

Yiming Pan (潘义明)

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ResearchGate @Yiming Pan. Zhihu @Yiming Pan: Columnist science writer (知乎专栏科普作家).

Address: #4-107, School of Physical Science and Technology, ShanghaiTech University, Shanghai 200031, China



EDUCATION&EXPERIENCE

2023.2-Present Assistant Professor, PI

School of Physical Science and Technology, and Center for Transformative Science, ShanghaiTech University, Shanghai 200031, China

2020.9-2023.2 **Post-DOC**

Physics Department and Solid State Institute, Technion, Haifa 32000, Israel

Major: Topological photonics in periodically driven systems, laser-induced accelerators, ultrafast free-electron radiations, PINEM and weak measurement, nonlinear photonic time crystals, and topological Floquet time crystals.

Supervisor: Mordechai Segev, and Daniel Podolsky, Professors

2018.9-2020.9 **Post-DOC**

Department of Physics of Complex Systems, Weizmann Institute of Science, Rehovot, 76100, Israel

Major: Laser-induced particle accelerators and radiations, topological photonics, laser direct writing, and weak measurement

Supervisor: Yaron Silberberg, and Nir Davidson, Professors

2016.9-2018.9 **Post-DOC**

Department of Electrical Engineering Physical Electronics, Tel Aviv University, Israel

Major: Free electron laser, laser-matter interactions, and weak measurement

Supervisor: Avraham Gover, Professor

The PBC program of the Israel council of higher education (2016-2018)

2010.9-2016.6 **Ph.D.**

National Laboratory of Solid State Microstructures and Department of Physics, Nanjing University, China

Major: Theoretical Physics, quantum transport

Ph.D. Supervisor: Baigeng Wang, Professor

Excellent graduate student award of Collaborative Innovation Center of Artificial Microstructure Science and Technology (2015); National Scholarship (2015)

2006.9-2010.6

B.S.

Department of Materials and Applied Physics, Anhui University, China

Major: Applied Physics

National undergraduate innovation programs of Anhui University, No.081035704 (2008-2009)

RESEARCH STATEMENT

Current Research Areas & Interests

- Laser-induced free-electron acceleration and radiation, Photon-induced near-field electron microscopy, ultrafast light-matter interaction, attosecond science, and weak measurement.
- Photonic and quantum simulation: Laser direct writing, topological photonics in SPP waveguides, microwave spoof SPP waveguides, and ultrafast electron synthetic dimensions. Time crystals: topological Floquet time crystals, nonlinear photonic time crystals, k-gap soliton, subharmonic phase transition, and modulational instability.
- Quantum transport in condensed matters: the chiral transport of Weyl semimetals, the transport phenomena of two-dimensional materials, topological insulators, and semimetals.

Research Skills & Taste

- Time-dependent Schrödinger equation, Wigner function in phase space, classical and quantum electrodynamics in radiations and accelerators.
 - Floquet quasi-energy spectrum analysis for periodically-driven systems. Non-equilibrium Green's function methods, the mean-field approximations, topological phases, functional renormalization group for quantum transports, and many-body phenomena.
 - Independent experiment and measurement with laser direct writing for topological photonics. Deep cooperation with other experimentalists from DLA, UTEM, Trapped Ions, Optical Platforms, and Condensed Matters.
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PUBLICATIONS

- [1]. Hu, P., Wu, H.*, Xie, P., Zhuo, Y., Sun, W., Sheng, Z., & Pan, Y. *. Hearing dynamical Floquet-Thouless pump of sound pulse. Accepted by Phys. Rev. B (2024)
- [2]. Pan, Y., Zhang, B., & Podolsky, D. Synthetic dimensions using ultrafast free electrons. arXiv preprint arXiv:2207.07010. Accepted by ACS Photonics (2024)
- [3]. Kiselev, Egor I., and Yiming Pan. Symmetry Breaking and Spatiotemporal Pattern Formation in Photonic Time Crystals. arXiv preprint arXiv:2404.16809 (2024).
- [4]. Zhang, Bin, Reuven Iancu, Aharon Friedman, Jacob Scheuer, Mikhail Tokman, Yiming Pan*, and Avraham Gover*. Shape-Dependence of Spontaneous Photon Emission by Quantum Electron

Wavepackets and the QED Origin of Bunched Electron Beam Superradiance. arXiv preprint arXiv:2401.05978 (2024).

- [5]. Pan, Y. *, Ruoyu Yin, Yongcheng Ding, Daniel Podolsky, and Bin Zhang. Half-electron ($e/2$) - free electron fractional charge induced by twisted light. arXiv preprint arXiv:2401.00723 (2024).
- [6]. Eldar, Maor, Zhaopin Chen, Yiming Pan, and Michael Krüger. Self-trapping of slow electrons in the energy domain. Physical Review Letters 132, no. 3 (2024): 035001.
- [7]. Zhaopin Chen, Bin Zhang, Yiming Pan*, Michael Krueger, Quantum wavefunction reconstruction by free-electron spectral shearing interferometry. arXiv:2210.16312 (2022); Science Advances 9, eadg8516(2023) (2023)
- [8]. Yiming Pan†, Moshe-Ishay Cohen†, Mordechai Segev, Superluminal k-gap solitons in photonic time-crystals with Kerr nonlinearity. CLEO 2022, PRL 130, 233801 (2023)
- [9]. Pan, Y.*, Chen, Z.*, Wang, B., & Poem, E. Photonic π -mode anomaly in (1+1) dimensional periodically driven topological/normal insulator heterostructures. arXiv:2010.05688 (2020), PRL 130, 223403 (2023).
- [10]. Pan, Y. *, Cohen, E.*, et al. Weak measurement, projective measurement, and quantum-to-classical transitions in electron-photon interactions. arXiv:1910.11685 (2020); Light Science & Applications 12: 267(2023).
- [11]. Kiselev, Egor I., and Yiming Pan. Light controlled THz plasmonic time varying media: momentum gaps, entangled plasmon pairs, and pulse induced time reversal. arXiv preprint arXiv:2311.17870 (2023).
- [12]. Mei, Xuehan, Rongwei Zha, Yiming Pan, Shaoyi Wang, Bin Sun, Cheng Lei, Changjun Ke, Zongqing Zhao, and Du Wang. Dielectric Laser Accelerators Driven by Ultrashort, Ultraintense Long-Wave Infrared Lasers. Ultrafast Science 3 (2023): 0050.
- [13]. Cohen, Moshe-Ishay, Yiming Pan, Ohad Segal, and Mordechai Segev. Annihilation of k-gap Solitons in Photonic Time Crystals. In CLEO: Fundamental Science, pp. FTu3D-6. Optica Publishing Group, 2023.
- [14]. Yiming Pan†, and Ruoyu Yin. Constructing Berry-Maxwell equations with Lorentz invariance and Gauss' law of Weyl monopoles in 4D energy-momentum space. arXiv preprint arXiv:2308.00612 (2023).
- [15]. Ding, Yongcheng, Yiming Pan, and Xi Chen. Superoscillating Quantum Control Induced By Sequential Selections. arXiv preprint arXiv:2305.04303 (2023).
- [16]. Yiming Pan†, Bin Zhang, and Daniel Podolsky. Low-energy Free-electron Rabi oscillation and its applications. arXiv preprint arXiv:2304.12174 (2023).

- [17].Pan, Y.†*, Chen, Z.†, Wang, B., & Poem, E. Photonic π -mode anomaly in (1+1) dimensional periodically driven topological/normal insulator heterostructures. arXiv:2010.05688 (2020), accepted by PRL (2022).
- [18].Pan, Y. †*, Cohen, E.*, et al. Demonstration of weak measurement, projective measurement, and quantum-to-classical transitions in electron-photon interactions. arXiv:1910.11685 (2020); accepted by *Light Science & Applications* (2022). [IF: 17.8]
- [19].Wang, B., Quan, J., Han, J., Shen, X.*, Wu, H.*, and Pan, Y.*, Observation of Photonic Topological Floquet time crystals. *Laser & Photon. Rev.*, 10.1002/lpor.202100469 (2022). [IF: 13.8]
- [20].Qingqing Cheng, Huaiqiang Wang, Yongguan Ke, Tao Chen, Ye Yu, Yuri S. Kivshar*, Chaohong Lee*, and Yiming Pan*, Asymmetric topological pumping in nonparaxial photonics. *Nature Communications*. <https://doi.org/10.1038/s41467-021-27773> (2022). [IF: 14.9]
- [21].Ang Li, Yiming Pan, Philip Dienstbier, and Peter Hommelhoff, Quantum interference visibility spectroscopy in two-color photoemission from tungsten needle tips. *Phys. Rev. Lett.* 126, 137403 (2021). [IF: 9.2]
- [22].Yiming Pan†*, Bing Wang, Time-crystalline phases and period-doubling oscillations in one-dimensional Floquet topological insulators. *Physical Review Research*, 2(4), 043239 (2020).
- [23].Pan, Y.†*, Zhang, J., Cohen, E., Wu, C.W., Chen, P.X. and Davidson, N., Weak-to-strong transition of quantum measurement in a trapped-ion system. *Nature Physics*, 16(12), 1206-1210 (2020). [IF:15.2]
- [24].Yiming Pan†*, and Avraham Gover. Beyond Fermi's Golden Rule in Free-Electron Quantum Electrodynamics: Acceleration/Radiation Correspondence. *New Journal of Physics* 23 (6), 063070 (2021). [IF: 3.7]
- [25].Chen, T., Yu, Y., Song, Y., Yu, D., Ye, H., Xie, J., Shen, X., Pan, Y. and Cheng, Q., 2019. Distinguishing the topological zero mode and Tamm mode in a microwave waveguide array. *Annalen der Physik*, 531(12), p.1900347. [IF: 3.6]
- [26].Ying Yang, Yiming Pan*. Engineering zero modes, Fano resonance and Tamm surface states of 'bound states in the gapped continuum'. *Optics Express* 27 (23), 32900-32911 (2019). [IF: 3.9]
- [27].Q. Q. Cheng†, Yiming Pan†*, Huaiqiang Wang†, et al. Observation of anomalous π modes in photonic Floquet engineering. 10.1103/PhysRevLett.122.173901 (2019). [IF: 9.2]
- [28].Yiming Pan†*, Bin Zhang†, and Avraham Gover. Anomalous Photon-induced Near-field Electron Microscopy. 10.1103/PhysRevLett.122.183204 (2019). [IF: 9.2]
- [29].Yiming Pan†*, and Avraham Gover. Spontaneous and Stimulated Emissions of Quantum Free-Electron Wavepackets - QED Analysis. 10.1103/PhysRevA.99.052107 (2019). [IF: 3.1]
- [30].Yiming Pan†*, and Avraham Gover. Spontaneous and Stimulated Radiative emission of Modulated Free-Electron Quantum wavepackets-Semiclassical Analysis. *Journal of Physics Communications* 2.11 (2018): 115026. [IF: 1.7]
- [31].Cheng, Q., Chen, T., Yu, D., ... & Pan, Y*. Flexibly designed spoof surface plasmon waveguide array for topological zero-mode realization. *Optics Express*, 26(24), 31636-31647 (2018). [IF: 3.9]
- [32].Gover, Avraham, Yiming Pan*. Dimension-dependent stimulated radiative interaction of a single electron quantum wavepacket. *Physics Letters A* 382.23 (2018): 1550-1555. [IF: 2.7]
- [33].Xing-Chen Pan, Yiming Pan, et al. Carrier balance and linear magnetoresistance in type-II Weyl semimetal WTe₂. *Frontiers of Physics* 12, No. 3 (2017): 127203. [IF: 3.6]
- [34].H.Q.Wang, Lubing Shao, Yiming Pan, et al. Flux-driven quantum phase transitions in two-leg Kitaev ladder systems. *Physics Letters A* 380, 46 (2016): 3936-3941. [IF: 2.7]

- [35]. Erfu Liu, Mingsheng Long, Junwen Zeng, Wei Luo, Yaojia Wang, Yiming Pan, et al. High responsively phototransistors based on few-layer ReS₂ for weak signal detection. *Advanced Functional Materials* 26, 12 (2016): 1938-1944. [IF: 18.8]
- [36]. Wang, Yaojia, Erfu Liu, Huimei Liu, Yiming Pan, et al. Gate-tunable negative longitudinal magnetoresistance in the predicted type-II Weyl semimetal WTe₂. *Nature Communications* 7 (2016): 13142. [IF: 14.9]
- [37]. Zhihao Yu†, Zhun-Yong Ong†, Yiming Pan†, et al. Realization of Room-Temperature Phonon-limited Carrier Transport in Monolayer MoS₂ by Dielectric and Carrier Screening. *Advanced Materials* 28, No. 3 (2016): 547-552. [IF: 30.8]
- [38]. Q. Q. Cheng†, Yiming Pan†, et al. Topologically protected interface mode in plasmonic waveguide arrays. *Laser & Photon. Rev.* doi: 10.1002/lpor.201400462(2015) [IF: 13.8]
- [39]. Daowei He†, Yiming Pan†, et al. Tunable Van der Waals heterojunctions with hybrid organic/inorganic semiconductors. *Applied Physics Letters*, 107(18), p.183103 (2015) [IF: 3.8]
- [40]. Miao Wang, Xiaojuan Lian, Yiming Pan, et al. A selector device based on graphene-oxide heterostructures for memristor crossbar application. *Appl. Phys. A* 120:403-407 (2015) [IF: 2.6]
- [41]. Yang Cui†, Run Xin†, Zhihao Yu†, Yiming Pan, et al. High-Performance Monolayer WS₂ Field-effect Transistors on High- κ Dielectrics. *Adv. Mater.* doi:10.1002/adma.201502222 (2015) [IF: 30.8]
- [42]. Zhihao Yu†, Yiming Pan†, et al. Towards Intrinsic Charge Transport in Monolayer Molybdenum Disulfide by Defect and Interface Engineering. *Nat. Commun.* **5**, 5290 (2014) [IF: 14.9]
- [43]. Min Qian, Yiming Pan, et al. Tunable, Ultralow-Power Switching in Memristive Devices Enabled by a Heterogeneous Graphene–Oxide Interface. *Adv. Mater.* **26**, 3275–3281 (2014) [IF: 30.8]
- [44]. Xiaxin Ding, Yiming Pan, et al. Strong and nonmonotonic temperature dependence of Hall coefficient in superconducting KxFe₂-ySe₂ single crystals. *Phys. Rev. B* **89**, 224515 (2014) [IF: 3.3]
- [45]. Enming Shang, Yiming Pan, et al. Detection of Majorana fermions in an Aharonov-Bohm interferometer. *Chinese Phys. B* **23**, 057201 (2014) [IF: 1.5]
- [46]. H.Q.Wang, R.Wang, Yiming Pan, et al. Entanglement spectrum of topological Weyl semimetal. *EPL* 107, 40007 (2014) [IF: 1.9]

RECENT CONFERENCES PAPERS

- [47]. Pan, Y. †*, Dikopoltsev, A., Lustig, E., Cheng, Q. and Segev, M., 2021. Anomalous Floquet Thouless pumping. In 2021 Conference on Lasers and Electro-Optics (CLEO) (pp. 1-2). IEEE.
- [48]. Zhang, B., Gover, A., Kaminer, I. and Pan, Y. *, 2021. Quantum-to-classical transition of laser-shaped ultrafast free electrons in phase space. In CLEO: QELS_Fundamental Science (pp. FM1L-4). Optical Society of America.
- [49]. Yiming Pan†*, Ido Kaminer, Michael Krueger, High harmonic lasing using attosecond electron pulses combs in photon-induced near-field electron microscopy, submitted to CLEO 2022.
- [50]. Yiming Pan†*, Moshe-Ishay Cohen, Mordechai Segev, Superluminal k-gap solitons in photonic time-crystals with Kerr nonlinearity, submitted to CLEO 2022.

Noted: † These authors contributed equally to the work; * These authors are corresponding authors.
 Highlighted papers are mostly cited or recently accepted.
