
http://edu.iphy.ac.cn/lianpei2/bd_detail.php?id=1435
The website of Daniel Tsui Lab
http://tsuilab.iphy.ac.cn/

Short Summary

Associate professor in IOP, CAS. In total, I have published 25 SCI papers, with more than 3,500 citations by google scholar, and H factor of 16; Among them, I have 11 papers as the first or corresponding author, including one on Science and one on Nature communications, three on Nano Letters, one on Physical Review Research and one on Nanoscale (review), etc. I was invited to give talks in many international conferences such as Silicon Platform for Quantum Spintronics (SiSpin) held in Copenhagen, Denmark in 2016, Gordon Research Conference held in Hong Kong, China in 2019, and Frontiers in Quantum Materials & Devices (FQMD) workshop held in Tokyo, Japan in 2019. Based on my previous work and contributions in topological state of matter and devices, I was invited by Nature magazine in June 2021 as a representative of topological quantum devices in the Asia-Pacific region to participate in Nature round table on magnetic topological materials, and discussed the development direction and application prospects of topological materials with editors of Nature, Nature physics, Nature review physics and so on. I joined IOP, CAS as an associate professor with a start-up funding supported by both IOP and CAS, with award from CAS.

Research Interest

1. Topological quantum devices and topological qubits, including the hybrid system of superconductor and semiconductor with spin-orbit coupling, topological insulator, 2D chern insulator and so on.
2. The application of devices, e. g. topological FET, single-electron transistor, topological spintronics.

Group Building

People: 2 postdocs, 5 Ph.D. candidates, 4 research assistants

Facilities: 2 Oxford Triton dilution refrigerator (9-1-1T, 12T)， 1 Glove box, 1 2D materials transfer system, 2 nanowires transfer system(1in SEM, 1 in optical microscopy)

Education and Research Experience

11/2019 – present : **Associate professor,** Institute of Physics, Chinese Academy of Sciences
Website: http://ssqic.iphy.ac.cn/aboutus/index.html

11/2015 – 10/2019 : **Postdoc**, Kavli Institute of Nanoscience, The Advanced Research Center QuTech, Delft University of Technology;
Microsoft Station Q-Delft Quantum Lab.
Major: Quantum transport of low-dimensional semiconductor system, especially superconducting-related hybrid structure, searching for Majorana bound states and aiming for topological quantum computation. The materials are InSb Nanowires, flakes and Ge-Si core-shell nanowires.
Advisor: Prof. Leo Kouwenhoven
Website: https://qutech.nl/ ； Kouwenhoven Lab - QuTech

09/2013 – 11/2015 : **Postdoc**, Mechanical Engineering and Materials Science, Yale University, USA
Major: Synthesis, device fabrication and electrical transport measurements of topological insulator/topological crystalline insulator nano-plates/ribbons/wires and two-dimensional transition metal dichalcogenides film. The materials are SnTe, In-doped SnTe and WTe_2.
Advisor: Prof. Judy J. Cha
Website: http://www.eng.yale.edu/cha/index.html

09/2008 – 2013/06 : **Ph.D.**, Daniel Chee Tsui Laboratory, Institute of Physics, Chinese Academy of Sciences, China.
Major: Low-temperature electron transport in materials and nano-devices with strong spin-orbit coupling materials and superconductor, especially focusing on Majorana zero modes on 3D topological insulator. Participating in the Quantum Anomalous Hall Effect in magnetically doped topological insulator MBE-grown film. The materials are Bi_2Se_3, Bi_2Te_3 and Cr-doped $(Bi,Sb)_2Te_3$.
Advisor: Prof. Li Lu
Website: http://tsuilab.iphy.ac.cn/

09/2004 – 06/2008 : **B.S.**, Department of Physics, Southeast University, China.
Major: Applied physics

Presentive Publications

Published as the first author or corresponding author

1) Qu, F. M.*, Yang, F.*, **Shen, J.***, Ding, Y., Chen, J., Ji, Z. Q., Liu, G. T., Fan, J., Jing, X. N., Yang, C. L., & Lu, L. (*The first three authors contributed equally to this work.)
Strong superconducting proximity effect in Pb-Bi2Te3 hybrid structures.
Scientific reports 2, 339 (2012)
2) Chang, C. Z.*, Zhang, J. S.*, Feng, X.*, **Shen, J.***, Zhang, Z. C, Guo, M. H., Li, K., Ou, Y. B., Wei, P., Wang, L. L., Ji, Z. Q., Feng, Y., Ji, S. H., Chen, X., Jia, J. F., Dai, X., Fang, Z., Zhang, S. C., He, K.†, Wang, Y. Y.†, Lu, L., Ma, X. C., & Xue, Q. K.† (*The first four authors contributed equally to this work.)
Experimental observation of the quantum anomalous hall effect in a magnetic topological insulator.
Science 340, 167-170 (2013)
3) **Shen, J.**, Jung, Y., Disa, A. S., Walker, F. J., Ahn, C. H., & Cha, J. J.
Synthesis of SnTe Nanoplates with {100} and {111} surfaces.
Nano letters 14, 4183-4188 (2014).
4) **Shen, J.**, Song, Y., Lee, M. L., & Cha, J. J.
Spatially resolved In and As distributions in InGaAs/GaP and InGaAs/GaAs quantum dot systems.
Nanotechnology 25, 465702 (2014).
5) **Shen, J.**, & Cha, J. J.
Topological crystalline insulator nanostructures.
Nanoscale 6, 14133-14140 (2014). (Review)
6) **Shen, J.**, Xie, Y. J., & Cha, J. J.
Revealing surface states in In-doped SnTe superconducting nanoplates with low bulk mobility.
Nano letters 15, 3827-3832 (2015).
7) **Shen, J.**, Woods, J.M., Xie, Y. J., Morales-Acosta, M. D. & Cha, J.
Structural Phase Transition and Carrier Density Tuning in SnSexTe1-x Nanoplates.
Advanced Electronic Materials 2, 1600144 (2016).
8) Woods, J. M.*, **Shen, J.***, Kumaravadivel, P., Pang, Y., Xie, Y., Pan, G. A., ... & Cha, J. J. (*The first two authors contributed equally to this work.)
Suppression of magnetoresistance in thin WTe2 flakes by surface oxidation.
ACS applied materials & interfaces 9(27), 23175-23180 (2017).
9) de Vries, F.K.*, **Shen, J.***, Skolasinski, R. J., Nowak, M. P., Varjas, D., Wang, L., Wimmer, M., Ridderbos, J., Zwanenburg, F.A., Li, A., Koelling, S., Verheijen, M. A., Bakkers, E. P. A. M. & Kouwenhoven. (Shen is the equal contribution and corresponding author)
Spin–Orbit Interaction and Induced Superconductivity in a One-Dimensional Hole Gas
Nano letters 18 (10), 6483–6488 (2018).
10) **Shen, J.**, Heedt, S., Borsoi, F., van Heck, B., … Geresdi, A., Palmstrøm, C. J., Bakkers, E. P. A. M. & Kouwenhoven, L. P. (Shen is the equal contribution and corresponding author)
Parity transitions in the superconducting ground state of hybrid InSb–Al Coulomb islands.
Nature Communications 9, 4801 (2018).
11) de Vries, F.K., Sol, M.L., Gazibegovic, S., op het Veld, R.L., Balk, S.C., Car, D., Bakkers, E.P., Kouwenhoven, L.P. and **Shen, J.**,

Crossed Andreev reflection in InSb flake Josephson junctions.
Physical Review Research 1(3), 032031(2019)

International Invited Talks

2014 Yale University
Title: The Growth and Electronic Transport of Topological Crystalline Insulator

2016 Silicon Platform for Quantum Spintronics (SiSpin) in CPH, Denmark
Title: Josephson Junction in GeSi Core-shell Nanowires

2019 Frontiers in Quantum Materials & Devices (FQMD) workshop, Tokyo University, Japan
Title: Parity Readout for Majorana Hybrid Devices

2019 Gordon Research Conferences, Hong Kong
Title: Hybrid InSb/Al Advanced Devices for Topological Parity Readout

2021 Nature round table on magnetic topological materials
Introduction of research and discussion of prospects of magnetic topological materials

Honors and Grants

2014-2017 NSF, USA
Title: Beyond conventional methods: chemical routes to dope topological insulator nanostructures and two-dimensional materials magnetically

2015-2018 DOE, USA
Title: Topological superconductor core-shell nanowires

2014-2019 FOM/NOW/Microsoft, Netherlands
Title: Scalable circuits of Majorana qubits,

2021-2025 CAS, China
Title: 中科院战略性先导科技B类专项“新一代超导与拓扑物理学”

2021-2015 NSFC, China
Title: “第二代量子体系的构筑和操控”重大研究计划项目

Interests

About popularization of science:
沈洁：一个电子的一生【中二所的奇妙冒险 | 公众科学日直播回放】_哔哩哔哩_bilibili
【云里·悟理12】气流和水流的舞蹈——流体力学初步【悟理学院】_哔哩哔哩_bilibili