

USQCD Publications—2022

- 69. J. S. Yoo, T. Bhattacharya, R. Gupta, S. Mondal and B. Yoon, “Electroweak box diagrams on the lattice for pion and neutron decay,” [PoS LATTICE2022](#), 360 (2023) [[arXiv:2212.12830 \[hep-lat\]](#)].
- 68. X. Gao, A. D. Hanlon, J. Holligan, N. Karthik, S. Mukherjee, P. Petreczky, S. Syritsyn and Y. Zhao, “Unpolarized proton PDF at NNLO from lattice QCD with physical quark masses,” [Phys. Rev. D](#) **107**, 074509 (2023) [[arXiv:2212.12569 \[hep-lat\]](#)].
- 67. A. Bazavov *et al.* [Fermilab Lattice and MILC], “D-meson semileptonic decays to pseudoscalars from four-flavor lattice QCD,” [Phys. Rev. D](#) **107**, 094516 (2023) [[arXiv:2212.12648 \[hep-lat\]](#)].
- 66. J. Delmar, C. Alexandrou, K. Cichy, M. Constantinou and K. Hadjiyiannakou, “Gluon PDF for the proton using the twisted mass formulation of lattice QCD,” [PoS LATTICE2022](#), 099 (2023) [[arXiv:2212.11399 \[hep-lat\]](#)].
- 65. P. Boyle, T. Izubuchi, L. Jin, C. Jung, C. Lehner, N. Matsumoto and A. Tomiya, “Use of Schwinger-Dyson equation in constructing an approximate trivializing map,” [PoS LATTICE2022](#), 229 (2023) [[arXiv:2212.11387 \[hep-lat\]](#)].
- 64. D. A. Clarke, “Isothermal and isentropic speed of sound in $(2+1)$ -flavor QCD at non-zero baryon chemical potential,” [PoS LATTICE2022](#), 147 (2023) [[arXiv:2212.10009 \[hep-lat\]](#)].
- 63. M. Black *et al.* [RBC and UKQCD], “B-meson decay constants using relativistic heavy quarks,” [PoS LATTICE2022](#), 405 (2023) [[arXiv:2212.10125 \[hep-lat\]](#)].
- 62. G. Bali, R. Bignell, A. Francis, S. Gottlieb, R. Gupta, I. Kanamori, B. Kostrzewa, A. Y. Kotov, Y. Kuramashi and R. Mawhinney, *et al.* “Lattice gauge ensembles and data management,” [PoS LATTICE2022](#), 203 (2022) [[arXiv:2212.10138 \[hep-lat\]](#)].
- 61. M. Constantinou, S. Bhattacharya, K. Cichy, J. Dodson, X. Gao, A. Metz, S. Mukherjee, A. Scapellato, F. Steffens and Y. Zhao, “Accessing proton GPDs in asymmetric frames: Numerical implementation,” [PoS LATTICE2022](#), 096 (2023) [[arXiv:2212.09818 \[hep-lat\]](#)].
- 60. D. Bollweg, D. A. Clarke, J. Goswami, O. Kaczmarek, F. Karsch, S. Mukherjee, P. Petreczky, C. Schmidt and S. Sharma, “Equation of state and speed of sound of $(2+1)$ -flavor QCD in strangeness-neutral matter at nonvanishing net baryon-number density,” [Phys. Rev. D](#) **108**, 014510 (2023) [[arXiv:2212.09043 \[hep-lat\]](#)].
- 59. L. Leskovec, S. Meinel, M. Petschlies, J. Negele, S. Paul, A. Pochinsky and G. Rendon, “A lattice QCD study of the $B \rightarrow \pi\pi\ell\bar{\nu}$ transition,” [PoS LATTICE2022](#), 416 (2023) [[arXiv:2212.08833 \[hep-lat\]](#)].
- 58. T. Whyte, A. Stathopoulos, E. Romero and K. Orginos, “Optimizing shift selection in multilevel Monte Carlo for disconnected diagrams in lattice QCD,” [Comput. Phys. Commun.](#) **294**, 108928 (2024) [[arXiv:2212.04430 \[hep-lat\]](#)].
- 57. R. Gupta, “All about the neutron from lattice QCD,” [SciPost Phys. Proc.](#) **15**, 021 (2024) [[arXiv:2211.16686 \[hep-lat\]](#)].
- 56. C. Schneider, A. Hasenfratz and O. Witzel, “Gradient flow scale setting with tree-level improvement,” [PoS LATTICE2022](#), 288 (2023) [[arXiv:2211.12406 \[hep-lat\]](#)].

55. T. J. Hou, H. W. Lin, M. Yan and C. P. Yuan, “Impact of lattice strangeness asymmetry data in the CTEQ-TEA global analysis,” *Phys. Rev. D* **107**, 076018 (2023) [[arXiv:2211.11064 \[hep-ph\]](#)].
54. R. G. Edwards *et al.* [HadStruc], “Non-singlet quark helicity PDFs of the nucleon from pseudo-distributions,” *JHEP* **03**, 086 (2023) [[arXiv:2211.04434 \[hep-lat\]](#)].
53. A. Hasenfratz, C. Rebbi and O. Witzel, “Gradient flow step-scaling function for SU(3) with $N_f = 8$ fundamental flavors,” *Phys. Rev. D* **107**, 114508 (2023) [[arXiv:2210.16760 \[hep-lat\]](#)].
52. Z. Fan, W. Good and H. W. Lin, “Gluon parton distribution of the nucleon from $2 + 1 + 1$ -flavor lattice QCD in the physical-continuum limit,” *Phys. Rev. D* **108**, 014508 (2023) [[arXiv:2210.09985 \[hep-lat\]](#)].
51. J. Shen, P. Draper and A. X. El-Khadra, “Vacuum decay and Euclidean lattice Monte Carlo,” *Phys. Rev. D* **107**, 094506 (2023) [[arXiv: 2210.05925 \[hep-lat\]](#)].
50. V. D. Elvira, S. Gottlieb, O. Gutsche, B. Nachmanm, S. Bailey, W. Bhimji, P. Boyle, G. Cerati, M. Carrasco Kind and K. Cranmer, *et al.* “The future of high energy physics software and computing,” [arXiv:2210.05822 \[hep-ex\]](#).
49. M. Artuso, R. H. Bernstein, A. A. Petrov, T. Blum, A. Di Canto, S. Davidson, B. Echenard, S. Gori, E. Goudzovski and R. F. Lebed, *et al.* “Report of the Frontier for Rare Processes and Precision Measurements,” [arXiv:2210.04765 \[hep-ex\]](#).
48. R. C. Brower and E. K. Owen, “Ising Model on the affine plane,” *Phys. Rev. D* **108**, 014511 (2023) [[arXiv:2209.15546 \[hep-th\]](#)].
47. A. Hasenfratz, C. Rebbi and O. Witzel, “Gradient flow step-scaling function for SU(3) with $N_f = 6$ or 4 fundamental flavors,” *Phys. Rev. D* **106**, 114509 (2022) [[arXiv:2209.14224 \[hep-lat\]](#)].
46. Z. Davoudi, E. T. Neil, C. W. Bauer, T. Bhattacharya, T. Blum, P. Boyle, R. C. Brower, S. Catterall, N. H. Christ and V. Cirigliano, *et al.* “Report of the Snowmass 2021 Topical Group on Lattice Gauge Theory,” [arXiv:2209.10758 \[hep-lat\]](#).
45. P. Boyle, K. Pedro and J. Qiang, “CompF2: Theoretical Calculations and Simulation Topical Group Report,” [arXiv:2209.08177 \[physics.comp-ph\]](#).
44. S. Bhattacharya, K. Cichy, M. Constantinou, J. Dodson, X. Gao, A. Metz, S. Mukherjee, A. Scapellato, F. Steffens and Y. Zhao, “Generalized parton distributions from lattice QCD with asymmetric momentum transfer: Unpolarized quarks,” *Phys. Rev. D* **106**, 114512 (2022) [[arXiv:2209.05373 \[hep-lat\]](#)].
43. E. T. Neil and J. W. Sitison, “Improved information criteria for Bayesian model averaging in lattice field theory,” *Phys. Rev. D* **109**, 014510 (2024) [[arXiv:2208.14983 \[stat.ME\]](#)].
42. A. Radhakrishnan *et al.* [Hadron Spectrum], “Radiative decay of the resonant K^* and the $\gamma K \rightarrow K\pi$ amplitude from lattice QCD,” *Phys. Rev. D* **106**, 114513 (2022) [[arXiv:2208.13755 \[hep-lat\]](#)].
41. W. Detmold, W. I. Jay, D. J. Murphy, P. R. Oare and P. E. Shanahan, “Neutrinoless double beta decay from lattice QCD: The Short-Distance $\pi^- \rightarrow \pi^+ e^- e^-$ Amplitude,” *Phys. Rev. D* **107**, 094501 (2023) [[arXiv:2208.05322 \[hep-lat\]](#)].
40. A. Di Canto and S. Meinel, “Weak decays of b and c Quarks,” [arXiv:2208.05403 \[hep-ex\]](#).

39. 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**, 191901 (2023) [[arXiv:2208.03834 \[hep-lat\]](#)].
38. X. Gao, A. D. Hanlon, N. Karthik, S. Mukherjee, P. Petreczky, P. Scior, S. Shi, S. Syritsyn, Y. Zhao and K. Zhou, “Continuum-extrapolated NNLO valence PDF of the pion at the physical point,” *Phys. Rev. D* **106**, 114510 (2022) [[arXiv:2208.02297 \[hep-lat\]](#)].
37. Z. Fan, H. W. Lin and M. Zeilbeck, “Nonperturbatively renormalized nucleon gluon momentum fraction in the continuum limit of $N_f = 2 + 1 + 1$ lattice QCD,” *Phys. Rev. D* **107**, 034505 (2023) [[arXiv:2208.00980 \[hep-lat\]](#)].
36. R. F. Lebed, T. Skwarnicki, L. An, S. Dobbs, B. Fulsom, F. K. Guo, M. Karliner, R. E. Mitchell, A. Pilloni and A. Pompili, *et al.* “Summary of Topical Group on Hadron Spectroscopy (RF07),” [arXiv:2207.14594 \[hep-ph\]](#).
35. D. J. Zhao *et al.* [χ QCD], “Distance between various discretized fermion actions,” *Phys. Rev. D* **107**, L091501 (2023) [[arXiv:2207.14132 \[hep-lat\]](#)].
34. M. Constantinou and H. Panagopoulos, “Improved renormalization scheme for nonlocal operators,” *Phys. Rev. D* **107**, 014503 (2023) [[arXiv:2207.09977 \[hep-lat\]](#)].
33. C. Egerer *et al.* [HadStruc], “Toward the determination of the gluon helicity distribution in the nucleon from lattice quantum chromodynamics,” *Phys. Rev. D* **106**, 094511 (2022) [[arXiv:2207.08733 \[hep-lat\]](#)].
32. A. S. Kronfeld *et al.* [USQCD], “Lattice QCD and Particle Physics,” [arXiv:2207.07641 \[hep-lat\]](#).
31. C. T. H. Davies *et al.* [Fermilab Lattice, MILC and HPQCD], “Windows on the hadronic vacuum polarization contribution to the muon anomalous magnetic moment,” *Phys. Rev. D* **106**, 074509 (2022) [[arXiv:2207.04765 \[hep-lat\]](#)].
30. X. Gao, A. D. Hanlon, N. Karthik, S. Mukherjee, P. Petreczky, P. Scior, S. Syritsyn and Y. Zhao, “Pion distribution amplitude at the physical point using the leading-twist expansion of the quasi-distribution-amplitude matrix” *Phys. Rev. D* **106**, 074505 (2022) [[arXiv:2206.04084 \[hep-lat\]](#)].
29. T. J. Hou, M. Yan, J. Liang, K. F. Liu and C. P. Yuan, “Connected and disconnected sea partons from the CT18 parametrization of PDFs,” *Phys. Rev. D* **106**, 096008 (2022) [[arXiv:2206.02431 \[hep-ph\]](#)].
28. 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**, 074510 (2022) [[arXiv:2206.00879 \[hep-lat\]](#)].
27. P. A. Boyle, B. Chakraborty, C. T. H. Davies, T. DeGrand, C. DeTar, L. Del Debbio, A. X. El-Khadra, F. Erben, J. M. Flynn and E. Gámiz, *et al.* “A lattice QCD perspective on weak decays of b and c quarks,” [arXiv:2205.15373 \[hep-lat\]](#).
26. N. Lang *et al.* [Hadron Spectrum], “Axial-vector D_1 hadrons in $D^*\pi$ scattering from QCD,” *Phys. Rev. Lett.* **129**, 252001 (2022) [[arXiv:2205.05026 \[hep-ph\]](#)].
25. F. He *et al.* [χ QCD], “RI/MOM and RI/SMOM renormalization of quark bilinear operators using overlap fermions,” *Phys. Rev. D* **106**, 114506 (2022) [[arXiv:2204.09246 \[hep-lat\]](#)].
24. A. Hasenfratz, “Emergent strongly coupled ultraviolet fixed point in four dimensions with eight Kähler-Dirac fermions,” *Phys. Rev. D* **106**, 014513 (2022) [[arXiv:2204.04801 \[hep-lat\]](#)].

23. C. W. Bauer, Z. Davoudi, A. B. Balantekin, T. Bhattacharya, M. Carena, W. A. de Jong, P. Draper, A. El-Khadra, N. Gemelke and M. Hanada, *et al.* “Quantum simulation for high energy physics,” [arXiv:2204.03381 \[quant-ph\]](#).
22. G. Wang *et al.* [χ QCD], “Muon $g - 2$ with overlap valence fermions,” *Phys. Rev. D* **107**, 034513 (2023) [[arXiv:2204.01280 \[hep-lat\]](#)].
21. P. C. Barry *et al.* [JAM and HadStruc], “Complementarity of experimental and lattice QCD data on pion parton distributions,” *Phys. Rev. D* **105**, 114051 (2022) [[arXiv:2204.00543 \[hep-ph\]](#)].
20. P. Boyle, D. Bollweg, R. Brower, N. Christ, C. DeTar, R. Edwards, S. Gottlieb, T. Izubuchi, B. Joo and F. Joswig, *et al.* “Lattice QCD and the Computational Frontier,” [arXiv:2204.00039 \[hep-lat\]](#).
19. J. Kuti, Z. Fodor, K. Holland and C. H. Wong, “From ten-flavor tests of the β -function to α_s at the Z-pole,” *PoS LATTICE2021*, 321 (2022) [[arXiv:2203.15847 \[hep-lat\]](#)].
18. L. Alvarez-Ruso, J. L. Barrow, L. Bellantoni, M. Betancourt, A. Bross, L. Cremonesi, K. Duffy, S. Dytman, L. Fields and T. Fukuda, *et al.* “Neutrino scattering measurements on hydrogen and deuterium,” [arXiv:2203.11298 \[hep-ex\]](#).
17. P. S. B. Dev, L. W. Koerner, S. Saad, S. Antusch, M. Askins, K. S. Babu, J. L. Barrow, J. Chakraborty, A. de Gouvêa and Z. Djurcic, *et al.* “Searches for baryon number violation in neutrino experiments: a white paper,” *J. Phys. G* **51**, 033001 (2024) [[arXiv:2203.08771 \[hep-ex\]](#)].
16. L. Alvarez Ruso, A. M. Ankowski, S. Bacca, A. B. Balantekin, J. Carlson, S. Gardiner, R. González-Jiménez, R. Gupta, T. J. Hobbs and M. Hoferichter, *et al.* “Theoretical tools for neutrino scattering: interplay between lattice QCD, EFTs, nuclear physics, phenomenology, and neutrino event generators,” [arXiv:2203.09030 \[hep-ph\]](#).
15. N. Osamura, P. Gubler and N. Yamanaka, “Contribution of the Weinberg-type operator to atomic and nuclear electric dipole moments,” *JHEP* **06**, 072 (2022) [[arXiv:2203.06878 \[hep-ph\]](#)].
14. J. Bulava, R. Briceño, W. Detmold, M. Döring, R. G. Edwards, A. Francis, F. Knechtli, R. Lewis, S. Prelovsek and S. M. Ryan, *et al.* “Hadron spectroscopy with lattice QCD,” [arXiv:2203.03230 \[hep-lat\]](#).
13. T. Bhattacharya, V. Cirigliano, R. Gupta, E. Mereghetti and B. Yoon, “Calculation of neutron electric dipole moment due to the QCD topological term, Weinberg three-gluon operator and the quark chromoelectric moment,” *PoS LATTICE2021*, 567 (2022) [[arXiv:2203.03746 \[hep-lat\]](#)].
12. R. Gupta, T. Bhattacharya, V. Cirigliano, M. Hoferichter, Y. C. Jang, B. Joo, E. Mereghetti, S. Mondal, S. Park and F. Winter, *et al.* “Excited states and precision results for nucleon charges and form factors,” *PoS LATTICE2021*, 478 (2022) [[arXiv:2203.05647 \[hep-lat\]](#)].
11. S. Park, T. Bhattacharya, R. Gupta, H. W. Lin, S. Mondal, B. Yoon and R. Zhang, “Flavor diagonal nucleon charges,” *PoS LATTICE2021*, 558 (2022) [[arXiv:2203.09584 \[hep-lat\]](#)].
10. D. Bollweg *et al.* [HotQCD], “Taylor expansions and Padé approximants for cumulants of conserved charge fluctuations at nonvanishing chemical potentials,” *Phys. Rev. D* **105**, 074511 (2022) [[arXiv:2202.09184 \[hep-lat\]](#)].
9. S. Catterall and J. Giedt, “Supersymmetric lattice theories,” [arXiv:2202.08154 \[hep-lat\]](#).

8. 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**, 172002 (2022) [[arXiv:2202.01472 \[hep-lat\]](#)].
7. A. Hasenfratz, C. J. Monahan, M. D. Rizik, A. Shindler and O. Witzel, “A novel nonperturbative renormalization scheme for local operators,” *PoS LATTICE2021*, 155 (2022) [[arXiv:2201.09740 \[hep-lat\]](#)].
6. K. Zhang, W. Sun, Y. B. Yang and R. Q. Zhang, “Performance of the GPU inverters with Chroma+ QUDA for various fermion actions,” *PoS LATTICE2021*, 347 (2022) [[arXiv:2201.09004 \[hep-lat\]](#)].
5. A. Scapellato, C. Alexandrou, K. Cichy, M. Constantinou, K. Hadjiyiannakou, K. Jansen and F. Steffens, “Proton generalized parton distributions from lattice QCD,” *Rev. Mex. Fis. Suppl.* **3**, 0308104 (2022) [[arXiv:2201.06519 \[hep-lat\]](#)].
4. S. Bacchio, J. Finkenrath and C. Stylianou, “Lynx-API: a Python API for Lattice QCD applications,” *PoS LATTICE2021*, 542 (2022) [[arXiv:2201.03873 \[hep-lat\]](#)].
3. M. Tomii, T. Blum, D. Hoyaing, T. Izubuchi, L. Jin, C. Jung and A. Soni, “ $K \rightarrow \pi\pi$ decay matrix elements at the physical point with periodic boundary conditions,” *PoS LATTICE2021*, 394 (2022) [[arXiv:2201.02320 \[hep-lat\]](#)].
2. X. Feng, T. Izubuchi, L. Jin and M. Golterman, “Pion electric polarizabilities from lattice QCD,” *PoS LATTICE2021*, 362 (2022) [[arXiv:2201.01396 \[hep-lat\]](#)].
1. S. Mondal, T. Bhattacharya, R. Gupta, B. Joó, H. W. Lin, S. Park, F. Winter and B. Yoon, “Nucleon isovector momentum fraction, helicity and transversity moment using Lattice QCD,” *PoS LATTICE2021*, 513 (2022) [[arXiv:2201.00067 \[hep-lat\]](#)].

INSPIRE search “find date 2022 and fulltext USQCD” includes papers using the USQCD software stack and/or data generated on USQCD computing resources. The 2022 list also includes contributions to the Snowmass and NSAC processes that mention the role of USQCD in shaping the U.S. HEP and/or NP programs.

May 24, 2024