

# LUCHANG JIN

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## EDUCATION

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**Columbia University, Graduate School of Arts and Sciences**

Doctor of Philosophy in Physics

**New York, NY**

Aug 2016

**Peking University, Physics Department**

Bachelor of Science in Physics

**Beijing, China**

May 2011

## RESEARCH EXPERIENCE

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**University of Connecticut**

Associate Professor

**Storrs, CT**

2023 - now

Assistant Professor

2017 - 2023

**Brookhaven National Laboratory**

Research Associate

**Upton, NY**

2016 - 2017

## GRANTS AND AWARDS

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- DOE Early Career Award, 2020.
- Kenneth G. Wilson Award for Excellence in Lattice Field Theory, 2019.
- Three year DOE Grant in High Energy Physics as Co-PI, 2019.
- Intel Fellowship for exceptional research achievements by a PhD student, 2016.
- Champion of Battlecode - MIT AI programming competition (teamed with Greg McGlynn), 2016.
- First place in Mini-CUSPEA program, 2011.
- Meritorious Winner in Mathematical Contest in Modeling, 2010.
- First Prize in Chinese Physics Olympiad, 2006.
- First Prize in Chinese National Olympiad in Informatics in Provinces, 2005.

## PUBLICATIONS

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1. C. Y. Seng, V. Cirigliano, X. Feng, M. Gorchtein, L. Jin and G. A. Miller, “Quark mass difference effects in hadronic Fermi matrix elements from first principles,” *Phys. Lett. B* 846, 138259 (2023)  
[doi:10.1016/j.physletb.2023.138259](https://doi.org/10.1016/j.physletb.2023.138259) [[arXiv:2306.10199](https://arxiv.org/abs/2306.10199)].
2. T. Blum *et al.* [RBC and UKQCD], “ $\Delta I=3/2$  and  $\Delta I=1/2$  channels of  $K \rightarrow \pi\pi$  decay at the physical point with periodic boundary conditions,” *Phys. Rev. D* 108, no.9, 094517 (2023)  
[doi:10.1103/PhysRevD.108.094517](https://doi.org/10.1103/PhysRevD.108.094517) [[arXiv:2306.06781](https://arxiv.org/abs/2306.06781)].
3. N. H. Christ, X. Feng, L. C. Jin, C. T. Sachrajda and T. Wang, “Radiative corrections to leptonic decays using infinite-volume reconstruction,” *Phys. Rev. D* 108, no.1, 014501 (2023)  
[doi:10.1103/PhysRevD.108.014501](https://doi.org/10.1103/PhysRevD.108.014501) [[arXiv:2304.08026](https://arxiv.org/abs/2304.08026)].
4. T. Blum *et al.* [RBC and UKQCD], “Isospin 0 and 2 two-pion scattering at physical pion mass using all-to-all propagators with periodic boundary conditions in lattice QCD,” *Phys. Rev. D* 107, no.9, 094512 (2023) [erratum: *Phys. Rev. D* 108, no.3, 039902 (2023)]  
[doi:10.1103/PhysRevD.107.094512](https://doi.org/10.1103/PhysRevD.107.094512) [[arXiv:2301.09286](https://arxiv.org/abs/2301.09286)].
5. T. Blum *et al.* [RBC and UKQCD], “Update of Euclidean windows of the hadronic vacuum polarization,” *Phys. Rev. D* 108, no.5, 054507 (2023)  
[doi:10.1103/PhysRevD.108.054507](https://doi.org/10.1103/PhysRevD.108.054507) [[arXiv:2301.08696](https://arxiv.org/abs/2301.08696)].

6. F. Yao *et al.* [Lattice Parton], “Nucleon Transversity Distribution in the Continuum and Physical Mass Limit from Lattice QCD,” *Phys. Rev. Lett.* 131, no.26, 261901 (2023)  
[doi:10.1103/PhysRevLett.131.261901](https://doi.org/10.1103/PhysRevLett.131.261901) [arXiv:2208.08008].
7. N. Christ, X. Feng, L. Jin, C. Tu and Y. Zhao, “Lattice QCD Calculation of  $\pi^0 \rightarrow e^+e^-$  Decay,” *Phys. Rev. Lett.* 130, no.19, 191901 (2023)  
[doi:10.1103/PhysRevLett.130.191901](https://doi.org/10.1103/PhysRevLett.130.191901) [arXiv:2208.03834].
8. D. J. Zhao *et al.* [ $\chi$ QCD], “Distance between various discretized fermion actions,” *Phys. Rev. D* 107, no.9, L091501 (2023)  
[doi:10.1103/PhysRevD.107.L091501](https://doi.org/10.1103/PhysRevD.107.L091501) [arXiv:2207.14132].
9. X. Y. Tuo, X. Feng and L. C. Jin, “Lattice QCD calculation of the light sterile neutrino contribution in  $0\nu 2\beta$  decay,” *Phys. Rev. D* 106, no.7, 074510 (2022)  
[doi:10.1103/PhysRevD.106.074510](https://doi.org/10.1103/PhysRevD.106.074510) [arXiv:2206.00879].
10. Y. Fu, X. Feng, L. C. Jin and C. F. Lu, “Lattice QCD Calculation of the Two-Photon Exchange Contribution to the Muonic-Hydrogen Lamb Shift,” *Phys. Rev. Lett.* 128, no.17, 172002 (2022)  
[doi:10.1103/PhysRevLett.128.172002](https://doi.org/10.1103/PhysRevLett.128.172002) [arXiv:2202.01472].
11. X. Feng, L. Jin and M. J. Riberdy, “Lattice QCD Calculation of the Pion Mass Splitting,” *Phys. Rev. Lett.* 128, no.5, 052003 (2022)  
[doi:10.1103/PhysRevLett.128.052003](https://doi.org/10.1103/PhysRevLett.128.052003) [arXiv:2108.05311].
12. X. Y. Tuo, X. Feng, L. C. Jin and T. Wang, “Lattice QCD calculation of  $K \rightarrow \ell \nu \ell \ell' + \ell'^-$  decay width,” *Phys. Rev. D* 105, no.5, 054518 (2022)  
[doi:10.1103/PhysRevD.105.054518](https://doi.org/10.1103/PhysRevD.105.054518) [arXiv:2103.11331].
13. P. X. Ma, X. Feng, M. Gorchtein, L. C. Jin and C. Y. Seng, “Lattice QCD calculation of the electroweak box diagrams for the kaon semileptonic decays,” *Phys. Rev. D* 103, 114503 (2021)  
[doi:10.1103/PhysRevD.103.114503](https://doi.org/10.1103/PhysRevD.103.114503) [arXiv:2102.12048].
14. N. H. Christ, X. Feng, L. C. Jin and C. T. Sachrajda, “Finite-volume effects in long-distance processes with massless leptonic propagators,” *Phys. Rev. D* 103, no.1, 014507 (2021)  
[doi:10.1103/PhysRevD.103.014507](https://doi.org/10.1103/PhysRevD.103.014507) [arXiv:2009.08287].
15. Y. Li, S. C. Xia, X. Feng, L. C. Jin and C. Liu, “Field sparsening for the construction of the correlation functions in lattice QCD,” *Phys. Rev. D* 103, no.1, 014514 (2021)  
[doi:10.1103/PhysRevD.103.014514](https://doi.org/10.1103/PhysRevD.103.014514) [arXiv:2009.01029].
16. C. Y. Seng, X. Feng, M. Gorchtein, L. C. Jin and U. G. Meißner, “New method for calculating electromagnetic effects in semileptonic beta-decays of mesons,” *JHEP* 10, 179 (2020)  
[doi:10.1007/JHEP10\(2020\)179](https://doi.org/10.1007/JHEP10(2020)179) [arXiv:2009.00459].
17. X. Gao, L. Jin, C. Kallidonis, N. Karthik, S. Mukherjee, P. Petreczky, C. Shugert, S. Syritsyn and Y. Zhao, “Valence parton distribution of the pion from lattice QCD: Approaching the continuum limit,” *Phys. Rev. D* 102, no.9, 094513 (2020)  
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18. T. Aoyama, N. Asmussen, M. Benayoun, J. Bijnens, T. Blum, M. Bruno, I. Caprini, C. M. Carloni Calame, M. Cè and G. Colangelo, *et al.* “The anomalous magnetic moment of the muon in the Standard Model,” *Phys. Rept.* 887, 1-166 (2020)  
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19. X. Feng, L. C. Jin, Z. Y. Wang and Z. Zhang, “Finite-volume formalism in the  $2 \xrightarrow{H_I+H_{I'}} 2$  transition: An application to the lattice QCD calculation of double beta decays,” *Phys. Rev. D* 103, no.3, 034508 (2021)  
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20. C. Y. Seng, X. Feng, M. Gorchtein and L. C. Jin, “Joint lattice QCD–dispersion theory analysis confirms the quark-mixing top-row unitarity deficit,” *Phys. Rev. D* 101, no.11, 111301 (2020)

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21. X. Feng, M. Gorchtein, L. C. Jin, P. X. Ma and C. Y. Seng, “First-principles calculation of electroweak box diagrams from lattice QCD,” *Phys. Rev. Lett.* 124, no.19, 192002 (2020)  
[doi:10.1103/PhysRevLett.124.192002](https://doi.org/10.1103/PhysRevLett.124.192002) [arXiv:2003.09798].
22. T. Blum, N. Christ, M. Hayakawa, T. Izubuchi, L. Jin, C. Jung and C. Lehner, “Hadronic Light-by-Light Scattering Contribution to the Muon Anomalous Magnetic Moment from Lattice QCD,” *Phys. Rev. Lett.* 124, no.13, 132002 (2020)  
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23. X. Feng, Y. Fu and L. C. Jin, “Lattice QCD calculation of the pion charge radius using a model-independent method,” *Phys. Rev. D* 101, no.5, 051502 (2020)  
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24. X. Y. Tuo, X. Feng and L. C. Jin, “Long-distance contributions to neutrinoless double beta decay  $\pi^- \rightarrow \pi^+ ee$ ,” *Phys. Rev. D* 100, no.9, 094511 (2019)  
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25. T. Izubuchi, L. Jin, C. Kallidonis, N. Karthik, S. Mukherjee, P. Petreczky, C. Shugert and S. Syritsyn, “Valence parton distribution function of pion from fine lattice,” *Phys. Rev. D* 100, no.3, 034516 (2019)  
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26. X. Feng and L. Jin, “QED self energies from lattice QCD without power-law finite-volume errors,” *Phys. Rev. D* 100, no.9, 094509 (2019)  
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27. X. Feng, L. C. Jin, X. Y. Tuo and S. C. Xia, “Light-Neutrino Exchange and Long-Distance Contributions to  $0\nu 2\beta$  Decays: An Exploratory Study on  $\pi\pi \rightarrow ee$ ,” *Phys. Rev. Lett.* 122, no.2, 022001 (2019)  
[doi:10.1103/PhysRevLett.122.022001](https://doi.org/10.1103/PhysRevLett.122.022001) [arXiv:1809.10511].
28. H. W. Lin, J. W. Chen, X. Ji, L. Jin, R. Li, Y. S. Liu, Y. B. Yang, J. H. Zhang and Y. Zhao, “Proton Isovector Helicity Distribution on the Lattice at Physical Pion Mass,” *Phys. Rev. Lett.* 121, no.24, 242003 (2018)  
[doi:10.1103/PhysRevLett.121.242003](https://doi.org/10.1103/PhysRevLett.121.242003) [arXiv:1807.07431].
29. Y. S. Liu *et al.* [Lattice Parton], “Unpolarized isovector quark distribution function from lattice QCD: A systematic analysis of renormalization and matching,” *Phys. Rev. D* 101, no.3, 034020 (2020)  
[doi:10.1103/PhysRevD.101.034020](https://doi.org/10.1103/PhysRevD.101.034020) [arXiv:1807.06566].
30. J. H. Zhang, J. W. Chen, L. Jin, H. W. Lin, A. Schäfer and Y. Zhao, “First direct lattice-QCD calculation of the  $x$ -dependence of the pion parton distribution function,” *Phys. Rev. D* 100, no.3, 034505 (2019)  
[doi:10.1103/PhysRevD.100.034505](https://doi.org/10.1103/PhysRevD.100.034505) [arXiv:1804.01483].
31. T. Blum *et al.* [RBC and UKQCD], “Calculation of the hadronic vacuum polarization contribution to the muon anomalous magnetic moment,” *Phys. Rev. Lett.* 121, no.2, 022003 (2018)  
[doi:10.1103/PhysRevLett.121.022003](https://doi.org/10.1103/PhysRevLett.121.022003) [arXiv:1801.07224].
32. X. Ji, L. C. Jin, F. Yuan, J. H. Zhang and Y. Zhao, “Transverse momentum dependent parton quasidistributions,” *Phys. Rev. D* 99, no.11, 114006 (2019)  
[doi:10.1103/PhysRevD.99.114006](https://doi.org/10.1103/PhysRevD.99.114006) [arXiv:1801.05930].
33. T. Izubuchi, X. Ji, L. Jin, I. W. Stewart and Y. Zhao, “Factorization Theorem Relating Euclidean and Light-Cone Parton Distributions,” *Phys. Rev. D* 98, no.5, 056004 (2018)  
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[doi:10.1016/j.nuclphysb.2018.12.020](https://doi.org/10.1016/j.nuclphysb.2018.12.020) [arXiv:1712.10025].

35. T. Ishikawa, [L. Jin](#), H. W. Lin, A. Schäfer, Y. B. Yang, J. H. Zhang and Y. Zhao, “Gaussian-weighted parton quasi-distribution (Lattice Parton Physics Project (LP<sup>3</sup>)),” *Sci. China Phys. Mech. Astron.* 62, no.9, 991021 (2019)  
[doi:10.1007/s11433-018-9375-1](#) [[arXiv:1711.07858](#)].
36. J. W. Chen *et al.* [LP3], “Symmetry properties of nonlocal quark bilinear operators on a Lattice,” *Chin. Phys. C* 43, no.10, 103101 (2019)  
[doi:10.1088/1674-1137/43/10/103101](#) [[arXiv:1710.01089](#)].
37. J. W. Chen, T. Ishikawa, [L. Jin](#), H. W. Lin, Y. B. Yang, J. H. Zhang and Y. Zhao, “Parton distribution function with nonperturbative renormalization from lattice QCD,” *Phys. Rev. D* 97, no.1, 014505 (2018)  
[doi:10.1103/PhysRevD.97.014505](#) [[arXiv:1706.01295](#)].
38. T. Blum, N. Christ, M. Hayakawa, T. Izubuchi, [L. Jin](#), C. Jung and C. Lehner, “Using infinite volume, continuum QED and lattice QCD for the hadronic light-by-light contribution to the muon anomalous magnetic moment,” *Phys. Rev. D* 96, no.3, 034515 (2017)  
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39. J. H. Zhang, J. W. Chen, X. Ji, [L. Jin](#) and H. W. Lin, “Pion Distribution Amplitude from Lattice QCD,” *Phys. Rev. D* 95, no.9, 094514 (2017)  
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40. T. Blum, N. Christ, M. Hayakawa, T. Izubuchi, [L. Jin](#), C. Jung and C. Lehner, “Connected and Leading Disconnected Hadronic Light-by-Light Contribution to the Muon Anomalous Magnetic Moment with a Physical Pion Mass,” *Phys. Rev. Lett.* 118, no.2, 022005 (2017)  
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41. T. Blum, P. A. Boyle, T. Izubuchi, [L. Jin](#), A. Jüttner, C. Lehner, K. Maltman, M. Marinkovic, A. Portelli and M. Spraggs, “Calculation of the hadronic vacuum polarization disconnected contribution to the muon anomalous magnetic moment,” *Phys. Rev. Lett.* 116, no.23, 232002 (2016)  
[doi:10.1103/PhysRevLett.116.232002](#) [[arXiv:1512.09054](#)].
42. T. Blum, N. Christ, M. Hayakawa, T. Izubuchi, [L. Jin](#) and C. Lehner, “Lattice Calculation of Hadronic Light-by-Light Contribution to the Muon Anomalous Magnetic Moment,” *Phys. Rev. D* 93, no.1, 014503 (2016)  
[doi:10.1103/PhysRevD.93.014503](#) [[arXiv:1510.07100](#)].

## SYNERGISTIC ACTIVITIES

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- Chair of the Physics department Particle and Nuclear (PAN) seminars, 2017 - 2024.
- Member of the Search Committee for theoretical atomic, molecular, and optical physics, 2020.
- Conference organizing:
  - Convener of the “Precision Physics at High Intensities” session of “[14th Conference on the Intersections of Particle and Nuclear Physics \(CIPANP 2022\)](#)”. Hilton Orlando, Aug 29 - Sep 4, 2022.
  - Member of the Organizing Committee for “[BNL-HET & RBRC Joint Workshop DWQ@25: The event marks the passage of twenty-five years since the first numerical simulations with Domain Wall Quarks \(DWQ\)](#)”. BNL-HET & RBRC (virtual event), December 13-17, 2021.
  - Chair of the Local Organizing Committee for “[Muon  \$g - 2\$  Theory Initiative Hadronic Light-by-Light Working Group Workshop](#)”. University of Connecticut, March 12th - March 14th, 2018.