References

- [1] Approximating the Turaev-Viro Invariant of Mapping Tori is Complete for One Clean Qubit, 2011/05/31 2011.
- [2] Partial-indistinguishability obfuscation using braids, 2014/08/21 2014.
- [3] Experimental Comparison of Two Quantum Computing Architectures, volume 114, 2017/03/21 2017.
- [4] Sequential measurements, disturbance and property testing, 2017/01/01 2017.
- [5] M. A. Aamir, P. J. Suria, J. A. M. Guzmán, C. Castillo-Moreno, J. M. Epstein, N. Y. Halpern, and S. Gasparinetti. Thermally driven quantum refrigerator autonomously resets superconducting qubit. 5/26/2023 2023.
- [6] S. Aaronson, S. Beigi, A. Drucker, B. Fefferman, and P. Shor. The power of unentanglement. 2008/04/04
- [7] R. Abbott, W. Detmold, F. Romero-López, Z. Davoudi, M. Illa, A. Parreño, R. J. Perry, P. E. Shanahan, and M. L. Wagman. Lattice quantum chromodynamics at large isospin density: 6144 pions in a box. 7/27/2023 2023.
- [8] J. Aftab, D. An, and K. Trivisa. Multi-product hamiltonian simulation with explicit commutator scaling. 3/13/2024 2024.
- [9] R. Agarwal, S. Rethinasamy, K. Sharma, and M. M. Wilde. Estimating distinguishability measures on quantum computers. 8/18/2021 2021.
- [10] C. A. Agón, M. Headrick, and B. Swingle. Subsystem complexity and holography. 2018.
- [11] I. Ahmadabadi, H. Dehghani, and M. Hafezi. Optical conductivity and orbital magnetization of floquet vortex states. 4/20/2022 2022.
- [12] G. Alagic, J. Alperin-Sheriff, D. Apon, D. Cooper, Q. Dang, J. Kelsey, Y.-K. Liu, C. Miller, D. Moody, R. Peralta, R. Perlner, A. Robinson, and D. Smith-Tone. Status report on the second round of the nist post-quantum cryptography standardization process. *NISTIR* 8309, 07/2020 2020.
- [13] G. Alagic, J. Alperin-Sheriff, D. Apon, D. Cooper, Q. Dang, C. Miller, D. Moody, R. Peralta, R. Perlner, A. Robinson, D. Smith-Tone, and Y.-K. Liu. Status report on the first round of the nist post-quantum cryptography standardization process. *School: National Institute for Standards and Technology*, 2019.
- [14] G. Alagic, D. Apon, D. Cooper, Q. Dang, T. Dang, J. Kelsey, J. Lichtinger, C. Miller, D. Moody, R. Peralta, R. Perlner, and A. Robinson. Status report on the third round of the nist post-quantum cryptography standardization process. *NIST*, 7/2022 2022.
- [15] G. Alagic, C. Bai, J. Katz, and C. Majenz. Post-quantum security of the even-mansour cipher. *Advances in Cryptology EUROCRYPT 2022*, 2022.
- [16] G. Alagic, C. Bai, J. Katz, C. Majenz, and P. Struck. Post-quantum security of the (tweakable) fx construction, and applications. 8/29/2022 2022.
- [17] G. Alagic, C. Bai, J. Katz, C. Majenz, and P. Struck. Post-quantum security of tweakable even-mansour, and applications. 2024.
- [18] G. Alagic, C. Bai, A. Poremba, and K. Shi. On the two-sided permutation inversion problem. 6/23/2023 2023.
- [19] G. Alagic, C. Bai, A. Poremba, and K. Shi. On the two-sided permutation inversion problem. *IACR Communications in Cryptology*, 1, 4/22/2024 2024.
- [20] G. Alagic, A. Bapat, and S. P. Jordan. Classical simulation of yang-baxter gates. 9th Conference on the Theory of Quantum Computation, Communication and Cryptography (TQC 2014), 27:161–175, 2014/07/05 2014.

- [21] G. Alagic and E. A. Bering. Quantum algorithms for invariants of triangulated manifolds. *Quantum Info. Comput. Vol.*, 12:843–863, 2012.
- [22] G. Alagic, Z. Brakerski, Y. Dulek, and C. Schaffner. Impossibility of quantum virtual black-box obfuscation of classical circuits. 5/13/2020 2020.
- [23] G. Alagic, A. Broadbent, B. Fefferman, T. Gagliardoni, C. Schaffner, and M. S. Jules. Computational security of quantum encryption. In *Computational Security of Quantum Encryption. In: Nascimento A., Barreto P. (eds) Information Theoretic Security.*, 2016/11/10 2016.
- [24] G. Alagic, A. M. Childs, A. B. Grilo, and S.-H. Hung. Non-interactive classical verification of quantum computation. *Theory of Cryptography Conference (TCC)*, Lecture Notes in Computer Science 12552:153–180, 3/9/2020 2020.
- [25] G. Alagic, Y. Dulek, C. Schaffner, and F. Speelman. Quantum fully homomorphic encryption with verification. *Proceedings of ASIACRYPT 2017*, pages 438–467, 2017/11/30 2017.
- [26] G. Alagic and B. Fefferman. On quantum obfuscation. 2016/02/04 2016.
- [27] G. Alagic, T. Gagliardoni, and C. Majenz. Unforgeable quantum encryption. 2017/09/19 2017.
- [28] G. Alagic, T. Gagliardoni, and C. Majenz. Unforgeable quantum encryption. *In: Nielsen J., Rijmen V. (eds) Advances in Cryptology EUROCRYPT 2018. Lecture Notes in Computer Science, Springer, Cham*, 10822, 2018.
- [29] G. Alagic, T. Gagliardoni, and C. Majenz. Can you sign a quantum state? *v4: version for publication in Quantum, v5: CC license*, 12/6/2021 2021.
- [30] G. Alagic, M. Jarret, and S. P. Jordan. Yang-baxter operators need quantum entanglement to distinguish knots. *Journal of Physics A*, 49:075203, 2016/01/12 2016.
- [31] G. Alagic, S. Jeffery, M. Ozols, and A. Poremba. On non-adaptive quantum chosen-ciphertext attacks and learning with errors. *14th Conference on the Theory of Quantum Computation, Communication and Cryptography, TQC 2019, June 3-5, 2019, University of Maryland, College Park, Maryland, USA*, pages 1:1–1:23, 2019.
- [32] G. Alagic, S. Jeffery, M. Ozols, and A. Poremba. On quantum chosen-ciphertext attacks and learning with errors. *Cryptography*, 4:10, 3/21/2020 2020.
- [33] G. Alagic, S. P. Jordan, R. Koenig, and B. W. Reichardt. Approximating turaev-viro 3-manifold invariants is universal for quantum computation. *Physical Review A*, 82, 2010/10/8 2010.
- [34] G. Alagic and C. Lo. 3-manifold diagrams and np vs p. *Quantum Information & Computation*, 17:125–141, 2017.
- [35] G. Alagic and C. Majenz. Quantum non-malleability and authentication. *In: Katz J., Shacham H. (eds) Advances in Cryptology CRYPTO 2017. Lecture Notes in Computer Science. Springer, Cham,* 10402, 2017.
- [36] G. Alagic, C. Majenz, and A. Russell. Efficient simulation of random states and random unitaries. *In: Canteaut A., Ishai Y. (eds) Advances in Cryptology EUROCRYPT 2020. Lecture Notes in Computer Science, Springer, Cham,* 12107:759–787, 5/1/2020 2020.
- [37] G. Alagic, C. Majenz, A. Russell, and F. Song. Quantum-secure message authentication via blind-unforgeability. 2018.
- [38] G. Alagic, C. Majenz, A. Russell, and F. Song. Quantum-access-secure message authentication via blind-unforgeability. *In: Canteaut A., Ishai Y. (eds) Advances in Cryptology EUROCRYPT 2020. Lecture Notes in Computer Science, Springer, Cham*, 12-17:788–817, 5/1/2020 2020.
- [39] G. Alagic, C. Moore, and A. Russell. Strong fourier sampling fails over gn. 11/7/2005 2005.
- [40] G. Alagic, C. Moore, and A. Russell. Quantum algorithms for simon's problem over general groups. *SODA '07: Proceedings of the eighteenth annual ACM-SIAM symposium on Discrete algorithms*, page 1217–1224, 1/25/2007 2007.

- [41] G. Alagic, C. Moore, and A. Russell. Quantum algorithms for simon's problem over nonabelian groups. *ACM Trans. Algorithms*, 6, 2010.
- [42] G. Alagic and A. Russell. Decoherence in quantum walks on the hypercube. *Phys. Rev. A*, 76:062304, 12/5/2005 2005.
- [43] G. Alagic and A. Russell. Quantum computing and the hunt for hidden symmetry. *Bulletin of the EATCS*, 93:53–75, 2007.
- [44] G. Alagic and A. Russell. Uncertainty principles for compact groups. *Illinois J. Math.*, 52:1315–1324, 2008.
- [45] G. Alagic and A. Russell. Spectral concentration of positive functions on compact groups. *Journal of Fourier Analysis and Applications*, 17:355–373, 2011.
- [46] G. Alagic and A. Russell. Quantum-secure symmetric-key cryptography based on hidden shifts. *In: Coron JS., Nielsen J. (eds) Advances in Cryptology EUROCRYPT 2017. Lecture Notes in Computer Science, Springer, Cham,* 10212, 2017.
- [47] V. V. Albert. Bosonic coding: introduction and use cases. 11/10/2022 2022.
- [48] V. V. Albert, D. Aasen, W. Xu, W. Ji, J. Alicea, and J. Preskill. Spin chains, defects, and quantum wires for the quantum-double edge. 11/23/2021 2021.
- [49] V. V. Albert, J. P. Covey, and J. Preskill. Robust encoding of a qubit in a molecule. *Phys. Rev. X*, 10, 9/1/2020 2020.
- [50] V. V. Albert, E. Kubischta, M. Lemeshko, and L. R. Liu. Topology and entanglement of molecular phase space. 3/7/2024 2024.
- [51] C. H. Alderete, S. Singh, N. H. Nguyen, D. Zhu, R. Balu, C. Monroe, C. M. Chandrashekar, and N. M. Linke. Quantum walks and dirac cellular automata on a programmable trapped-ion quantum computer. 2/6/2020 2020.
- [52] D. S. Alexander, N. J. Ross, P. Selinger, J. M. Smith, and B. Valiron. Programming the quantum future. *Communications of the ACM*, 58:52–61, 2015/08/01 2015.
- [53] Y. Alexeev, M. Amsler, M. A. Barroca, S. Bassini, T. Battelle, D. Camps, D. Casanova, Y. J. Choi, F. T. Chong, C. Chung, C. Codella, A. D. Córcoles, J. Cruise, A. Di Meglio, I. Duran, T. Eckl, S. Economou, S. Eidenbenz, B. Elmegreen, C. Fare, I. Faro, C. S. Fernández, R. N. B. Ferreira, K. Fuji, B. Fuller, L. Gagliardi, G. Galli, J. R. Glick, I. Gobbi, P. Gokhale, S. de la Puente Gonzalez, J. Greiner, B. Gropp, M. Grossi, E. Gull, B. Healy, M. R. Hermes, B. Huang, T. S. Humble, N. Ito, A. F. Izmaylov, A. Javadi-Abhari, D. Jennewein, S. Jha, L. Jiang, B. Jones, W. A. de Jong, P. Jurcevic, W. Kirby, S. Kister, M. Kitagawa, J. Klassen, K. Klymko, K. Koh, M. Kondo, D. M. Kürkçüoglu, K. Kurowski, T. Laino, R. Landfield, M. Leininger, V. Leyton-Ortega, A. Li, M. Lin, J. Liu, N. Lorente, A. Luckow, S. Martiel, F. Martin-Fernandez, M. Martonosi, C. Marvinney, A. C. Medina, D. Merten, A. Mezzacapo, K. Michielsen, A. Mitra, T. Mittal, K. Moon, J. Moore, S. Mostame, M. Motta, Y.-H. Na, Y. Nam, P. Narang, Y.-y. Ohnishi, D. Ottaviani, M. Otten, S. Pakin, V. R. Pascuzzi, E. Pednault, T. Piontek, J. Pitera, P. Rall, G. S. Ravi, N. Robertson, M. A. Rossi, P. Rydlichowski, H. Ryu, G. Samsonidze, M. Sato, N. Saurabh, V. Sharma, K. Sharma, S. Shin, G. Slessman, M. Steiner, I. Sitdikov, I.-S. Suh, E. D. Switzer, W. Tang, J. Thompson, S. Todo, M. C. Tran, D. Trenev, C. Trott, H.-H. Tseng, N. M. Tubman, E. Tureci, D. G. Valiñas, S. Vallecorsa, C. Wever, K. Wojciechowski, X. Wu, S. Yoo, N. Yoshioka, V. W.-z. Yu, S. Yunoki, S. Zhuk, and D. Zubarev. Quantum-centric supercomputing for materials science: A perspective on challenges and future directions. Future Generation Computer Systems, 160:666-710, 9/19/2024 2024.
- [54] Y. Alexeev, D. Bacon, K. R. Brown, R. Calderbank, L. D. Carr, F. T. Chong, B. DeMarco, D. Englund, E. Farhi, B. Fefferman, A. V. Gorshkov, A. Houck, J. Kim, S. Kimmel, M. Lange, S. Lloyd, M. D. Lukin, D. Maslov, P. Maunz, C. Monroe, J. Preskill, M. Roetteler, M. Savage, J. Thompson, and U. Vazirani. Quantum computer systems for scientific discovery. 12/16/2019 2019.
- [55] Á. M. Alhambra, J. Riddell, and L. P. García-Pintos. Time evolution of correlation functions in quantum many-body systems. *Phys. Rev. Lett*, 124, 3/19/2020 2020.

- [56] G. W. Alldredge, C. D. Hauck, D. P. O'Leary, and A. L. Tits. Adaptive change of basis in entropy-based moment closures for linear kinetic equations. *Journal of Computational Physics*, 258:489 508, 2014/02/01 2014.
- [57] A. Almheiri, A. Milekhin, and B. Swingle. Universal constraints on energy flow and syk thermalization. 12/10/2019 2019.
- [58] Y. Alnawakhtha, A. Mantri, C. Miller, and D. Wang. Lattice-based quantum advantage from rotated measurements. *Quantum*, 8:1399, 7/2/2024 2024.
- [59] Y. Alnawakhtha and C. Miller. Where we are with quantum. Nature Physics, 4/28/2022 2022.
- [60] P. Alsing, P. Battle, J. C. Bienfang, T. Borders, T. Brower-Thomas, L. D. Carr, F. Chong, S. Dadras, B. DeMarco, I. Deutsch, E. Figueroa, D. Freedman, H. Everitt, D. Gauthier, E. Johnston-Halperin, J. Kim, M. Kira, P. Kumar, P. Kwiat, J. Lekki, A. Loiacono, M. Lončar, J. R. Lowell, M. Lukin, C. Merzbacher, A. Miller, C. Monroe, J. Pollanen, D. Pappas, M. Raymer, R. Reano, B. Rodenburg, M. Savage, T. Searles, and J. Ye. Accelerating progress towards practical quantum advantage: The quantum technology demonstration project roadmap. 3/20/2023 2023.
- [61] E. Altman, K. R. Brown, G. Carleo, L. D. Carr, E. Demler, C. Chin, B. DeMarco, S. E. Economou, M. A. Eriksson, K.-M. C. Fu, M. Greiner, K. R. A. Hazzard, R. G. Hulet, A. J. Kollár, B. L. Lev, M. D. Lukin, R. Ma, X. Mi, S. Misra, C. Monroe, K. Murch, Z. Nazario, K.-K. Ni, A. C. Potter, and P. Roushan. Quantum simulators: Architectures and opportunities. 12/14/2019 2019.
- [62] S. Amarasinghe, R. Baghdadi, Z. Davoudi, W. Detmold, M. Illa, A. Parreño, A. V. Pochinsky, P. E. Shanahan, and M. L. Wagman. Variational study of two-nucleon systems with lattice qcd. *Physical Review D*, 107, 5/17/2023 2023.
- [63] A. Ambainis, A. M. Childs, F. L. Gall, and S. Tani. The quantum query complexity of certification. 2009/03/06 2009.
- [64] A. Ambainis, A. M. Childs, and Y.-K. Liu. Quantum property testing for bounded-degree graphs. *Proc. RANDOM*, pages 365–376, 2010/12/14 2010.
- [65] M. Amy, J. Chen, and N. J. Ross. A finite presentation of cnot-dihedral operators. 2016/12/31 2016.
- [66] M. Amy, A. N. Glaudell, and N. J. Ross. Number-theoretic characterizations of some restricted clifford+t circuits. 8/16/2019 2019.
- [67] D. An, A. M. Childs, and L. Lin. Quantum algorithm for linear non-unitary dynamics with near-optimal dependence on all parameters. 12/6/2023 2023.
- [68] D. An, D. Fang, S. Jordan, J.-P. Liu, G. H. Low, and J. Wang. Efficient quantum algorithm for nonlinear reaction-diffusion equations and energy estimation. 5/2/2022 2022.
- [69] D. An, D. Fang, and L. Lin. Time-dependent hamiltonian simulation of highly oscillatory dynamics and superconvergence for schrödinger equation. *Quantum*, 6:690, apr 2022.
- [70] D. An, N. Linden, J.-P. Liu, A. Montanaro, C. Shao, and J. Wang. Quantum-accelerated multilevel monte carlo methods for stochastic differential equations in mathematical finance. *Quantum 5*, 481 (2021), 5:481, 6/22/2021 2021.
- [71] D. An, J.-P. Liu, and L. Lin. Linear combination of hamiltonian simulation for non-unitary dynamics with optimal state preparation cost. *Phys. Rev. Lett.*, 131, 10/13/2023 2023.
- [72] D. An, J.-P. Liu, D. Wang, and Q. Zhao. A theory of quantum differential equation solvers: limitations and fast-forwarding. 11/9/2022 2022.
- [73] D. An, J.-P. Liu, D. Wang, and Q. Zhao. A theory of quantum differential equation solvers: limitations and fast-forwarding. 3/2/2023 2023.
- [74] A. Anandkumar, D. P. Foster, D. Hsu, S. M. Kakade, and Y.-K. Liu. A spectral algorithm for latent dirichlet allocation. *Algorithmica*, pages 193–214, 2012/04/30 2012.

- [75] B. M. Anderson, J. M. Taylor, and V. M. Galitski. Interferometry with synthetic gauge fields. *Physical Review A*, 83, 2011/3/3 2011.
- [76] F. Andreoli, M. Gullans, A. A. High, A. Browaeys, and D. E. Chang. Maximum refractive index of an atomic medium. *Physical Review X*, 11, 2/18/2021 2021.
- [77] F. Andreoli, B. Windt, S. Grava, G. M. Andolina, M. Gullans, A. A. High, and D. E. Chang. The maximum refractive index of an atomic crystal from quantum optics to quantum chemistry. 3/20/2023 2023.
- [78] A. Anshu, D. Touchette, P. Yao, and N. Yu. Exponential separation of quantum communication and classical information. In 20th Annual Conference on Quantum Information Processing (QIP), 2016/11/28 2016.
- [79] A. S. Arora, K. Bharti, A. Cojocaru, and A. Coladangelo. A computational test of quantum contextuality, and even simpler proofs of quantumness. *FOCS 2024 Accepted Paper*, 5/10/2024 2024.
- [80] A. S. Arora, A. Coladangelo, M. Coudron, A. Gheorghiu, U. Singh, and H. Waldner. Quantum depth in the random oracle model. 10/12/2022 2022.
- [81] S. Arunachalam, A. Belovs, A. M. Childs, R. Kothari, A. Rosmanis, and R. de Wolf. Quantum coupon collector. Proceedings of the 15th Conference on the Theory of Quantum Computation, Communication and Cryptography (TQC 2020), Leibniz International Proceedings in Informatics, 158:10:1–10:17, 2/18/2020 2020.
- [82] S. Arunachalam, A. B. Grilo, and A. Sundaram. Quantum hardness of learning shallow classical circuits. 03/07/2019 2019.
- [83] D. R. M. Arvidsson-Shukur, W. F. B. Jr., S. D. Bievre, J. Dressel, A. N. Jordan, C. Langrenez, M. Lostaglio, J. S. Lundeen, and N. Y. Halpern. Properties and applications of the kirkwood-dirac distribution. 3/27/2024 2024
- [84] D. R. M. Arvidsson-Shukur, A. G. McConnell, and N. Y. Halpern. Quantum simulations of time travel can power nonclassical metrology. *Phys. Rev. Lett.*, 131, 11/3/2023 2023.
- [85] D. R. M. Arvidsson-Shukur, A. G. McConnell, and N. Yunger Halpern. Nonclassical advantage in metrology established via quantum simulations of hypothetical closed timelike curves. *Phys. Rev. Lett.*, 131:150202, 10/12/2023 2023.
- [86] M. Aschbacher, A. M. Childs, and P. Wocjan. The limitations of nice mutually unbiased bases. *Journal of Algebraic Combinatorics*, 25:111 123, 2006/7/11 2007.
- [87] B. Augustino, J. Leng, G. Nannicini, T. Terlaky, and X. Wu. A quantum central path algorithm for linear optimization. 11/7/2023 2023.
- [88] D. Awschalom, K. K. Berggren, H. Bernien, S. Bhave, L. D. Carr, P. Davids, S. E. Economou, D. Englund, A. Faraon, M. Fejer, S. Guha, M. V. Gustafsson, E. Hu, L. Jiang, J. Kim, B. Korzh, P. Kumar, P. G. Kwiat, M. Lončar, M. D. Lukin, D. A. B. Miller, C. Monroe, S. W. Nam, P. Narang, and J. S. Orcutt. Development of quantum interconnects for next-generation information technologies. 12/13/2019 2019.
- [89] A. Aydin, M. A. Alekseyev, and A. Barg. A family of permutationally invariant quantum codes. *Quantum*, 8:1321, 6/18/2024 2024.
- [90] A. Aydin and A. Barg. Class of codes correcting absorptions and emissions. 10/4/2024 2024.
- [91] D. Bacon, A. M. Childs, I. L. Chuang, J. Kempe, D. W. Leung, and X. Zhou. Universal simulation of markovian quantum dynamics. *Physical Review A*, 64, 2001/11/9 2001.
- [92] D. Bacon, A. M. Childs, and W. van Dam. From optimal measurement to efficient quantum algorithms for the hidden subgroup problem over semidirect product groups. 2005/04/11 2005.
- [93] D. Bacon, A. M. Childs, and W. van Dam. Optimal measurements for the dihedral hidden subgroup problem. 2005/01/10 2005.
- [94] C. Badertscher, A. Cojocaru, L. Colisson, E. Kashefi, D. Leichtle, A. Mantri, and P. Wallden. Security limitations of classical-client delegated quantum computing. 7/3/2020 2020.

- [95] T. Bagci, A. Simonsen, S. Schmid, L. G. Villanueva, E. Zeuthen, J. Appel, J. M. Taylor, A. Sørensen, K. Usami, A. Schliesser, and E. S. Polzik. Optical detection of radio waves through a nanomechanical transducer. *Nature*, 507:81 85, 2014/3/5 2014.
- [96] C. L. Baldwin, P. Bienias, A. V. Gorshkov, M. Gullans, and M. Maghrebi. Singularities in nearly-uniform 1d condensates due to quantum diffusion. 3/10/2021 2021.
- [97] C. L. Baldwin, A. Ehrenberg, A. Y. Guo, and A. V. Gorshkov. Disordered lieb-robinson bounds in one dimension. 8/10/2022 2022.
- [98] C. L. Baldwin, S. Shivam, S. L. Sondhi, and M. Kardar. Distinct critical behaviors from the same state in quantum spin and population dynamics perspectives. 9/10/2020 2020.
- [99] C. L. Baldwin and B. Swingle. Quenched vs annealed: Glassiness from sk to syk. 11/26/2019 2019.
- [100] J. D. Baltrusch, A. Negretti, J. M. Taylor, and T. Calarco. Fast and robust quantum computation with ionic wigner crystals. *Physical Review A*, 83, 2011/4/15 2011.
- [101] S. Bandyopadhyay, G. Brassard, S. Kimmel, and W. K. Wootters. Entanglement cost of nonlocal measurements. *Physical Review A*, 80, 2009/7/15 2009.
- [102] D. Bao and B. Lackey. A hodge decomposition theorem for finsler spaces. *Comptes rendus de l'Académie des sciences. Série 1, Mathématique*, 323(1):51–56, 1996/01/01 1996.
- [103] D. Bao and B. Lackey. Special eigenforms on the sphere bundle of a finsler manifold. *Contemporary Mathematics*, 196:67–78, 1996.
- [104] D. Bao and B. Lackey. A geometric inequality and a Weitzenboeck formula for Finsler surfaces, page 245–275. Springer, 1998.
- [105] D. Bao and B. Lackey. Randers surfaces whose laplacians have completely positive symbol. *Nonlinear Analysis: Theory, Methods & Applications*, 38:27–40, 1999.
- [106] N. Bao, A. Bouland, and S. P. Jordan. Grover search and the no-signaling principle. *Physical Review Letters*, 117:120501, 2016/09/14 2016.
- [107] N. Bao, R. Bousso, S. P. Jordan, and B. Lackey. Fast optimization algorithms and the cosmological constant. *Physical Review D*, 96:103512, 2017/11/13 2017.
- [108] N. Bao, C. Cao, S. Fischetti, and C. Keeler. Towards bulk metric reconstruction from extremal area variations. 04/09/19 2019.
- [109] N. Bao, C. Cao, S. Fischetti, J. Pollack, and Y. Zhong. More of the bulk from extremal area variations. *Classical and Quantum Gravity*, 38:047001, 12/24/2020 2020.
- [110] N. Bao, C. Cao, and V. P. Su. Magic state distillation from entangled states. 6/23/2021 2021.
- [111] N. Bao, C. Cao, and G. Zhu. Deconfinement and error thresholds in holography. 2/9/2022 2022.
- [112] A. Bapat, A. M. Childs, A. V. Gorshkov, S. King, E. Schoute, and H. Shastri. Quantum routing with fast reversals. *Quantum*, 5, 8/24/2021 2021.
- [113] A. Bapat, A. M. Childs, A. V. Gorshkov, and E. Schoute. Advantages and limitations of quantum routing. *PRX Quantum*, 4, 2/1/2023 2023.
- [114] A. Bapat, Z. Eldredge, J. R. Garrison, A. Desphande, F. T. Chong, and A. V. Gorshkov. Unitary entanglement construction in hierarchical networks. 2018.
- [115] A. Bapat and S. Jordan. Bang-bang control as a design principle for classical and quantum optimization algorithms. *Quantum Information & Computation*, 19:424–446, 8/1/2019 2019.
- [116] A. Bapat and S. P. Jordan. Approximate optimization of maxcut with a local spin algorithm. 8/13/2020 2020.

- [117] A. Bapat, E. Schoute, A. V. Gorshkov, and A. M. Childs. Nearly optimal time-independent reversal of a spin chain. *accepted for publication in Physical Review Research*, 3/5/2020 2020.
- [118] M. Barbosa, G. Barthe, C. Doczkal, J. Don, S. Fehr, B. Grégoire, Y.-H. Huang, A. Hülsing, Y. Lee, and X. Wu. Fixing and mechanizing the security proof of fiat-shamir with aborts and dilithium. In H. Handschuh and A. Lysyanskaya, editors, *Advances in Cryptology CRYPTO 2023*, Cham, 8/9/2023 2023. Springer Nature Switzerland, Springer Nature Switzerland.
- [119] M. Barbosa, G. Barthe, X. Fan, B. Grégoire, S.-H. Hung, J. Katz, P.-Y. Strub, X. Wu, and L. Zhou. Easypqc: Verifying post-quantum cryptography. *ACM CCS 2021*, 9/20/2021 2021.
- [120] A. Barg, N. J. Coble, D. Hangleiter, and C. Kang. Geometric structure and transversal logic of quantum reed-muller codes. 10/10/2024 2024.
- [121] D. S. Barker, D. Carney, T. W. LeBrun, D. C. Moore, and J. M. Taylor. Collision-resolved pressure sensing. 3/17/2023 2023.
- [122] M. Barkeshli, Y.-A. Chen, P.-S. Hsin, and R. Kobayashi. Higher-group symmetry in finite gauge theory and stabilizer codes. 11/21/2022 2022.
- [123] M. Barkeshli, Y.-A. Chen, P.-S. Hsin, and N. Manjunath. Classification of (2+1)d invertible fermionic topological phases with symmetry. *Phys. Rev. B*, 105, 5/30/2022 2022.
- [124] M. Barkeshli, Y.-A. Chen, S.-J. Huang, R. Kobayashi, N. Tantivasadakarn, and G. Zhu. Codimension-2 defects and higher symmetries in (3+1)d topological phases. 8/15/2022 2022.
- [125] A. O. Barvinsky, D. Carney, and P. C. E. Stamp. Structure of correlated worldline theories of quantum gravity. *Phys. Rev.*, D:084052, 2018/06/21 2018.
- [126] C. W. Bauer, Z. Davoudi, A. B. Balantekin, T. Bhattacharya, M. Carena, W. A. de Jong, P. Draper, A. El-Khadra, N. Gemelke, M. Hanada, D. Kharzeev, H. Lamm, Y.-Y. Li, J. Liu, M. Lukin, Y. Meurice, C. Monroe, B. Nachman, G. Pagano, J. Preskill, E. Rinaldi, A. Roggero, D. I. Santiago, M. J. Savage, I. Siddiqi, G. Siopsis, D. Van Zanten, N. Wiebe, Y. Yamauchi, K. Yeter-Aydeniz, and S. Zorzetti. Quantum simulation for high energy physics. 4/7/2022 2022.
- [127] C. W. Bauer, Z. Davoudi, N. Klco, and M. J. Savage. Quantum simulating nature's fundamental fields. *Nature Reviews Physics*, 5:420–432, 4/9/2024 2023.
- [128] Ä. Baumeler, A. S. Gilani, and J. Rashid. Unlimited non-causal correlations and their relation to non-locality. *Quantum*, 6:673, 3/22/2022 2022.
- [129] F. Baumer, F. Münchow, A. Görlitz, S. E. Maxwell, P. S. Julienne, and E. Tiesinga. Spatial separation in a thermal mixture of ultracold ¹⁷⁴yb and ⁸⁷rb atoms. *Physical Review A*, 83, 2011/4/21 2011.
- [130] S. Bäuml, S. Das, X. Wang, and M. M. Wilde. Resource theory of entanglement for bipartite quantum channels. 07/08/2019 2019.
- [131] S. Beigi, J. Chen, M. Grassl, Z. Ji, Q. Wang, and B. Zeng. Symmetries of codeword stabilized quantum codes. 8th Conference on the Theory of Quantum Computation, Communication and Cryptography (TQC 2013), 22:192–206, 2013/03/28 2013.
- [132] R. Belyansky, P. Bienias, Y. A. Kharkov, A. V. Gorshkov, and B. Swingle. Minimal model for fast scrambling. *Phys. Rev. Lett.*, 125, 9/22/2020 2020.
- [133] R. Belyansky, S. Whitsitt, R. Lundgren, Y. Wang, A. Vrajitoarea, A. A. Houck, and A. V. Gorshkov. Transport and dynamics in the frustrated two-bath spin-boson model. 7/7/2020 2020.
- [134] R. Belyansky, S. Whitsitt, R. Lundgren, Y. Wang, A. Vrajitoarea, A. A. Houck, and A. V. Gorshkov. Frustration-induced anomalous transport and strong photon decay in waveguide qed. *Phys. Rev. Research*, 3, 9/16/2021 2021.
- [135] R. Belyansky, S. Whitsitt, N. Mueller, A. Fahimniya, E. R. Bennewitz, Z. Davoudi, and A. V. Gorshkov. High-energy collision of quarks and hadrons in the schwinger model: From tensor networks to circuit qed. 7/5/2023 2023.

- [136] R. Belyansky, S. Whitsitt, N. Mueller, A. Fahimniya, E. R. Bennewitz, Z. Davoudi, and A. V. Gorshkov. High-energy collision of quarks and mesons in the schwinger model: From tensor networks to circuit qed. *Physical Review Letters*, 132, 2/28/2024 2024.
- [137] R. Belyansky, J. T. Young, P. Bienias, Z. Eldredge, A. M. Kaufman, P. Zoller, and A. V. Gorshkov. Non-destructive cooling of an atomic quantum register via state-insensitive rydberg interactions. 7/28/2019 2019.
- [138] S. Ben-David, A. Bouland, A. Garg, and R. Kothari. Classical lower bounds from quantum upper bounds. 2018.
- [139] S. Ben-David, A. M. Childs, A. Gilyen, W. Kretschmer, S. Podder, and D. Wang. Symmetries, graph properties, and quantum speedups. In *Proceedings of the 61st IEEE Symposium on Foundations of Computer Science (FOCS 2020)*, pp. 649–660 (2020), 6/23/2020 2020.
- [140] M. Benito, X. Mi, J. M. Taylor, J. R. Petta, and G. Burkard. Input-output theory for spin-photon coupling in si double quantum dots. *Physical Review B*, 96:235434, 2017/12/22 2017.
- [141] E. R. Bennewitz, B. Ware, A. Schuckert, A. Lerose, F. M. Surace, R. Belyansky, W. Morong, D. Luo, A. De, K. S. Collins, O. Katz, C. Monroe, Z. Davoudi, and A. V. Gorshkov. Simulating meson scattering on spin quantum simulators. 3/11/2024 2024.
- [142] Z. A. Benson, A. Peshkov, N. Y. Halpern, D. C. Richardson, and W. Losert. Experimentally measuring rolling and sliding in three-dimensional dense granular packings. *Phys. Rev. Lett.*, 129:048001, 06/18/2022 2022.
- [143] J. Bermejo-Vega, C. Y.-Y. Lin, and M. V. den Nest. The computational power of normalizer circuits over black-box groups. 2014/09/16 2014.
- [144] J. Bermejo-Vega, C. Y.-Y. Lin, and M. V. den Nest. Normalizer circuits and a gottesman-knill theorem for infinite-dimensional systems. 2014/09/10 2014.
- [145] D. W. Berry and A. M. Childs. Black-box hamiltonian simulation and unitary implementation. 2009/10/22 2009.
- [146] D. W. Berry, A. M. Childs, R. Cleve, R. Kothari, and R. D. Somma. Exponential improvement in precision for simulating sparse hamiltonians. *Proceedings of the 46th ACM Symposium on Theory of Computing (STOC 2014)*, pages 283–292, 2014/05/31 2014.
- [147] D. W. Berry, A. M. Childs, R. Cleve, R. Kothari, and R. D. Somma. Simulating hamiltonian dynamics with a truncated taylor series. *Physical Review Letters*, 114:090502, 2015/03/03 2015.
- [148] D. W. Berry, A. M. Childs, and R. Kothari. Hamiltonian simulation with nearly optimal dependence on all parameters. *Proceedings of the 56th IEEE Symposium on Foundations of Computer Science*, pages 792–809, 2015/01/08 2015.
- [149] D. W. Berry, A. M. Childs, A. Ostrander, and G. Wang. Quantum algorithm for linear differential equations with exponentially improved dependence on precision. *Communications in Mathematical Physics*, 356:1057–1081, 2017/12/01 2017.
- [150] D. W. Berry, A. M. Childs, Y. Su, X. Wang, and N. Wiebe. Time-dependent hamiltonian simulation with 11-norm scaling. *Quantum*, 4, 4/20/2020 2020.
- [151] N. Berthusen, F. Alam, and Y. Zhang. Multi-reference quantum davidson algorithm for quantum dynamics. 6/12/2024 2024.
- [152] N. Berthusen, D. Devulapalli, E. Schoute, A. M. Childs, M. J. Gullans, A. V. Gorshkov, and D. Gottesman. Toward a 2d local implementation of quantum ldpc codes. 4/26/2024 2024.
- [153] N. Berthusen, J. Dreiling, C. Foltz, J. P. Gaebler, T. M. Gatterman, D. Gresh, N. Hewitt, M. Mills, S. A. Moses, B. Neyenhuis, P. Siegfried, and D. Hayes. Experiments with the 4d surface code on a qccd quantum computer. 8/16/2024 2024.

- [154] N. Berthusen and D. Gottesman. Partial syndrome measurement for hypergraph product codes. *Quantum*, 8:1345, 5/1/2024 2024.
- [155] M. Beverland, V. Kliuchnikov, and E. Schoute. Surface code compilation via edge-disjoint paths. 10/21/2021 2021.
- [156] M. E. Beverland, G. Alagic, M. J. Martin, A. P. Koller, A. M. Rey, and A. V. Gorshkov. Realizing exactly solvable su(n) magnets with thermal atoms. *Physical Review A*, 93, 2016/05/06 2016.
- [157] M. E. Beverland, J. Haah, G. Alagic, G. K. Campbell, A. M. Rey, and A. V. Gorshkov. Spectrum estimation of density operators with alkaline-earth atoms. 120, 2018/01/09 2018.
- [158] Z. Bian, F. Chudak, R. Israel, B. Lackey, W. G. Macready, and A. Roy. Discrete optimization using quantum annealing on sparse ising models. *Frontiers in Physics*, 2:56, 2014/09/01 2014.
- [159] Z. Bian, F. Chudak, R. Israel, B. Lackey, W. G. Macready, and A. Roy. Mapping constrained optimization problems to quantum annealing with application to fault diagnosis. 2016.
- [160] Z. Bian, F. Chudak, R. B. Israel, B. Lackey, W. G. Macready, and A. Roy. Mapping contrained optimization problems to quantum annealing with application to fault diagnosis. *Frontiers in ICT*, 3:14, 2016/07/28 2016.
- [161] J. C. Bienfang, C. W. Clark, C. J. Williams, E. W. Hagley, and J. Wen. Advantages of high-speed technique for quantum key distribution; reply to quant-ph/0407050. 2004/07/18 2004.
- [162] J. C. Bienfang, A. J. Gross, A. Mink, B. J. Hershman, A. Nakassis, X. Tang, R. Lu, D. H. Su, C. W. Clark, C. J. Williams, E. W. Hagley, and J. Wen. Quantum key distribution with 1.25 gbps clock synchronization. *Optics Express*, 12:2011, 2004/05/17 2004.
- [163] P. Bienias, I. Boettcher, R. Belyansky, A. J. Kollár, and A. V. Gorshkov. Circuit quantum electrodynamics in hyperbolic space: From photon bound states to frustrated spin models. 5/13/2021 2021.
- [164] P. Bienias, S. Choi, O. Firstenberg, M. F. Maghrebi, M. Gullans, M. D. Lukin, A. V. Gorshkov, and H. P. Büchler. Scattering resonances and bound states for strongly interacting rydberg polaritons. *Physical Review A*, 90, 2014/11/3 2014.
- [165] P. Bienias, J. Douglas, A. Paris-Mandoki, P. Titum, I. Mirgorodskiy, C. Tresp, E. Zeuthen, M. Gullans, M. Manzoni, S. Hofferberth, D. Chang, and A. V. Gorshkov. Photon propagation through dissipative rydberg media at large input rates. 2018.
- [166] P. Bienias, M. Gullans, M. Kalinowski, A. N. Craddock, D. P. Ornelas-Huerta, S. L. Rolston, J. V. Porto, and A. V. Gorshkov. Exotic photonic molecules via lennard-jones-like potentials. *Phys. Rev. Lett.*, 125, 9/19/2020 2020.
- [167] P. Bienias, A. Seif, and M. Hafezi. Meta hamiltonian learning. 4/9/2021 2021.
- [168] P. Bienias, S. Subhankar, Y. Wang, T.-C. Tsui, F. Jendrzejewski, T. Tiecke, G. Juzeliunas, L. Jiang, S. L. Rolston, J. V. Porto, and A. V. Gorshkov. Coherent optical nano-tweezers for ultra-cold atoms. 2018.
- [169] P. Bierhorst, E. Knill, S. Glancy, A. Mink, S. P. Jordan, A. Rommal, Y.-K. Liu, B. Christensen, S. W. Nam, and L. K. Shalm. Experimentally generated random numbers certified by the impossibility of superluminal signaling. 2017/02/16 2017.
- [170] P. Bierhorst, E. Knill, S. Glancy, Y. Zhang, A. Mink, S. Jordan, A. Rommal, Y.-K. Liu, B. Christensen, S. W. Nam, M. J. Stevens, and L. K. Shalm. Experimentally generated randomness certified by the impossibility of superluminal signals. *Nature*, 556:223–226, 2018/04/11 2018.
- [171] M. Bishof, Y. Lin, M. D. Swallows, A. V. Gorshkov, J. Ye, and A. M. Rey. Resolved atomic interaction sidebands in an optical clock transition. *Physical Review Letters*, 106, 2011/6/22 2011.
- [172] A. Blanc, Y.-K. Liu, and A. Vahda. Designing incentives for peer-to-peer routing. *Proc. INFOCOM*, pages 374–385, 2005/03/13 2005.

- [173] D. Bluvstein, S. J. Evered, A. A. Geim, S. H. Li, H. Zhou, T. Manovitz, S. Ebadi, M. Cain, M. Kalinowski, D. Hangleiter, J. P. B. Ataides, N. Maskara, I. Cong, X. Gao, P. S. Rodriguez, T. Karolyshyn, G. Semeghini, M. Gullans, M. Greiner, V. Vuletic, and M. D. Lukin. Logical quantum processor based on reconfigurable atom arrays. *Nature*, 12/7/2023 2023.
- [174] I. Boettcher, P. Bienias, R. Belyansky, A. J. Kollár, and A. V. Gorshkov. Quantum simulation of hyperbolic space with circuit quantum electrodynamics: From graphs to geometry. *Phys. Rev. A*, 102, 9/11/2020 2020.
- [175] I. Boettcher, A. V. Gorshkov, A. J. Kollár, J. Maciejko, S. Rayan, and R. Thomale. Crystallography of hyperbolic lattices. 5/3/2021 2021.
- [176] A. D. Bookatz, S. P. Jordan, Y.-K. Liu, and P. Wocjan. Testing quantum expanders is co-qma-complete. *Physical Review A*, 87, 2013/4/15 2013.
- [177] J. L. Bosse, A. M. Childs, C. Derby, F. M. Gambetta, A. Montanaro, and R. A. Santos. Efficient and practical hamiltonian simulation from time-dependent product formulas. 3/13/2024 2024.
- [178] C. Bouey, C. Graves, A. Ostrander, and G. Palma. Non-recursively constructible recursive families of graphs. *The Electronic Journal of Combinatorics*, 19, 2012/04/16 2012.
- [179] A. Bouland, B. Fefferman, C. Nirkhe, and U. Vazirani. Quantum supremacy and the complexity of random circuit sampling. 2018.
- [180] A. Bouland, T. Giurgica-Tiron, and J. Wright. The state hidden subgroup problem and an efficient algorithm for locating unentanglement. 10/16/2024 2024.
- [181] L. T. Brady, C. L. Baldwin, A. Bapat, Y. Kharkov, and A. V. Gorshkov. Optimal protocols in quantum annealing and qaoa problems. 3/19/2020 2020.
- [182] L. T. Brady, L. Kocia, P. Bienias, A. Bapat, Y. Kharkov, and A. V. Gorshkov. Behavior of analog quantum algorithms. 7/2/2021 2021.
- [183] F. G. S. L. Brandão, A. Kalev, T. Li, C. Y.-Y. Lin, K. M. Svore, and X. Wu. Exponential quantum speed-ups for semidefinite programming with applications to quantum learning. 2017/10/06 2017.
- [184] F. G. S. L. Brandão, A. Kalev, T. Li, C. Y.-Y. Lin, K. M. Svore, and X. Wu. Quantum sdp solvers: Large speed-ups, optimality, and applications to quantum learning. *To appear at the 46th International Colloquium on Automata, Languages and Programming (ICALP 2019)*, 2018.
- [185] J. B. Brask, L. Jiang, A. V. Gorshkov, V. Vuletic, A. S. Sorensen, and M. D. Lukin. Fast entanglement distribution with atomic ensembles and fluorescent detection. *Physical Review A*, 81, 2010/2/12 2010.
- [186] D. Braun, J. Hoffman, and E. Tiesinga. Superradiance of cold atoms coupled to a superconducting circuit. *Physical Review A*, 83, 2011/6/6 2011.
- [187] S. Breiner, A. Kalev, and C. Miller. Parallel self-testing of the ghz state with a proof by diagrams. *EPTCS*, 287:43–66, 01/29/2019 2019.
- [188] S. Breiner, C. Miller, and N. J. Ross. Graphical methods in device-independent quantum cryptography. *Quantum*, 3, 05/20/2019 2019.
- [189] G. K. Brennen, D. P. O'Leary, and S. S. Bullock. Criteria for exact qudit universality. *Physical Review A*, 71, 2005/5/16 2005.
- [190] G. K. Brennen, G. Pupillo, A. M. Rey, C. W. Clark, and C. J. Williams. Scalable register initialization for quantum computing in an optical lattice. *Journal of Physics B: Atomic, Molecular and Optical Physics*, 38:1687 1694, 2005/06/14 2005.
- [191] G. K. Brennen, D. Song, and C. J. Williams. A quantum computer architecture using nonlocal interactions. *Physical Review A*, 67, 2003/5/27 2003.
- [192] J. Bringewatt, I. Boettcher, P. Niroula, P. Bienias, and A. V. Gorshkov. Protocols for estimating multiple functions with quantum sensor networks: Geometry and performance. *Physical Review Research*, 3, 5/3/2021 2021.

- [193] J. Bringewatt and L. T. Brady. Simultaneous stoquasticity. Phys. Rev. A, 105, 06/09/2022 2022.
- [194] J. Bringewatt and Z. Davoudi. Parallelization techniques for quantum simulation of fermionic systems. 3/30/2023 2023.
- [195] J. Bringewatt, W. Dorland, and S. P. Jordan. Polynomial time algorithms for estimating spectra of adiabatic hamiltonians. *Phys. Rev. A*, 100, 10/1/2020 2019.
- [196] J. Bringewatt, W. Dorland, S. P. Jordan, and A. Mink. Diffusion monte carlo versus adiabatic computation for local hamiltonians. *Physical Review A*, 97:022323, 2018/02/15 2018.
- [197] J. Bringewatt, A. Ehrenberg, T. Goel, and A. V. Gorshkov. Optimal function estimation with photonic quantum sensor networks. *Physical Review Research*, 6, 3/6/2024 2024.
- [198] J. Bringewatt and M. Jarret. Effective gaps are not effective: quasipolynomial classical simulation of obstructed stoquastic hamiltonians. 4/21/2020 2020.
- [199] J. Bringewatt, M. Jarret, and T. C. Mooney. On the stability of solutions to schrödinger's equation short of the adiabatic limit. 3/23/2023 2023.
- [200] J. Bringewatt, J. Kunjummen, and N. Mueller. Randomized measurement protocols for lattice gauge theories. *Quantum*, 8:1300, 3/20/2024 2024.
- [201] J. Bringewatt, N. Sato, W. Melnitchouk, J.-W. Qiu, F. Steffens, and M. Constantinou. Confronting lattice parton distributions with global qcd analysis. 10/1/2020 2020.
- [202] J. Bringewatt, Z. Steffen, M. A. Ritter, A. Ehrenberg, H. Wang, B. S. Palmer, A. J. Kollár, A. V. Gorshkov, and L. P. García-Pintos. Generalized geometric speed limits for quantum observables. 9/6/2024 2024.
- [203] D. J. Brod and A. M. Childs. The computational power of matchgates and the xy interaction on arbitrary graphs. *Quantum Information and Computation*, 14:901–916, 2014/09/01 2014.
- [204] A. R. Brown, H. Gharibyan, S. Leichenauer, H. W. Lin, S. Nezami, G. Salton, L. Susskind, B. Swingle, and M. Walter. Quantum gravity in the lab: Teleportation by size and traversable wormholes. 2019/11/14 2019.
- [205] K. R. Brown, J. Kim, and C. Monroe. Co-designing a scalable quantum computer with trapped atomic ions. 2016/02/09 2016.
- [206] R. C. Brown, R. Wyllie, S. B. Koller, E. A. Goldschmidt, M. Foss-Feig, and J. V. Porto. 2d superexchange mediated magnetization dynamics in an optical lattice. *Science*, 348:540 544, 2015/04/30 2015.
- [207] J. Bub. Quantum mechanics as a principle theory. 1999/10/22 1999.
- [208] J. Bub. The quantum bit commitment theorem. 2000/07/25 2000.
- [209] J. Bub. Secure key distribution via pre- and post-selected quantum states. *Physical Review A*, 63, 2001/2/14 2001.
- [210] J. Bub. Maxwell's demon and the thermodynamics of computation. 2002/03/05 2002.
- [211] J. Bub. Why the quantum? 2004/02/20 2004.
- [212] J. Bub. Quantum information and computation. 2005/12/15 2005.
- [213] J. Bub. Quantum mechanics is about quantum information. *Foundations of Physics*, 35:541 560, 2005/04/01 2005.
- [214] J. Bub. Quantum computation from a quantum logical perspective. 2006/05/29 2006.
- [215] J. Bub. Quantum computation and pseudo-telepathic games. *Philosophy of Science*, 75:458–472, 2010/05/14 2010.
- [216] J. Bub. Quantum probabilities: an information-theoretic interpretation. 2010/05/14 2010.

- [217] J. Bub. Von neumann's 'no hidden variables' proof: A re-appraisal. *Foundations of Physics*, 40:1333 1340, 2010/6/11 2010.
- [218] J. Bub. Why the tsirelson bound? *The Probable and the Improbable: The Meaning and Role of Probability in Physics*, pages 167–185, 2012/08/18 2012.
- [219] J. Bub. Quantum correlations and the measurement problem. *International Journal of Theoretical Physics*, 53:3346 3369, 2013/6/30 2014.
- [220] J. Bub. The measurement problem from the perspective of an information theoretic interpretation of quantum mechanics. *Entropy*, 17:7374–7386, 10/28/2015 2015.
- [221] J. Bub. Bananaworld: Quantum Mechanics for Primates. Oxford University Press, 2012/11/13 2016.
- [222] J. Bub. Why bohr was (mostly) right. 2017/11/05 2017.
- [223] J. Bub. In defense of a "single-world" interpretation of quantum mechanics. *forthcoming in Studies in History and Philosophy of Modern Physics*, page 15, 2018.
- [224] J. Bub. 'two dogmas' redux. 7/14/2019 2019.
- [225] J. Bub. Understanding the frauchiger-renner argument. 9/4/2020 2020.
- [226] J. Bub and T. Bub. *Totally random: why nobody understands quantum mechanics (a serious comic on entanglement)*. Princeton University Press, 2018.
- [227] J. Bub, R. Clifton, and S. Goldstein. Revised proof of the uniqueness theorem for 'no collapse' interpretations of quantum mechanics. 1999/10/22 1999.
- [228] J. Bub and I. Pitowsky. Two dogmas about quantum mechanics. 2007/12/27 2007.
- [229] J. Bub, P. Schroeder-Heister, G. Heinzmann, W. Hodges, and P. E. Bour. "einstein and bohr meet alice and bob', logic and science facing the new technologies. *Proceedings of the 14th Congress for Logic (Nancy), Logic, Methodology and Philosophy of Science*, 2014/01/01 2014.
- [230] J. Bub and A. Stairs. Contextuality and nonlocality in 'no signaling' theories. *Foundations of Physics*, 39:690 711, 2009/4/21 2009.
- [231] J. Bub and A. Stairs. Contextuality in quantum mechanics: Testing the klyachko inequality. 2010/06/02 2010.
- [232] J. Bub and A. Stairs. Quantum interactions with closed timelike curves and superluminal signaling. *Physical Review A*, 89, 2014/2/12 2014.
- [233] J. Bub and E. N. Zalta. Quantum entanglement and information. *The Stanford Encyclopedia of Philosophy*, 02/07/2015 2015.
- [234] J. Bub, A. Zeilinger, and R. Bertlmann. Whose information? information about what? *Quantum [Un]Speakables II: 50 Years of Bell's Theorem*, 2016/01/01 2016.
- [235] S. S. Bullock, G. K. Brennen, and D. P. O'Leary. Time reversal and n-qubit canonical decompositions. *Journal of Mathematical Physics*, 46:062104, 2005/01/01 2005.
- [236] S. S. Bullock and D. P. O'Leary. Locality bounds on hamiltonians for stabilizer codes. *Quantum Information and Computation*, 9, 2009/09/22 2009.
- [237] S. S. Bullock, D. P. O'Leary, and G. K. Brennen. Asymptotically optimal quantum circuits for d-level systems. *Physical Review Letters*, 94, 2005/6/14 2005.
- [238] B. Cao, T. Grass, O. Gazzano, K. A. Patel, J. Hu, M. Müller, T. Huber, L. Anzi, K. Watanabe, T. Taniguchi, D. Newell, M. Gullans, R. Sordan, M. Hafezi, and G. Solomon. Chiral transport of hot carriers in graphene in the quantum hall regime. 10/3/2021 2021.
- [239] C. Cao. From quantum codes to gravity: A journey of gravitizing quantum mechanics. 11/30/2021 2021.

- [240] C. Cao, A. Chatwin-Davies, and A. Singh. How low can vacuum energy go when your fields are finite-dimensional? 05/11/2019 2019.
- [241] C. Cao, M. Gullans, B. Lackey, and Z. Wang. Quantum lego expansion pack: Enumerators from tensor networks. 8/9/2023 2023.
- [242] C. Cao and B. Lackey. Approximate bacon-shor code and holography. *Journal of High Energy Physics*, 2021, 5/14/2021 2021.
- [243] C. Cao and B. Lackey. Quantum lego: Building quantum error correction codes from tensor networks. *PRX Quantum*, 3:020332, 05/11/2022 2022.
- [244] C. Cao, J. Pollack, and Y. Wang. Hyper-invariant mera: Approximate holographic error correction codes with power-law correlations. 3/15/2021 2021.
- [245] C. Cao, X.-L. Q, B. Swingle, and E. Tang. Building bulk geometry from the tensor radon transform. *Journal of High Energy Physics*, 2020:1–50, 12/4/2020 2020.
- [246] F. Caravelli, G. C.-D. Wit, L. P. García-Pintos, and A. Hamma. Random quantum batteries. *Phys. Rev. Research*, 2, 5/5/2020 2020.
- [247] F. Caravelli, B. Yan, L. P. García-Pintos, and A. Hamma. Energy storage and coherence in closed and open quantum batteries. *Quantum*, 5:505, 7/15/2021 2021.
- [248] D. Carney, L. Chaurette, D. Neuenfeld, and G. Semenoff. On the need for soft dressing. *High Energ. Phys.*, 121, 2018 2018.
- [249] D. Carney, Y. Chen, A. Geraci, H. Müller, C. D. Panda, P. C. E. Stamp, and J. M. Taylor. Snowmass 2021 white paper: Tabletop experiments for infrared quantum gravity. 3/22/2022 2022.
- [250] D. Carney, S. Ghosh, G. Krnjaic, and J. M. Taylor. Gravitational direct detection of dark matter. *Phys. Rev. D*, 102, 10/13/2020 2020.
- [251] D. Carney, S. Ghosh, G. Krnjaic, and J. M. Taylor. Proposal for gravitational direct detection of dark matter. *Physical Review D*, 102, 8/23/2021 2021.
- [252] D. Carney, H. Häffner, D. C. Moore, and J. M. Taylor. Trapped electrons and ions as particle detectors. *Phys. Rev. Lett.*, 127, 8/5/2021 2021.
- [253] D. Carney, A. Hook, Z. Liu, J. M. Taylor, and Y. Zhao. Ultralight dark matter detection with mechanical quantum sensors. *New Journal of Physics*, 23:023041, 3/10/2021 2021.
- [254] D. Carney, G. Krnjaic, D. C. Moore, C. A. Regal, G. Afek, S. Bhave, B. Brubaker, T. Corbitt, J. Cripe, N. Crisosto, A.Geraci, S. Ghosh, J. G. E. Harris, A. Hook, E. W. Kolb, J. Kunjummen, R. F. Lang, T. Li, T. Lin, Z. Liu, J. Lykken, L. Magrini, J. Manley, N. Matsumoto, A. Monte, F. Monteiro, T. Purdy, C. J. Riedel, R. Singh, S. Singh, K. Sinha, J. M. Taylor, J. Qin, D. J. Wilson, and Y. Zhao. Mechanical quantum sensing in the search for dark matter. 8/13/2020 2020.
- [255] D. Carney, H. Müller, and J. M. Taylor. Comment on "using an atom interferometer to infer gravitational entanglement generation". 11/8/2021 2021.
- [256] D. Carney, H. Müller, and J. M. Taylor. Testing quantum gravity with interactive information sensing. 1/27/2021 2021.
- [257] D. Carney, H. Müller, and J. M. Taylor. Using an atom interferometer to infer gravitational entanglement generation. *PRX Quantum*, 2, 8/20/2021 2021.
- [258] D. Carney, P. C. E. Stamp, and J. M. Taylor. Tabletop experiments for quantum gravity: a user's manual. 2018.
- [259] D. Carney, P. C. E. Stamp, and J. M. Taylor. Tabletop experiments for quantum gravity: a user's manual. 2018.
- [260] D. Carney and J. M. Taylor. Strongly incoherent gravity. 1/20/2023 2023.

- [261] M. C. Caro, H.-Y. Huang, M. Cerezo, K. Sharma, A. Sornborger, L. Cincio, and P. J. Coles. Generalization in quantum machine learning from few training data. 11/9/2021 2021.
- [262] J. Carolan, A. S. Gilani, and M. Vempati. Quantum advantage and lower bounds in parallel query complexity. 10/3/2024 2024.
- [263] J. Carolan and A. Poremba. Quantum one-wayness of the single-round sponge with invertible permutations. *To appear in the proceedings of CRYPTO 2024*, 3/7/2024 2024.
- [264] J. Carolan and L. Schaeffer. Succinct fermion data structures. 10/5/2024 2024.
- [265] A. L. Carter, J. O'Reilly, G. Toh, S. Saha, M. Shalaev, I. Goetting, and C. Monroe. Ion trap with in-vacuum high numerical aperture imaging for a dual-species modular quantum computer. *Review of Scientific Instruments*, 95, 3/26/2024 2024.
- [266] S. Chakrabarti, A. M. Childs, S.-H. Hung, T. Li, C. Wang, and X. Wu. Quantum algorithm for estimating volumes of convex bodies. *ACM Transactions on Quantum Computing*, 4, 4/2023 2023.
- [267] S. Chakrabarti, A. M. Childs, T. Li, and X. Wu. Quantum algorithms and lower bounds for convex optimization. *Quantum*, 4, 12/18/2019 2020.
- [268] S. Chakrabarti, Y. Huang, T. Li, S. Feizi, and X. Wu. Quantum wasserstein generative adversarial networks. *Advances in Neural Information Processing Systems (NIPS)*, 32, 2019/10/31 2019.
- [269] S. Chakrabarti, R. Krishnakumar, G. Mazzola, N. Stamatopoulos, S. Woerner, and W. J. Zeng. A threshold for quantum advantage in derivative pricing. *Quantum*, 5:463, 2021.
- [270] H. Chan, J. Katz, K. Nayak, A. Polychroniadou, and E. Shi. More is less: Perfectly secure oblivious algorithms in the multi-server setting. 2018.
- [271] D. E. Chang, L. Jiang, A. V. Gorshkov, and H. J. Kimble. Cavity qed with atomic mirrors. *New J. Phys.*, 14:063003, 2012.
- [272] J. Chen, L. Chen, and B. Zeng. Unextendible product basis for fermionic systems. *Journal of Mathematical Physics*, 55:082207, 2014/01/01 2014.
- [273] J. Chen, X. Chen, R. Duan, Z. Ji, and B. Zeng. No-go theorem for one-way quantum computing on naturally occurring two-level systems. *Physical Review A*, 83, 2011/5/9 2011.
- [274] J. Chen, A. M. Childs, and S.-H. Hung. Quantum algorithm for multivariate polynomial interpolation. *Proceedings of The Royal Society A*, 474, 2018/01/17 2018.
- [275] J. Chen, T. S. Cubitt, A. W. Harrow, and G. Smith. Entanglement can completely defeat quantum noise. *Physical Review Letters*, 107, 2011/12/15 2011.
- [276] J. Chen, H. Dawkins, Z. Ji, N. Johnston, D. Kribs, F. Shultz, and B. Zeng. Uniqueness of quantum states compatible with given measurement results. *Physical Review A*, 88, 2013/7/11 2013.
- [277] J. Chen, R. Duan, Z. Ji, M. Ying, and J. Yu. Existence of universal entangler. *Journal of Mathematical Physics*, 49:012103, 2008/01/01 2008.
- [278] J. Chen, C. Guo, Z. Ji, Y.-T. Poon, N. Yu, B. Zeng, and J. Zhou. Joint product numerical range and geometry of reduced density matrices. 2016/06/23 2016.
- [279] J. Chen, Z. Ji, A. Klyachko, D. W. Kribs, and B. Zeng. Rank reduction for the local consistency problem. *Journal of Mathematical Physics*, 53:022202, 2012/02/09 2012.
- [280] J. Chen, Z. Ji, D. Kribs, N. Lütkenhaus, and B. Zeng. Symmetric extension of two-qubit states. *Physical Review A*, 90, 2014/9/17 2014.
- [281] J. Chen, Z. Ji, D. Kribs, Z. Wei, and B. Zeng. Ground-state spaces of frustration-free hamiltonians. *Journal of Mathematical Physics*, 53:102201, 2012/01/01 2012.
- [282] J. Chen, Z. Ji, D. W. Kribs, and B. Zeng. Minimum entangling power is close to its maximum. 2012/10/04 2012.

- [283] J. Chen, Z. Ji, C.-K. Li, Y.-T. Poon, Y. Shen, N. Yu, B. Zeng, and D. Zhou. Discontinuity of maximum entropy inference and quantum phase transitions. *New Journal of Physics*, 17:083019, 2015/08/10 2015.
- [284] J. Chen, Z. Ji, M. B. Ruskai, B. Zeng, and D. Zhou. Principle of maximum entropy and ground spaces of local hamiltonians. 2010/10/13 2010.
- [285] J. Chen, Z. Ji, M. B. Ruskai, B. Zeng, and D.-L. Zhou. Comment on some results of erdahl and the convex structure of reduced density matrices. *Journal of Mathematical Physics*, 53:072203, 2012/05/16 2012.
- [286] J. Chen, Z. Ji, Z. Wei, and B. Zeng. Correlations in excited states of local hamiltonians. *Physical Review A*, 85, 2012/4/9 2012.
- [287] J. Chen, Z. Ji, N. Yu, and B. Zeng. Detecting consistency of overlapping quantum marginals by separability. *Physical Review A*, 93:032105, 2016/03/03 2016.
- [288] J. Chen, Z. Ji, B. Zeng, and D. L. Zhou. From ground states to local hamiltonians. *Physical Review A*, 86, 2012/8/30 2012.
- [289] J. Chen and N. Johnston. The minimum size of unextendible product bases in the bipartite case (and some multipartite cases). *Communications in Mathematical Physics*, 333:351 365, 2014/10/10 2015.
- [290] J. Chen, N. Johnston, C.-K. Li, and S. Plosker. Quantifying the coherence of pure quantum states. *Physical Review A*, 94:042313, 2016/10/07 2016.
- [291] J. Chen and A. Winter. Non-additivity of the entanglement of purification (beyond reasonable doubt). 2012/06/06 2012.
- [292] J. Chen and M. Ying. Ancilla-assisted discrimination of quantum gates. 2008/09/02 2008.
- [293] L. Chen, J. Chen, D. Z. Djokovic, and B. Zeng. Universal subspaces for local unitary groups of fermionic systems. *Communications in Mathematical Physics*, 333:541 563, 2014/10/10 2015.
- [294] Q. Chen, Y. Du, Q. Zhao, Y. Jiao, X. Lu, and X. Wu. Efficient and practical quantum compiler towards multi-qubit systems with deep reinforcement learning. 4/14/2022 2022.
- [295] W. Chen, K. M. Beck, R. Bücker, M. Gullans, M. D. Lukin, H. Tanji-Suzuki, and V. Vuletic. All-optical switch and transistor gated by one stored photon. *Science*, 341:768 770, 2013/07/04 2013.
- [296] Y.-A. Chen, A. M. Childs, M. Hafezi, Z. Jiang, H. Kim, and Y. Xu. Efficient product formulas for commutators and applications to quantum simulation. *Physical Review Research*, 4, 03/10/2022 2022.
- [297] Y.-A. Chen, A. V. Gorshkov, and Y. Xu. Error-correcting codes for fermionic quantum simulation. 10/16/2022 2022.
- [298] Y.-A. Chen and P.-S. Hsin. Exactly solvable lattice hamiltonians and gravitational anomalies. 10/27/2021 2021.
- [299] Y.-A. Chen and S. Tata. Higher cup products on hypercubic lattices: application to lattice models of topological phases. 6/9/2021 2021.
- [300] Y.-H. Chen, K.-M. Chung, C.-Y. Lai, S. P. Vadhan, and X. Wu. Computational notions of quantum minentropy. 2017/09/09 2017.
- [301] G. Cheng and B. Swingle. Chaos in a quantum rotor model. 01/29/2019 2019.
- [302] N.-H. Chia, C.-N. Chou, J. Zhang, and R. Zhang. Quantum meets the minimum circuit size problem. 8/6/2021 2021.
- [303] N.-H. Chia, K.-M. Chung, Q. Liu, and T. Yamakawa. On the impossibility of post-quantum black-box zero-knowledge in constant rounds. 3/20/2021 2021.
- [304] N.-H. Chia, K.-M. Chung, and T. Yamakawa. A black-box approach to post-quantum zero-knowledge in constant rounds. 11/5/2020 2020.

- [305] N.-H. Chia, A. Gilyen, T. Li, H.-H. Lin, E. Tang, and C. Wang. Sampling-based sublinear low-rank matrix arithmetic framework for dequantizing quantum machine learning. *to appear in Proceedings of STOC 2020*, 6/18/2020 2020.
- [306] N.-H. Chia, T. Li, H.-H. Lin, and C. Wang. Quantum-inspired classical sublinear-time algorithm for solving low-rank semidefinite programming via sampling approaches. 2019.
- [307] L. Childress, J. M. Taylor, A. S. Sorensen, and M. D. Lukin. Fault-tolerant quantum communication with minimal physical requirements. *Physical Review Letters*, 96, 2006/2/23 2006.
- [308] L. I. Childress, J. M. Taylor, A. S. Sorensen, and M. D. Lukin. Fault-tolerant quantum repeaters with minimal physical resources, and implementations based on single photon emitters. *Physical Review A*, 72, 2005/11/28 2005.
- [309] A. M. Childs. Secure assisted quantum computation. 2001/11/07 2001.
- [310] A. M. Childs. Universal computation by quantum walk. Physical Review Letters, 102, 2009/5/4 2009.
- [311] A. M. Childs. On the relationship between continuous- and discrete-time quantum walk. *Communications in Mathematical Physics*, 294:581 603, 2009/10/10 2010.
- [312] A. M. Childs and I. L. Chuang. Universal quantum computation with two-level trapped ions. *Physical Review A*, 63, 2000/12/11 2000.
- [313] A. M. Childs, I. L. Chuang, and D. W. Leung. Realization of quantum process tomography in nmr. *Physical Review A*, 64, 2001/6/13 2001.
- [314] A. M. Childs, R. Cleve, E. Deotto, E. Farhi, S. Gutmann, and D. A. Spielman. Exponential algorithmic speedup by quantum walk. 2002/09/24 2002.
- [315] A. M. Childs, R. Cleve, S. P. Jordan, and D. Yeung. Discrete-query quantum algorithm for nand trees. *Theory of Computing*, 5:119 123, 2009/07/01 2009.
- [316] A. M. Childs, M. Coudron, and A. S. Gilani. Quantum algorithms and the power of forgetting. *14th Innovations in Theoretical Computer Science Conference (ITCS 2023)*, 251:37:1–37:22, 2023.
- [317] A. M. Childs, E. Deotto, E. Farhi, J. Goldstone, S. Gutmann, and A. J. Landahl. Quantum search by measurement. *Physical Review A*, 66, 2002/9/23 2002.
- [318] A. M. Childs and J. M. Eisenberg. Quantum algorithms for subset finding. 2003/11/06 2003.
- [319] A. M. Childs, E. Farhi, J. Goldstone, and S. Gutmann. Finding cliques by quantum adiabatic evolution. 2000/12/19 2000.
- [320] A. M. Childs, E. Farhi, and S. Gutmann. An example of the difference between quantum and classical random walks. *Quantum Information Processing*, 1:35 43, 2002/04/01 2001.
- [321] A. M. Childs, E. Farhi, and J. Preskill. Robustness of adiabatic quantum computation. *Physical Review A*, 65, 2001/12/14 2001.
- [322] A. M. Childs, H. Fu, D. Leung, Z. Li, M. Ozols, and V. Vyas. Streaming quantum state purification. 9/28/2023 2023.
- [323] A. M. Childs and Y. Ge. Spatial search by continuous-time quantum walks on crystal lattices. *Physical Review A*, 89, 2014/5/30 2014.
- [324] A. M. Childs and J. Goldstone. Spatial search and the dirac equation. *Physical Review A*, 70, 2004/10/19 2004.
- [325] A. M. Childs and J. Goldstone. Spatial search by quantum walk. *Physical Review A*, 70, 2004/8/23 2004.
- [326] A. M. Childs and D. Gosset. Levinson's theorem for graphs ii. *Journal of Mathematical Physics*, 53:102207, 2012/11/21 2012.

- [327] A. M. Childs, D. Gosset, D. Nagaj, M. Raha, and Z. Webb. Momentum switches. *Quantum Information and Computation*, 15:601–621, 2015/05/01 2015.
- [328] A. M. Childs, D. Gosset, and Z. Webb. Universal computation by multi-particle quantum walk. *Science*, 339:791 794, 2013/02/14 2013.
- [329] A. M. Childs, D. Gosset, and Z. Webb. The bose-hubbard model is qma-complete. *Proceedings of the 41st International Colloquium on Automata, Languages, and Programming (ICALP 2014)*, 8572:308–319, 2014/07/08 2014.
- [330] A. M. Childs, D. Gosset, and Z. Webb. Complexity of the xy antiferromagnet at fixed magnetization. *Quantum Information and Computation*, 16:1–18, 2016/01/01 2016.
- [331] A. M. Childs, A. W. Harrow, and P. Wocjan. Weak fourier-schur sampling, the hidden subgroup problem, and the quantum collision problem. 2006/09/14 2006.
- [332] A. M. Childs, H. L. Haselgrove, and M. A. Nielsen. Lower bounds on the complexity of simulating quantum gates. *Physical Review A*, 68, 2003/11/18 2003.
- [333] A. M. Childs, S.-H. Hung, and T. Li. Quantum query complexity with matrix-vector products. 48th International Colloquium on Automata, Languages, and Programming (ICALP 2021), 2/7/2021 2021.
- [334] A. M. Childs, S.-H. Hung, and T. Li. Quantum query complexity with matrix-vector products. *Proceedings of the 48th International Colloquium on Automata, Languages, and Programming (ICALP 2021), Leibniz International Proceedings in Informatics*, 198:55:1–55:19, 3/14/2021 2021.
- [335] A. M. Childs and G. Ivanyos. Quantum computation of discrete logarithms in semigroups. *Journal of Mathematical Cryptology*, 8, 2014/01/1 2014.
- [336] A. M. Childs, D. Jao, and V. Soukharev. Constructing elliptic curve isogenies in quantum subexponential time. *Journal of Mathematical Cryptology*, 8:1 29, 2014/01/01 2014.
- [337] A. M. Childs, S. Jeffery, R. Kothari, and F. Magniez. A time-efficient quantum walk for 3-distinctness using nested updates. 2013/02/28 2013.
- [338] A. M. Childs, S. Kimmel, and R. Kothari. The quantum query complexity of read-many formulas. *Lecture Notes in Computer Science*, 7501:337–348, 2012/09/10 2012.
- [339] A. M. Childs and R. Kothari. Limitations on the simulation of non-sparse hamiltonians. 2009/08/31 2009.
- [340] A. M. Childs and R. Kothari. Simulating sparse hamiltonians with star decompositions. 2010/03/18 2010.
- [341] A. M. Childs and R. Kothari. Quantum query complexity of minor-closed graph properties. *Proc. 28th Symposium on Theoretical Aspects of Computer Science (STACS 2011), Leibniz International Proceedings in Informatics*, 9:661–672, 2011/01/01 2011.
- [342] A. M. Childs, R. Kothari, M. Kovacs-Deak, A. Sundaram, and D. Wang. Quantum divide and conquer. 10/12/2022 2022.
- [343] A. M. Childs, R. Kothari, M. Ozols, and M. Roetteler. Easy and hard functions for the boolean hidden shift problem. *Proceedings of TQC 2013*, 22:50–79, 2013/04/16 2013.
- [344] A. M. Childs, R. Kothari, and R. D. Somma. Quantum algorithm for systems of linear equations with exponentially improved dependence on precision. *SIAM Journal on Computing*, 46:1920–1950, 2017/12/21 2017.
- [345] A. M. Childs, A. J. Landahl, and P. A. Parrilo. Improved quantum algorithms for the ordered search problem via semidefinite programming. *Physical Review A*, 75, 2007/3/26 2007.
- [346] A. M. Childs and T. Lee. Optimal quantum adversary lower bounds for ordered search. 2007/08/24 2007.
- [347] A. M. Childs, J. Leng, T. Li, J.-P. Liu, and C. Zhang. Quantum simulation of real-space dynamics. *Quantum*, 6:860, 11/8/2022 2022.

- [348] A. M. Childs, D. Leung, L. Mancinska, and M. Ozols. Characterization of universal two-qubit hamiltonians. 2010/04/09 2010.
- [349] A. M. Childs, D. Leung, L. Mancinska, and M. Ozols. A framework for bounding nonlocality of state discrimination. *Communications in Mathematical Physics*, 323:1121 1153, 2013/9/4 2013.
- [350] A. M. Childs, D. Leung, L. Mancinska, and M. Ozols. Interpolatability distinguishes locc from separable von neumann measurements. *Journal of Mathematical Physics*, 54:112204, 2013/06/25 2013.
- [351] A. M. Childs, D. W. Leung, and H.-K. Lo. Two-way quantum communication channels. *International Journal of Quantum Information*, 04:63 83, 2006/02/01 2006.
- [352] A. M. Childs, D. W. Leung, and M. A. Nielsen. Unified derivations of measurement-based schemes for quantum computation. *Physical Review A*, 71, 2005/3/17 2005.
- [353] A. M. Childs, D. W. Leung, F. Verstraete, and G. Vidal. Asymptotic entanglement capacity of the ising and anisotropic heisenberg interactions. 2002/07/10 2002.
- [354] A. M. Childs, D. W. Leung, and G. Vidal. Reversible simulation of bipartite product hamiltonians. *IEEE Transactions on Information Theory*, 50:1189 1197, 2004/06/01 2004.
- [355] A. M. Childs and T. Li. Efficient simulation of sparse markovian quantum dynamics. *Quantum Information and Computation*, 17:901–947, 2017/09/01 2017.
- [356] A. M. Childs, T. Li, J.-P. Liu, C. Wang, and R. Zhang. Quantum algorithms for sampling log-concave distributions and estimating normalizing constants. *Advances in Neural Information Processing Systems* (NeurIPS 2022), 35, 10/12/2022 2022.
- [357] A. M. Childs and J.-P. Liu. Quantum spectral methods for differential equations. *Commun. Math. Phys.*, 375:1427–1457, 2/18/2020 2020.
- [358] A. M. Childs, J.-P. Liu, and A. Ostrander. High-precision quantum algorithms for partial differential equations. *Quantum 5*, 574, 5, 11/4/2021 2021.
- [359] A. M. Childs, D. Maslov, Y. Nam, N. J. Ross, and Y. Su. Toward the first quantum simulation with quantum speedup. *Proceedings of the National Academy of Sciences*, 115:9456–9461, 2018.
- [360] A. M. Childs, A. Ostrander, and Y. Su. Faster quantum simulation by randomization. *Quantum*, 3, 08/28/2019 2019.
- [361] A. M. Childs, R. B. Patterson, and D. J. C. MacKay. Exact sampling from non-attractive distributions using summary states. *Physical Review E*, 63, 2001/2/22 2001.
- [362] A. M. Childs, J. Preskill, and J. Renes. Quantum information and precision measurement. *Journal of Modern Optics*, 47:155 176, 1999/04/07 2000.
- [363] A. M. Childs, B. W. Reichardt, R. Spalek, and S. Zhang. Every nand formula of size n can be evaluated in time $n^{1/2+o(1)}$ on a quantum computer. 2007/03/022007.
- [364] A. M. Childs, E. Schoute, and C. M. Unsal. Circuit transformations for quantum architectures. *Proceedings of TQC 2019, LIPIcs*, 135, 02/25/2019 2019.
- [365] A. M. Childs, L. J. Schulman, and U. V. Vazirani. Quantum algorithms for hidden nonlinear structures. 2007/05/21 2007.
- [366] A. M. Childs and D. Strouse. Levinson's theorem for graphs. *Journal of Mathematical Physics*, 52:082102, 2011/06/30 2011.
- [367] A. M. Childs and Y. Su. Nearly optimal lattice simulation by product formulas. *Phys. Rev. Lett.*, 123, 12/17/2019 2019.
- [368] A. M. Childs, Y. Su, M. C. Tran, N. Wiebe, and S. Zhu. Theory of trotter error with commutator scaling. *Phys. Rev. X*, 11:49, 2/1/2021 2021.
- [369] A. M. Childs and W. van Dam. Quantum algorithm for a generalized hidden shift problem. 2005/07/19 2005.

- [370] A. M. Childs and W. van Dam. Quantum algorithms for algebraic problems. *Reviews of Modern Physics*, 82:1 52, 2010/1/15 2010.
- [371] A. M. Childs, W. van Dam, S.-H. Hung, and I. E. Shparlinski. Optimal quantum algorithm for polynomial interpolation. *43rd International Colloquium on Automata, Languages, and Programming (ICALP 2016)*, 55:16:1–16:13, 2016/03/01 2016.
- [372] A. M. Childs and D. Wang. Can graph properties have exponential quantum speedup? 1/28/2020 2020.
- [373] A. M. Childs and N. Wiebe. Hamiltonian simulation using linear combinations of unitary operations. *Quantum Information and Computation*, 12:901–924, 2012/11/01 2012.
- [374] A. M. Childs and N. Wiebe. Product formulas for exponentials of commutators. *Journal of Mathematical Physics*, 54:062202, 2013/02/07 2013.
- [375] A. M. Childs and P. Wocjan. On the quantum hardness of solving isomorphism problems as nonabelian hidden shift problems. 2005/10/25 2005.
- [376] A. M. Childs and J. Young. Optimal state discrimination and unstructured search in nonlinear quantum mechanics. *Physical Review A*, 93:022314, 2016/02/11 2016.
- [377] C. Chin, R. Grimm, P. Julienne, and E. Tiesinga. Feshbach resonances in ultracold gases. *Reviews of Modern Physics*, 82:1225 1286, 2010/4/29 2010.
- [378] C. Chin, V. Vuletic, A. J. Kerman, S. Chu, E. Tiesinga, P. J. Leo, and C. J. Williams. Ultracold cs₂ feshbach spectroscopy. 2003/12/23 2003.
- [379] E. Chitambar, C. Miller, and Y. Shi. Matrix pencils and entanglement classification. *Journal of Mathematical Physics*, 51:072205, 2010/01/01 2010.
- [380] E. Chitambar, C. Miller, and Y. Shi. Deciding unitary equivalence between matrix polynomials and sets of bipartite quantum states. *Quantum Information and Computation*, 11:813–819, 2001/09/01 2011.
- [381] A. Chotia, B. Neyenhuis, S. A. Moses, B. Yan, J. P. Covey, M. Foss-Feig, A. M. Rey, D. S. Jin, and J. Ye. Long-lived dipolar molecules and feshbach molecules in a 3d optical lattice. *Physical Review Letters*, 108, 2012/2/23 2012.
- [382] S.-K. Chu, C.-T. Ma, and C.-H. Wu. Two-dimensional dilaton gravity theory and lattice schwarzian theory. 2018.
- [383] S.-K. Chu, G. Zhu, J. R. Garrison, Z. Eldredge, A. V. Curiel, P. Bienias, I. B. Spielman, and A. V. Gorshkov. Scale-invariant continuous entanglement renormalization of a chern insulator. *Phys. Rev. Lett*, 122, 03/27/2019 2019.
- [384] K.-M. Chung, Y. Lee, H.-H. Lin, and X. Wu. Constant-round blind classical verification of quantum sampling. 12/8/2020 2020.
- [385] M. Ciamp, A. Cojocaru, E. Kashefi, and A. Mantri. Secure quantum two-party computation: Impossibility and constructions. 10/15/2020 2020.
- [386] Z.-P. Cian, M. Hafezi, and M. Barkeshli. Extracting wilson loop operators and fractional statistics from a single bulk ground state. 9/28/2022 2022.
- [387] Z.-P. Cian, G. Zhu, S.-K. Chu, A. Seif, W. DeGottardi, L. Jiang, and M. Hafezi. Photon pair condensation by engineered dissipation. *Phys. Rev. Lett.*, 123, 04/02/2019 2019.
- [388] R. Clifton, J. Bub, and H. Halvorson. Characterizing quantum theory in terms of information-theoretic constraints. *Foundations of Physics*, 33:1561 1591, 2003/11/01 2002.
- [389] I. C. Cloët, M. R. Dietrich, J. Arrington, A. Bazavov, M. Bishof, A. Freese, A. V. Gorshkov, A. Grassellino, K. Hafidi, Z. Jacob, M. McGuigan, Y. Meurice, Z.-E. Meziani, P. Mueller, C. Muschik, J. Osborn, M. Otten, P. Petreczky, T. Polakovic, A. Poon, R. Pooser, A. Roggero, M. Saffman, B. VanDevender, J. Zhang, and E. Zohar. Opportunities for nuclear physics & quantum information science. 03/13/2019 2019.
- [390] N. J. Coble and M. Coudron. Quasi-polynomial time approximation of output probabilities of constant-depth, geometrically-local quantum circuits. *Accepted to QIP 2021*, 12/10/2020 2020.

- [391] N. J. Coble and M. Coudron. Quasi-polynomial time approximation of output probabilities of geometrically-local, shallow quantum circuits. 12/10/2020 2020.
- [392] N. J. Coble, M. Coudron, J. Nelson, and S. S. Nezhadi. Hamiltonians whose low-energy states require $\omega(n)$ t gates. $10/2/2023\ 2023$.
- [393] N. J. Coble, M. Coudron, J. Nelson, and S. S. Nezhadi. Local hamiltonians with no low-energy stabilizer states. 2/28/2023 2023.
- [394] J. Cochran, T. Henderson, A. Ostrander, and R. Taylor. Domination with decay in triangular matchstick arrangement graphs. *Involve, a Journal of Mathematics*, 10:749 766, 2017/05/14 2017.
- [395] A. Cojocaru, J. Garay, and F. Song. Generalized hybrid search and applications to blockchain and hash function security. 11/7/2023 2023.
- [396] T. W. Collaboration, A. Attanasio, S. A. Bhave, C. Blanco, D. Carney, M. Demarteau, B. Elshimy, M. Febbraro, M. A. Feldman, S. Ghosh, A. Hickin, S. Hong, R. F. Lang, B. Lawrie, S. Li, Z. Liu, J. P. A. Maldonado, C. Marvinney, H. Z. Y. Oo, Y.-Y. Pai, R. Pooser, J. Qin, T. J. Sparmann, J. M. Taylor, H. Tian, and C. Tunnell. Snowmass 2021 white paper: The windchime project. 3/14/2022 2022.
- [397] J. M. Conroy, S. T. Davis, J. Kubina, Y.-K. Liu, D. P. O'Leary, and J. D. Schlesinger. Multilingual summarization: Dimensionality reduction and a step towards optimal term coverage. *MultiLing (Workshop on Multilingual Multi-document Summarization)*, pages 55–63, 2013/08/09 2013.
- [398] S. Cooper, M. Rozali, B. Swingle, M. V. Raamsdonk, C. Waddell, and D. Wakeham. Black hole microstate cosmology. 2018.
- [399] R. Cosmic, H. Ikegami, Z. Lin, K. Inomata, J. M. Taylor, and Y. Nakamura. Circuit qed-based measurement of vortex lattice order in a josephson junction array. *Phys. Rev. B* 98, 060501, 2018/03/12 2018.
- [400] R. Cosmic, K. Kawabata, Y. Ashida, H. Ikegami, S. Furukawa, P. Patil, J. M. Taylor, and Y. Nakamura. Probing xy phase transitions in a josephson junction array with tunable frustration. 1/22/2020 2020.
- [401] P. C. Costa, S. P. Jordan, and A. Ostrander. Quantum algorithm for simulating the wave equation. *Phys. Rev. A*, 99, 03/24/2019 2019.
- [402] P. C. S. Costa, D. An, R. Babbush, and D. Berry. The discrete adiabatic quantum linear system solver has lower constant factors than the randomized adiabatic solver. 12/12/2023 2023.
- [403] P. C. S. Costa, D. An, Y. R. Sanders, Y. Su, R. Babbush, and D. W. Berry. Optimal scaling quantum linear systems solver via discrete adiabatic theorem. 11/15/2021 2021.
- [404] P. C. S. Costa, D. An, Y. R. Sanders, Y. Su, R. Babbush, and D. W. Berry. Optimal scaling quantum linear systems solver via discrete adiabatic theorem. *PRX Quantum*, 3:040303, 10/7/2022 2022.
- [405] J. Cotler, P. Hayden, G. Penington, G. Salton, B. Swingle, and M. Walter. Entanglement wedge reconstruction via universal recovery channels. 2017.
- [406] J. Couch, S. Eccles, P. Nguyen, B. Swingle, and S. Xu. The speed of quantum information spreading in chaotic systems. 08/19/2019 2019.
- [407] M. Coudron and S. Menda. Computations with greater quantum depth are strictly more powerful (relative to an oracle). *Accepted to the Symposium on the Theory of Computing (STOC) 2020 conference*, 4/23/2020 2020.
- [408] M. Coudron, J. Stark, and T. Vidick. Trading locality for time: Certifiable randomness from low-depth circuits. *Communications in Mathematical Physics*, 382:49 86, 2/9/2021 2021.
- [409] K. C. Cox, P. Bienias, D. H. Meyer, D. P. Fahey, P. D. Kunz, and A. V. Gorshkov. Linear and continuous variable spin-wave processing using a cavity-coupled atomic ensemble. 9/30/2021 2021.
- [410] K. C. Cox, P. Bienias, D. H. Meyer, P. D. Kunz, D. P. Fahey, and A. V. Gorshkov. Spin-wave quantum computing with atoms in a single-mode cavity. 9/30/2021 2021.
- [411] M. Cramer, M. B. Plenio, S. T. Flammia, D. Gross, S. D. Bartlett, R. Somma, O. Landon-Cardinal, Y.-K. Liu, and D. Poulin. Efficient quantum state tomography. *Nature Communications*, 1:149, 2010/12/21 2010.

- [412] O. Crawford, B. van Straaten, D. Wang, T. Parks, E. Campbell, and S. Brierley. Efficient quantum measurement of pauli operators. *Quantum*, 5, 01/19/2021 2021.
- [413] C. Crocker, M. Lichtman, K. Sosnova, A. Carter, S. Scarano, and C. Monroe. High purity single photons entangled with an atomic memory. 2018.
- [414] E. Crosson, E. Farhi, C. Y.-Y. Lin, H.-H. Lin, and P. Shor. Different strategies for optimization using the quantum adiabatic algorithm. 2014/01/28 2014.
- [415] T. S. Cubitt, J. Chen, and A. W. Harrow. Superactivation of the asymptotic zero-error classical capacity of a quantum channel. *IEEE Transactions on Information Theory*, 57:8114 8126, 2011/12/01 2011.
- [416] E. Culf, T. Vidick, and V. V. Albert. Group coset monogamy games and an application to device-independent continuous-variable qkd. 12/7/2022 2022.
- [417] J. B. Curtis, I. Boettcher, J. T. Young, M. F. Maghrebi, H. Carmichael, A. V. Gorshkov, and M. Foss-Feig. Critical theory for the breakdown of photon blockade. 6/9/2020 2020.
- [418] Z. Davoudi, W. Detmold, Z. Fu, A. V. Grebe, W. Jay, D. Murphy, P. Oare, P. E. Shanahan, and M. L. Wagman. Long-distance nuclear matrix elements for neutrinoless double-beta decay from lattice qcd. 2/14/2024 2024.
- [419] Z. Davoudi, M. Hafezi, C. Monroe, G. Pagano, A. Seif, and A. Shaw. Towards analog quantum simulations of lattice gauge theories with trapped ions. *Physical Review Research*, 2, 4/8/2020 2020.
- [420] Z. Davoudi, C.-C. Hsieh, and S. V. Kadam. Scattering wave packets of hadrons in gauge theories: Preparation on a quantum computer. 2/1/2024 2024.
- [421] Z. Davoudi, C. Jarzynski, N. Mueller, G. Oruganti, C. Powers, and N. Y. Halpern. Quantum thermodynamics of nonequilibrium processes in lattice gauge theories. 4/3/2024 2024.
- [422] Z. Davoudi, A. F. Shaw, and J. R. Stryker. General quantum algorithms for hamiltonian simulation with applications to a non-abelian lattice gauge theory. *Quantum*, 7:1213, 12/14/2023 2023.
- [423] A. De, P. Cook, K. Collins, W. Morong, D. Paz, P. Titum, G. Pagano, A. V. Gorshkov, M. Maghrebi, and C. Monroe. Non-equilibrium critical scaling and universality in a quantum simulator. 9/19/2023 2023.
- [424] R. De Viti, I. Sheff, N. Glaeser, B. Dinis, R. Rodrigues, J. Katz, B. Bhattacharjee, A. Hithnawi, D. Garg, and P. Druschel. Covault: A secure analytics platform. 8/7/2022 2022.
- [425] S. Debnath, N. M. Linke, C. Figgatt, K. A. Landsman, K. Wright, and C. Monroe. Demonstration of a small programmable quantum computer with atomic qubits. *Nature*, 536:63–66, 2016/08/04 2016.
- [426] H. Deng, R. Tao, Y. Peng, and X. Wu. A case for synthesis of recursive quantum unitary programs. *Proceedings of the ACM on Programming Languages*, 8:1759–1788, 12/5/2023 2024.
- [427] A. Derevianko, S. G. Porsev, S. Kotochigova, E. Tiesinga, and P. S. Julienne. Ultracold collision properties of metastable alkaline-earth atoms. *Physical Review Letters*, 90, 2003/2/13 2003.
- [428] A. Deshpande, B. Fefferman, M. Foss-Feig, and A. V. Gorshkov. Complexity of sampling as an order parameter. 2017/03/15 2017.
- [429] A. Deshpande, B. Fefferman, A. V. Gorshkov, M. Gullans, P. Niroula, and O. Shtanko. Tight bounds on the convergence of noisy random circuits to uniform. 12/1/2021 2021.
- [430] A. Deshpande, B. Fefferman, M. C. Tran, M. Foss-Feig, and A. V. Gorshkov. Dynamical phase transitions in sampling complexity. *Phys. Rev. Lett.*, 121:12 pages, 4 figures. v3: published version, 2018.
- [431] A. Deshpande, A. V. Gorshkov, and B. Fefferman. Importance of the spectral gap in estimating ground-state energies. *PRX Quantum*, 3, 12/9/2022 2022.
- [432] A. Deshpande, A. Mehta, T. Vincent, N. Quesada, M. Hinsche, M. Ioannou, L. Madsen, J. Lavoie, H. Qi, J. Eisert, D. Hangleiter, B. Fefferman, and I. Dhand. Quantum computational supremacy via high-dimensional gaussian boson sampling. 2/24/2021 2021.

- [433] A. Deshpande, A. Mehta, T. Vincent, N. Quesada, M. Hinsche, M. Ioannou, L. Madsen, J. Lavoie, H. Qi, J. Eisert, D. Hangleiter, B. Fefferman, and I. Dhand. Quantum computational advantage via high-dimensional gaussian boson sampling. *Science Advances*, 8:eabi7894, 1/5/2022 2022.
- [434] A. Deshpande and A. E. B. Nielsen. Lattice laughlin states on the torus from conformal field theory. *Journal of Statistical Mechanics: Theory and Experiment*, 2016:013102, 2016/01/28 2016.
- [435] D. Devulapalli, E. Schoute, A. Bapat, A. M. Childs, and A. V. Gorshkov. Quantum routing with teleportation. *Physical Review Research*, 6, 9/23/2024 2024.
- [436] S. Dontha, S. J. S. Tan, S. Smith, S. Choi, and M. Coudron. Approximating output probabilities of shallow quantum circuits which are geometrically-local in any fixed dimension. *Leibniz International Proceedings in Informatics* (*LIPIcs*), 232:9:1–9:17, 4/7/2022 2022.
- [437] R. Dou and J. P. Zwolak. Practitioner's guide to social network analysis: Examining physics anxiety in an active-learning setting. 2018.
- [438] J. S. Douglas, H. Habibian, A. V. Gorshkov, H. J. Kimble, and D. E. Chang. Atom induced cavities and tunable long-range interactions between atoms trapped near photonic crystals. *Nature Photon. 9*, 326 (2015), 2015/03/03 2015.
- [439] J. S. Douglas, H. Habibian, C.-L. Hung, A. V. Gorshkov, H. J. Kimble, and D. E. Chang. Quantum many-body models with cold atoms coupled to photonic crystals. *Nature Photonics*, 9:326 331, 2015/04/04 2015.
- [440] A. Dua, A. Kubica, L. Jiang, S. T. Flammia, and M. Gullans. Clifford-deformed surface codes. *PRX Quantum*, 5, 3/19/2024 2024.
- [441] V. Dunjko, Y.-K. Liu, X. Wu, and J. M. Taylor. Exponential improvements for quantum-accessible reinforcement learning. 2017.
- [442] V. Dunjko, Y.-K. Liu, X. Wu, and J. M. Taylor. Super-polynomial and exponential improvements for quantum-enhanced reinforcement learning. 2017/12/12 2017.
- [443] V. Dunjko, J. M. Taylor, and H. J. Briegel. Framework for learning agents in quantum environments. 2015/07/30 2015.
- [444] V. Dunjko, J. M. Taylor, and H. J. Briegel. Quantum-enhanced machine learning. *Physical Review Letters*, 117:130501, 2016/09/20 2016.
- [445] V. Dunjko, J. M. Taylor, and H. J. Briegel. Advances in quantum reinforcement learning. *IEEE SMC*, *Banff*, *AB*, pages 282–287, 2017 2017.
- [446] S. K. Dutta, F. W. Strauch, R. M. Lewis, K. Mitra, H. Paik, T. A. Palomaki, E. Tiesinga, J. R. Anderson, A. J. Dragt, C. J. Lobb, and F. C. Wellstood. Multilevel effects in the rabi oscillations of a josephson phase qubit. *Physical Review B*, 78, 2008/9/15 2008.
- [447] L. Egan, D. M. Debroy, C. Noel, A. Risinger, D. Zhu, D. Biswas, M. Newman, M. Li, K. R. Brown, M. Cetina, and C. Monroe. Fault-tolerant operation of a quantum error-correction code. 9/24/2020 2020.
- [448] A. Ehrenberg, J. Bringewatt, and A. V. Gorshkov. Minimum-entanglement protocols for function estimation. *Physical Review Research*, 5, 9/29/2023 2023.
- [449] A. Ehrenberg, A. Deshpande, C. L. Baldwin, D. A. Abanin, and A. V. Gorshkov. Simulation complexity of many-body localized systems. 5/25/2022 2022.
- [450] A. Ehrenberg, J. T. Iosue, A. Deshpande, D. Hangleiter, and A. V. Gorshkov. Transition of anticoncentration in gaussian boson sampling. 12/13/2023 2023.
- [451] A. Ehrenberg, J. T. Iosue, A. Deshpande, D. Hangleiter, and A. V. Gorshkov. The second moment of hafnians in gaussian boson sampling. 3/20/2024 2024.
- [452] Z. Eldredge, M. Foss-Feig, S. L. Rolston, and A. V. Gorshkov. Optimal and secure measurement protocols for quantum sensor networks. 2018/03/23 2018.

- [453] Z. Eldredge, Z.-X. Gong, A. H. Moosavian, M. Foss-Feig, and A. V. Gorshkov. Fast state transfer and entanglement renormalization using long-range interactions. *Physical Review Letters*, 119:170503, 2017/10/25 2017.
- [454] Z. Eldredge, P. Solano, D. Chang, and A. V. Gorshkov. Self-organization of atoms coupled to a chiral reservoir. *Physical Review A*, 94:053855, 2016/11/29 2016.
- [455] Z. Eldredge, L. Zhou, A. Bapat, J. R. Garrison, A. Deshpande, F. T. Chong, and A. V. Gorshkov. Entanglement bounds on the performance of quantum computing architectures. *Phys. Rev. Research*, 2, 9/22/2020 2020.
- [456] T. D. Ellison, Y.-A. Chen, A. Dua, W. Shirley, N. Tantivasadakarn, and D. J. Williamson. Pauli stabilizer models of twisted quantum doubles. *PRX Quantum*, 3, 3/30/2022 2022.
- [457] T. D. Ellison, Y.-A. Chen, A. Dua, W. Shirley, N. Tantivasadakarn, and D. J. Williamson. Pauli topological subsystem codes from abelian anyon theories. 11/7/2022 2022.
- [458] D. V. Else, C. Monroe, C. Nayak, and N. Y. Yao. Discrete time crystals. *Annual Review of Condensed Matter Physics*, 11:467–499, 3/10/2020 2020.
- [459] P. S. Emani, J. Warrell, A. Anticevic, S. Bekiranov, M. Gandal, M. J. McConnell, G. Sapiro, A. Aspuru-Guzik, J. Baker, M. Bastiani, P. McClure, J. Murray, S. N. Sotiropoulos, J. M. Taylor, G. Senthil, T. Lehner, M. B. Gerstein, and A. W. Harrow. Quantum computing at the frontiers of biological sciences. 2019/11/16 2019.
- [460] R. Erbanni, K. Bharti, L.-C. Kwek, and D. Poletti. Nisq algorithm for the matrix elements of a generic observable. 5/20/2022 2022.
- [461] P. W. Evans, D. Hangleiter, and K. P. Y. Thébault. How to engineer a quantum wavefunction. 12/2/2021 2021.
- [462] A. Fahimniya, H. Dehghani, K. Bharti, S. Mathew, A. J. Kollár, A. V. Gorshkov, and M. Gullans. Fault-tolerant hyperbolic floquet quantum error correcting codes. 9/18/2023 2023.
- [463] P. Faist, S. Nezami, V. V. Albert, G. Salton, F. Pastawski, P. Hayden, and J. Preskill. Continuous symmetries and approximate quantum error correction. *Phys. Rev. X*, 10, 10/26/2020 2020.
- [464] P. Faist, M. P. Woods, V. V. Albert, J. M. Renes, J. Eisert, and J. Preskill. Time-energy uncertainty relation for noisy quantum metrology. *PRX Quantum*, 4(4), 12/5/2023 2023.
- [465] K. Fang, X. Wang, M. Tomamichel, and M. Berta. Quantum channel simulation and the channel's smooth maxinformation. 2018.
- [466] W. Fang, M. Ying, and X. Wu. Differentiable quantum programming with unbounded loops. 11/8/2022 2022.
- [467] E. Farhi, S. Kimmel, and K. Temme. A quantum version of schöning's algorithm applied to quantum 2-sat. *Quantum Information and Computation*, 16, 2016/03/22 2016.
- [468] T. Faulkner, S. Hollands, B. Swingle, and Y. Wang. Approximate recovery and relative entropy i. general von neumann subalgebras. 6/14/2020 2020.
- [469] T. Faulkner, S. Hollands, B. Swingle, and Y. Wang. Approximate recovery and relative entropy i. general von neumann subalgebras. 6/14/2020 2020.
- [470] C. Fechisin, N. Tantivasadakarn, and V. V. Albert. Non-invertible symmetry-protected topological order in a group-based cluster state. 12/14/2023 2023.
- [471] B. Fefferman, M. Foss-Feig, and A. V. Gorshkov. Exact sampling hardness of ising spin models. *Physical Review A*, 96:032324, 2017/09/14 2017.
- [472] B. Fefferman, S. Ghosh, M. Gullans, K. Kuroiwa, and K. Sharma. Effect of non-unital noise on random circuit sampling. 6/28/2023 2023.
- [473] B. Fefferman and S. Kimmel. Quantum vs classical proofs and subset verification. 2015/10/22 2015.
- [474] B. Fefferman, H. Kobayashi, C. Y.-Y. Lin, T. Morimae, and H. Nishimura. Space-efficient error reduction for unitary quantum computations. *43rd International Colloquium on Automata, Languages, and Programming (ICALP 2016)*, 55:14:1–14:14, 2016/04/27 2016.

- [475] B. Fefferman and C. Y.-Y. Lin. A complete characterization of unitary quantum space. 2016/04/05 2016.
- [476] B. Fefferman and C. Y.-Y. Lin. Quantum merlin arthur with exponentially small gap. 2016/01/08 2016.
- [477] B. Fefferman, R. Shaltiel, C. Umans, and E. Viola. On beating the hybrid argument. *Proceedings*, *ITCS*, 9:809–843, 2013/11/14 2012.
- [478] B. Fefferman and C. Umans. Pseudorandom generators and the bqp vs. ph problem. 2010/07/02 2010.
- [479] B. Fefferman and C. Umans. The power of quantum fourier sampling. 2015/07/20 2015.
- [480] L. Feng, O. Katz, C. Haack, M. Maghrebi, A. V. Gorshkov, Z. Gong, M. Cetina, and C. Monroe. Continuous symmetry breaking in a trapped-ion spin chain. 11/2/2022 2022.
- [481] C. Figgatt, D. Maslov, K. A. Landsman, N. M. Linke, S. Debnath, and C. Monroe. Complete 3-qubit grover search on a programmable quantum computer. *Nature Communications, accepted*, 2017/03/30 2017.
- [482] C. Figgatt, A. Ostrander, N. M. Linke, K. A. Landsman, D. Zhu, D. Maslov, and C. Monroe. Parallel entangling operations on a universal ion trap quantum computer. 2018.
- [483] O. Firstenberg, M. D. Lukin, T. Peyronel, Q. Y. Liang, V. Vuletic, A. V. Gorshkov, S. Hofferberth, and T. Pohl. Quantum nonlinear optics: Strongly interacting photons. *Opt. Photonics News*, 24:48, 2013.
- [484] O. Firstenberg, T. Peyronel, Q.-Y. Liang, A. V. Gorshkov, M. D. Lukin, and V. Vuletic. Attractive photons in a quantum nonlinear medium. *Nature (London)*, 502:71, 2013.
- [485] J. K. Fitzsimons, A. Mantri, R. Pisarczyk, T. Rainforth, and Z. Zhao. A note on blind contact tracing at scale with applications to the covid-19 pandemic. 4/10/2020 2020.
- [486] S. T. Flammia, D. Gross, Y.-K. Liu, and J. Eisert. Quantum tomography via compressed sensing: Error bounds, sample complexity, and efficient estimators. *New Journal of Physics*, 14:095022, 2012/09/27 2012.
- [487] S. T. Flammia and Y.-K. Liu. Direct fidelity estimation from few pauli measurements. *Physical Review Letters*, 106, 2011/6/8 2011.
- [488] C. J. Flower, S. Barik, S. Mittal, and M. Hafezi. Topological edge mode tapering. 6/14/2022 2022.
- [489] M. Foss-Feig, A. J. Daley, J. K. Thompson, and A. M. Rey. Steady-state many-body entanglement of hot reactive fermions. *Physical Review Letters*, 109, 2012/12/4 2012.
- [490] M. Foss-Feig and J. R. Friedman. Geometric-phase-effect tunnel-splitting oscillations in single-molecule magnets with fourth-order anisotropy induced by orthorhombic distortion. *EPL (Europhysics Letters)*, 86:27002, 2009/04/30 2009.
- [491] M. Foss-Feig, Z.-X. Gong, C. W. Clark, and A. V. Gorshkov. Nearly-linear light cones in long-range interacting quantum systems. *Physical Review Letters*, 114:157201, 2015/04/13 2015.
- [492] M. Foss-Feig, Z.-X. Gong, A. V. Gorshkov, and C. W. Clark. Entanglement and spin-squeezing without infinite-range interactions. 2016/12/22 2016.
- [493] M. Foss-Feig, K. R. A. Hazzard, J. J. Bollinger, and A. M. Rey. Non-equilibrium dynamics of ising models with decoherence: an exact solution. *Physical Review A*, 87, 2013/4/3 2013.
- [494] M. Foss-Feig, K. R. A. Hazzard, J. J. Bollinger, A. M. Rey, and C. W. Clark. Dynamical quantum correlations of ising models on an arbitrary lattice and their resilience to decoherence. *New Journal of Physics*, 15:113008, 2013/11/07 2013.
- [495] M. Foss-Feig, M. Hermele, V. Gurarie, and A. M. Rey. Heavy fermions in an optical lattice. *Physical Review A*, 82, 2010/11/22 2010.
- [496] M. Foss-Feig, M. Hermele, and A. M. Rey. Probing the kondo lattice model with alkaline earth atoms. *Physical Review A*, 81, 2010/5/7 2010.
- [497] M. Foss-Feig, P. Niroula, J. T. Young, M. Hafezi, A. V. Gorshkov, R. M. Wilson, and M. F. Maghrebi. Emergent equilibrium in many-body optical bistability. *Physical Review A*, 95:043826, 2017/04/17 2017.

- [498] M. Foss-Feig and A. M. Rey. Phase diagram of the bose kondo-hubbard model. *Physical Review A*, 84, 2011/11/16 2011.
- [499] M. Foss-Feig, J. T. Young, V. V. Albert, A. V. Gorshkov, and M. F. Maghrebi. A solvable family of driven-dissipative many-body systems. *Physical Review Letters*, 119, 2017/11/10 2017.
- [500] A. R. Fritsch, S. Guo, S. M. Koh, I. B. Spielman, and J. P. Zwolak. Dark solitons in bose-einstein condensates: A dataset for many-body physics research. 05/17/2022 2022.
- [501] H. Fu. Constant-sized correlations are sufficient to robustly self-test maximally entangled states with unbounded dimension. *Quantum*, 6:614, 01/03/2022 2022.
- [502] H. Fu, D. Leung, and L. Mancinska. When the asymptotic limit offers no advantage in the local-operations-and-classical-communication paradigm. *Phys. Rev. A*, 89, 5/9/2014 2014.
- [503] H. Fu and C. Miller. Local randomness: Examples and application. Phys. Rev. A, page 032324, 03/2018 2018.
- [504] H. Fu, C. Miller, and W. Slofstra. The membership problem for constant-sized quantum correlations is undecidable. 1/26/2021 2021.
- [505] H. Fu, D. Wang, and Q. Zhao. Computational self-testing of multi-qubit states and measurements. 1/31/2022 2022.
- [506] H. Fu, D. Wang, and Q. Zhao. Parallel self-testing of epr pairs under computational assumptions. 3/29/2023 2023.
- [507] H. Fu, D. Wang, and Q. Zhao. Parallel self-testing of epr pairs under computational assumptions. 3/29/2023 2023.
- [508] X. Fu and D. Gottesman. Error correction in dynamical codes. 3/7/2024 2024.
- [509] S. Gandhari, V. V. Albert, T. Gerrits, J. M. Taylor, and M. Gullans. Continuous-variable shadow tomography. 11/9/2022 2022.
- [510] S. Gandhari, V. V. Albert, T. Gerrits, J. M. Taylor, and M. Gullans. Precision bounds on continuous-variable state tomography using classical shadows. *PRX Quantum*, 5:010346, 3/18/2024 2024.
- [511] S. Ganeshan, A. V. Gorshkov, V. Gurarie, and V. M. Galitski. Exactly soluble model of boundary degeneracy. *Physical Review B*, 95, 2017/01/25 2017.
- [512] B. Gao, E. Tiesinga, C. J. Williams, and P. S. Julienne. Multichannel quantum-defect theory for slow atomic collisions. *Physical Review A*, 72, 2005/10/28 2005.
- [513] L. P. García-Pintos, K. Bharti, J. Bringewatt, H. Dehghani, A. Ehrenberg, N. Y. Halpern, and A. V. Gorshkov. Estimation of hamiltonian parameters from thermal states. 1/18/2024 2024.
- [514] L. P. García-Pintos, L. T. Brady, J. Bringewatt, and Y.-K. Liu. Lower bounds on quantum annealing times. *Phys. Rev. Lett.*, 130, 4/5/2023 2023.
- [515] L. P. García-Pintos and A. del Campo. Limits to perception by quantum monitoring with finite efficiency. *Entropy*, 23:1527, 11/17/2021 2021.
- [516] L. P. García-Pintos, A. Hamma, and A. del Campo. Fluctuations in extractable work bound the charging power of quantum batteries. *Phys. Rev. Lett.*, 125, 7/22/2020 2020.
- [517] L. P. García-Pintos, A. Hamma, and A. del Campo. García-pintos, hamma, and del campo reply. *Phys. Rev. Lett.*, 127:028902, 7/9/2021 2021.
- [518] L. P. García-Pintos, S. Nicholson, J. R. Green, A. del Campo, and A. V. Gorshkov. Unifying quantum and classical speed limits on observables. 8/9/2021 2021.
- [519] L. P. García-Pintos, T. O'Leary, T. Biswas, J. Bringewatt, L. Cincio, L. T. Brady, and Y.-K. Liu. Resilience-runtime tradeoff relations for quantum algorithms. 8/5/2024 2024.
- [520] J. R. Garrison, R. V. Mishmash, and M. P. A. Fisher. Partial breakdown of quantum thermalization in a hubbard-like model. *Physical Review B*, 95:054204, 2017/02/17 2017.
- [521] W. Ge, K. Jacobs, Z. Eldredge, A. V. Gorshkov, and M. Foss-Feig. Distributed quantum metrology and the entangling power of linear networks. *Phys. Rev. Lett.* 121, 043604, 2018/07/25 2018.

- [522] W. Ge, K. Jacobs, Z. Eldredge, A. V. Gorshkov, and M. Foss-Feig. Distributed quantum metrology and the entangling power of linear networks. 2018/07/25 2018.
- [523] J. Gea-Banacloche, A. M. Rey, G. Pupillo, C. J. Williams, and C. W. Clark. Mean-field treatment of the damping of the oscillations of a 1d bose gas in an optical lattice. *Physical Review A*, 73, 2006/1/9 2006.
- [524] O. Gerberding, F. G. Cervantes, J. Melcher, J. R. Pratt, and J. M. Taylor. Optomechanical reference accelerometer. *Metrologia*, 52:654, 2015/09/08 2015.
- [525] S. Gharibian, Z. Landau, S. W. Shin, and G. Wang. Tensor network non-zero testing. *Quantum Information & Computation*, 15:885–899, 2015/07/01 2015.
- [526] S. Gharibian, M. Santha, J. Sikora, A. Sundaram, and J. Yirka. Quantum generalizations of the polynomial hierarchy with applications to qma(2). *Proceedings of 43rd International Symposium on Mathematical Foundations of Computer Science (MFCS 2018)*, 2018.
- [527] H. Gharibyan, M. Hanada, B. Swingle, and M. Tezuka. A characterization of quantum chaos by two-point correlation functions. 02/28/2019 2019.
- [528] H. Gharibyan, M. Hanada, B. Swingle, and M. Tezuka. Quantum lyapunov spectrum. JHEP04, 082, 04/10/2019 2019.
- [529] A. Ghazaryan, T. Graß, M. Gullans, P. Ghaemi, and M. Hafezi. Light-induced fractional quantum hall phases in graphene. *Physical Review Letters*, 119:247403, 2017/12/15 2017.
- [530] S. Ghosh, D. Carney, P. Shawhan, and J. M. Taylor. Back-action evading impulse measurement with mechanical quantum sensors. *Phys. Rev. A*, 102, 8/28/2020 2020.
- [531] S. Ghosh, A. Deshpande, D. Hangleiter, A. V. Gorshkov, and B. Fefferman. Sharp complexity phase transitions generated by entanglement. 12/20/2022 2022.
- [532] A. Gilyen and T. Li. Distributional property testing in a quantum world. *Proceedings of ITCS* 2020, 25:1–25, 02/02/2019 2020.
- [533] A. Gilyen, Y. Su, G. H. Low, and N. Wiebe. Quantum singular value transformation and beyond: exponential improvements for quantum matrix arithmetics. *Proceedings of the 51st ACM Symposium on Theory of Computing*, pages 193–204, 2018/06/05 2018.
- [534] A. N. Glaudell, N. J. Ross, and J. M. Taylor. Canonical forms for single-qutrit clifford+t operators. *Annals of Physics*, 406:54–70, 8/19/2019 2019.
- [535] A. N. Glaudell, N. J. Ross, and J. M. Taylor. Optimal two-qubit circuits for universal fault-tolerant quantum computation. 1/16/2020 2020.
- [536] A. N. Glaudell, E. Waks, and J. M. Taylor. Serialized quantum error correction protocol for high-bandwidth quantum repeaters. *New Journal of Physics*, 18:093008, 2016/09/02 2016.
- [537] K. T. Goh, J. Kaniewski, E. Wolfe, T. Vértesi, X. Wu, Y. Cai, Y.-C. Liang, and V. Scarani. Geometry of the quantum set of correlations. *Physical Review A*, 97:022104, 2018/02/07 2018.
- [538] E. A. Goldschmidt, T. Boulier, R. C. Brown, S. B. Koller, J. T. Young, A. V. Gorshkov, S. L. Rolston, and J. V. Porto. Anomalous broadening in driven dissipative rydberg systems. *Physical Review Letters*, 116:113001, 2016/03/16 2016.
- [539] W. Gong, Y. Kharkov, M. C. Tran, P. Bienias, and A. V. Gorshkov. Improved digital quantum simulation by non-unitary channels. 7/24/2023 2023.
- [540] Z.-X. Gong. Effective error-suppression scheme for reversible quantum computer. 2006/08/20 2006.
- [541] Z.-X. Gong and L. M. Duan. Comment on "foundation of statistical mechanics under experimentally realistic conditions". 2011/09/22 2011.
- [542] Z.-X. Gong and L. M. Duan. Prethermalization and dynamical transition in an isolated trapped ion spin chain. *New Journal of Physics*, 15:113051, 2013/11/26 2013.

- [543] Z.-X. Gong, M. Foss-Feig, F. G. S. L. Brandão, and A. V. Gorshkov. Entanglement area laws for long-range interacting systems. *Physical Review Letters*, 119:050501, 2017/07/31 2017.
- [544] Z.-X. Gong, M. Foss-Feig, S. Michalakis, and A. V. Gorshkov. Persistence of locality in systems with power-law interactions. *Physical Review Letters*, 113, 2014/7/16 2014.
- [545] Z.-X. Gong, G. D. Lin, and L. M. Duan. Temperature driven structural phase transition for trapped ions and its experimental detection. *Physical Review Letters*, 105, 2010/12/29 2010.
- [546] Z.-X. Gong, M. F. Maghrebi, A. Hu, M. Foss-Feig, P. Richerme, C. Monroe, and A. V. Gorshkov. Kaleidoscope of quantum phases in a long-range interacting spin-1 chain. *Physical Review B*, 93:205115, 2016/05/11 2016.
- [547] Z.-X. Gong, M. F. Maghrebi, A. Hu, M. L. Wall, M. Foss-Feig, and A. V. Gorshkov. Topological phases with long-range interactions. *Physical Review B*, 93:041102, 2016/01/08 2016.
- [548] Z.-X. Gong, Z. qi Yin, and L. M. Duan. Dynamics of overhauser field under nuclear spin diffusion in a quantum dot. *New Journal of Physics*, 13:033036, 2011/03/25 2011.
- [549] Z.-X. Gong, M. Xu, M. Foss-Feig, J. K. Thompson, A. M. Rey, M. Holland, and A. V. Gorshkov. Steady-state superradiance with rydberg polaritons. *arXiv:1611.00797*, 2016/11/02 2016.
- [550] S. Gopalakrishnan and M. Gullans. Entanglement and purification transitions in non-hermitian quantum mechanics. *Phys. Rev. Lett.*, *in press*, 12/2/2020 2021.
- [551] K. Goral, T. Koehler, S. A. Gardiner, E. Tiesinga, and P. S. Julienne. Adiabatic association of ultracold molecules via magnetic field tunable interactions. *Journal of Physics B: Atomic, Molecular and Optical Physics*, 37:3457 3500, 2004/09/14 2004.
- [552] A. V. Gorshkov. Thesis: Novel systems and methods for quantum communication, quantum computation, and quantum simulation. *Harvard University Physics Department*, Ph.D. Thesis, 2010.
- [553] A. V. Gorshkov, A. Andre, M. Fleischhauer, A. S. Sorensen, and M. D. Lukin. Universal approach to optimal photon storage in atomic media. *Physical Review Letters*, 98, 2007/3/19 2007.
- [554] A. V. Gorshkov, A. Andre, M. D. Lukin, and A. S. Sorensen. Photon storage in lambda-type optically dense atomic media. i. cavity model. *Physical Review A*, 76, 2007/9/7 2007.
- [555] A. V. Gorshkov, A. Andre, M. D. Lukin, and A. S. Sorensen. Photon storage in lambda-type optically dense atomic media. ii. free-space model. *Physical Review A*, 76, 2007/9/7 2007.
- [556] A. V. Gorshkov, A. Andre, M. D. Lukin, and A. S. Sorensen. Photon storage in lambda-type optically dense atomic media. iii. effects of inhomogeneous broadening. *Physical Review A*, 76, 2007/9/7 2007.
- [557] A. V. Gorshkov, T. Calarco, M. D. Lukin, and A. S. Sorensen. Photon storage in lambda-type optically dense atomic media. iv. optimal control using gradient ascent. *Physical Review A*, 77, 2008/4/4 2008.
- [558] A. V. Gorshkov, K. R. A. Hazzard, and A. M. Rey. Kitaev honeycomb and other exotic spin models with polar molecules. *Molecular Physics*, 111:1908 1916, 2013/01/01 2013.
- [559] A. V. Gorshkov, M. Hermele, V. Gurarie, C. Xu, P. S. Julienne, J. Ye, P. Zoller, E. Demler, M. D. Lukin, and A. M. Rey. Two-orbital su(n) magnetism with ultracold alkaline-earth atoms. *Nature Phys.*, 6:289, 2010.
- [560] A. V. Gorshkov, L. Jiang, M. Greiner, P. Zoller, and M. D. Lukin. Coherent quantum optical control with subwavelength resolution. *Physical Review Letters*, 100, 2008/3/7 2008.
- [561] A. V. Gorshkov, S. R. Manmana, G. Chen, E. Demler, M. D. Lukin, and A. M. Rey. Quantum magnetism with polar alkali dimers. *Physical Review A*, 84, 2011/9/15 2011.
- [562] A. V. Gorshkov, S. R. Manmana, G. Chen, E. Demler, M. D. Lukin, and A. M. Rey. Quantum magnetism with polar alkali-metal dimers. *Phys. Rev. A*, 84:033619, 2011.
- [563] A. V. Gorshkov, S. R. Manmana, G. Chen, J. Ye, E. Demler, M. D. Lukin, and A. M. Rey. Tunable superfluidity and quantum magnetism with ultracold polar molecules. *Physical Review Letters*, 107, 2011/9/8 2011.

- [564] A. V. Gorshkov, R. Nath, and T. Pohl. Dissipative many-body quantum optics in rydberg media. *Physical Review Letters*, 110, 2013/4/9 2013.
- [565] A. V. Gorshkov, J. Otterbach, E. Demler, M. Fleischhauer, and M. D. Lukin. Photonic phase gate via an exchange of fermionic spin waves in a spin chain. *Physical Review Letters*, 105, 2010/8/5 2010.
- [566] A. V. Gorshkov, J. Otterbach, M. Fleischhauer, T. Pohl, and M. D. Lukin. Photon-photon interactions via rydberg blockade. *Physical Review Letters*, 107, 2011/9/22 2011.
- [567] A. V. Gorshkov, P. Rabl, G. Pupillo, A. Micheli, P. Zoller, M. D. Lukin, and H. P. Büchler. Suppression of inelastic collisions between polar molecules with a repulsive shield. *Phys. Rev. Lett.*, 101:073201, 2008.
- [568] A. V. Gorshkov, A. M. Rey, A. J. Daley, M. M. Boyd, J. Ye, P. Zoller, and M. D. Lukin. Alkaline-earth-metal atoms as few-qubit quantum registers. *Physical Review Letters*, 102, 2009/3/18 2009.
- [569] D. Gosset, D. Grier, A. Kerzner, and L. Schaeffer. Fast simulation of planar clifford circuits. *Quantum*, 8:1251, 2/12/2024 2024.
- [570] D. Gottesman. Opportunities and challenges in fault-tolerant quantum computation. 10/28/2022 2022.
- [571] J. D. Grant and B. Lackey. On galilean connections and the first jet bundle. *Central European Journal of Mathematics*, 10(5):1889–1895, 2012/10/01 2012.
- [572] J. D. E. Grant and B. Lackey. On galilean connections and the first jet bundle. 1999/09/24 1999.
- [573] T. Graß, P. Bienias, M. Gullans, R. Lundgren, J. Maciejko, and A. V. Gorshkov. Fractional quantum hall phases of bosons with tunable interactions: From the laughlin liquid to a fractional wigner crystal. 2018.
- [574] A. Green, H. Li, J. H. S. Toh, X. Tang, K. McCormick, M. Li, E. Tiesinga, S. Kotochigova, and S. Gupta. Feshbach resonances in p-wave three-body recombination within fermi-fermi mixtures of open-shell 6li and closed-shell 173yb atoms. 12/10/2019 2019.
- [575] A. S. Green, P. L. Lumsdaine, N. J. Ross, P. Selinger, and B. Valiron. An introduction to quantum programming in quipper. *Lecture Notes in Computer Science*, 7948:110–124, 2013/07/05 2013.
- [576] A. S. Green, P. L. Lumsdaine, N. J. Ross, P. Selinger, and B. Valiron. Quipper: A scalable quantum programming language. *ACM SIGPLAN Notices*, 48:333–342, 2013/06/23 2013.
- [577] D. Grier, H. Pashayan, and L. Schaeffer. Sample-optimal classical shadows for pure states. 11/21/2022 2022.
- [578] D. Gross and D. Hangleiter. Secret extraction attacks against obfuscated iqp circuits. 12/15/2023 2023.
- [579] D. Gross, Y.-K. Liu, S. T. Flammia, S. Becker, and J. Eisert. Quantum state tomography via compressed sensing. *Physical Review Letters*, 105, 2010/10/4 2010.
- [580] N. Grzesiak, A. Maksymov, P. Niroula, and Y. Nam. Efficient quantum programming using ease gates on a trappedion quantum computer. 7/15/2021 2021.
- [581] E. Guardado-Sanchez, B. M. Spar, P. Schauss, R. Belyansky, J. T. Young, P. Bienias, A. V. Gorshkov, T. Iadecola, and W. S. Bakr. Quench dynamics of a fermi gas with strong long-range interactions. *Phys. Rev. X*, 11, 5/24/2021 2021.
- [582] M. Gullans, M. Caranti, A. R. Mills, and J. R. Petta. Compressed gate characterization for quantum devices with time-correlated noise. 12/22/2023 2023.
- [583] M. Gullans, D. E. Chang, F. H. L. Koppens, F. J. G. de Abajo, and M. D. Lukin. Single-photon nonlinear optics with graphene plasmons. *Physical Review Letters*, 111, 2013/12/11 2013.
- [584] M. Gullans, S. Diehl, S. T. Rittenhouse, B. P. Ruzic, J. P. D'Incao, P. Julienne, A. V. Gorshkov, and J. M. Taylor. Efimov states of strongly interacting photons. *Physical Review Letters*, 119:233601, 2017/12/04 2017.
- [585] M. Gullans and D. A. Huse. Dynamical purification phase transition induced by quantum measurements. *Physical Review X*, 10, 7/30/2020 2020.

- [586] M. Gullans, S. Krastanov, D. A. Huse, L. Jiang, and S. T. Flammia. Quantum coding with low-depth random circuits. 10/19/2020 2020.
- [587] M. Gullans, J. J. Krich, J. M. Taylor, H. Bluhm, B. I. Halperin, C. M. Marcus, M. Stopa, A. Yacoby, and M. D. Lukin. Dynamic nuclear polarization in double quantum dots. *Physical Review Letters*, 104, 2010/6/4 2010.
- [588] M. Gullans, J. J. Krich, J. M. Taylor, B. I. Halperin, and M. D. Lukin. Preparation of non-equilibrium nuclear spin states in double quantum dots. *Physical Review B*, 88, 2013/7/15 2013.
- [589] M. Gullans, Y. Y. Liu, J. Stehlik, J. R. Petta, and J. M. Taylor. Phonon-assisted gain in a semiconductor double quantum dot maser. *Physical Review Letters*, 114:196802, 2015/05/13 2015.
- [590] M. Gullans and J. R. Petta. Coherent transport of spin by adiabatic passage in quantum dot arrays. *Phys. Rev. B*, 102, 9/17/2020 2020.
- [591] M. Gullans and J. R. Petta. Coherent transport of spin by adiabatic passage in quantum dot arrays. *Physical Review B*, 102, 9/17/2020 2020.
- [592] M. Gullans, J. Stehlik, Y. Y. Liu, J. R. Petta, and J. M. Taylor. Sisyphus thermalization of photons in a cavity-coupled double quantum dot. *Physical Review Letters*, 117:056801, 2016/07/25 2016.
- [593] M. Gullans and J. M. Taylor. A quantum network of silicon qubits using mid-infrared graphene plasmons. 2014/07/25 2014.
- [594] M. Gullans and J. M. Taylor. Optical control of donor spin qubits in silicon. *Physical Review B*, 92:195411, 2015/11/11 2015.
- [595] M. Gullans, J. M. Taylor, A. Imamoglu, P. Ghaemi, and M. Hafezi. High-order multipole radiation from quantum hall states in dirac materials. *Physical Review B*, 95:235439, 2017/06/30 2017.
- [596] M. Gullans, J. M. Taylor, and J. R. Petta. Probing electron-phonon interactions in the charge-photon dynamics of cavity-coupled double quantum dots. *Physical Review B*, 97:035305, 2018/01/16 2018.
- [597] M. Gullans, J. D. Thompson, Y. Wang, Q. Y. Liang, V. Vuletic, M. D. Lukin, and A. V. Gorshkov. Effective field theory for rydberg polaritons. *Physical Review Letters*, 117:113601, 2016/09/09 2016.
- [598] M. Gullans, T. Tiecke, D. E. Chang, J. Feist, J. D. Thompson, J. I. Cirac, P. Zoller, and M. D. Lukin. Nanoplasmonic lattices for ultracold atoms. *Physical Review Letters*, 109, 2012/12/6 2012.
- [599] A. Y. Guo, A. Deshpande, S.-K. Chu, Z. Eldredge, P. Bienias, D. Devulapalli, Y. Su, A. M. Childs, and A. V. Gorshkov. Implementing a fast unbounded quantum fanout gate using power-law interactions. *Phys. Rev. Research*, 4, 10/27/2022 2022.
- [600] A. Y. Guo, S. Lieu, M. C. Tran, and A. V. Gorshkov. Clustering of steady-state correlations in open systems with long-range interactions. 10/28/2021 2021.
- [601] A. Y. Guo, M. C. Tran, A. M. Childs, A. V. Gorshkov, and Z.-X. Gong. Signaling and scrambling with strongly long-range interactions. *Physical Review A*, 102, 7/8/2020 2020.
- [602] A. Y. Guo, J. T. Young, R. Belyansky, P. Bienias, and A. V. Gorshkov. Experimental roadmap for optimal state transfer and entanglement generation in power-law systems. 2/12/2024 2024.
- [603] S. Guo, A. R. Fritsch, C. Greenberg, I. B. Spielman, and J. P. Zwolak. Machine-learning enhanced dark soliton detection in bose-einstein condensates. *Mach. Learn.: Sci. Technol.*, 2:035020, 6/17/2021 2021.
- [604] S. Guo, S. M. Koh, A. R. Fritsch, I. B. Spielman, and J. P. Zwolak. Combining machine learning with physics: A framework for tracking and sorting multiple dark solitons. *Phys. Rev. Research*, 4:023163, 06/01/2022 2022.
- [605] S. Guo, Y. Wang, T. Purdy, and J. M. Taylor. Beyond spontaneous emission: Giant atom bounded in continuum. 12/20/2019 2019.
- [606] N. Gupta, J. Katz, and N. Chopra. Information-theoretic privacy for distributed average consensus: Bounded integral inputs. 03/28/2019 2018.
- [607] N. Gupta, J. Katz, and N. Chopra. Information-theoretic privacy in distributed average consensus. 2018.

- [608] N. Gupta, J. Katz, and N. Chopra. Statistical privacy in distributed average consensus on bounded real inputs. 03/20/2019 2019.
- [609] J. A. M. Guzmán, P. Erker, S. Gasparinetti, M. Huber, and N. Y. Halpern. Divincenzo-like criteria for autonomous quantum machines. 7/17/2023 2023.
- [610] J. A. M. Guzmán, P. Erker, S. Gasparinetti, M. Huber, and N. Y. Halpern. Useful autonomous quantum machines. 9/11/2024 2024.
- [611] J. Haferkamp, P. Faist, N. B. T. Kothakonda, J. Eisert, and N. Y. Halpern. Linear growth of quantum circuit complexity. *Nat. Phys.*, 3/28/2022 2022.
- [612] M. Hafezi, P. Adhikari, and J. M. Taylor. A chemical potential for light. *Physical Review B*, 92:174305, 2014/05/22 2015.
- [613] N. Y. Halpern, M. E. Beverland, and A. Kalev. Equilibration to the non-abelian thermal state in quantum many-body physics. 6/21/2019 2019.
- [614] N. Y. Halpern, M. E. Beverland, and A. Kalev. Noncommuting conserved charges in quantum many-body thermalization. *Phys. Rev. E*, 101, 4/15/2020 2020.
- [615] N. Y. Halpern, N. B. T. Kothakonda, J. Haferkamp, A. Munson, J. Eisert, and P. Faist. Resource theory of quantum uncomplexity. 10/21/2021 2021.
- [616] N. Y. Halpern, N. B. T. Kothakonda, J. Haferkamp, A. Munson, J. Eisert, and P. Faist. Resource theory of quantum uncomplexity. *Physical Review A*, 106, 12/19/2022 2022.
- [617] N. Y. Halpern and S. Majidy. How to build hamiltonians that transport noncommuting charges in quantum thermodynamics. *npj Quantum Inf*, 8, 01/27/2022 2022.
- [618] N. Y. Halpern, B. Swingle, and J. Dressel. The quasiprobability behind the out-of-time-ordered correlator. *Phys. Rev.*, A, 04/2018 2018.
- [619] H. Halvorson and J. Bub. Can quantum cryptography imply quantum mechanics? reply to smolin. 2003/11/11 2003.
- [620] D. Hangleiter, J. Carolan, and K. P. Y. Thébault. *Analogue Quantum Simulation: A New Instrument for Scientific Understanding*. Springer Nature, 2022.
- [621] D. Hangleiter and J. Eisert. Computational advantage of quantum random sampling. 6/8/2022 2022.
- [622] D. Hangleiter and M. Gullans. Bell sampling from quantum circuits. *Physical Review Letters*, 133, 6/1/2024 2024.
- [623] D. Hangleiter, I. Roth, J. Eisert, and P. Roushan. Precise hamiltonian identification of a superconducting quantum processor. 8/18/2021 2021.
- [624] T. M. Hanna, E. Tiesinga, and P. S. Julienne. Prediction of feshbach resonances from three input parameters. *Physical Review A*, 79, 2009/4/30 2009.
- [625] T. M. Hanna, E. Tiesinga, and P. S. Julienne. Creation and manipulation of feshbach resonances with radio-frequency radiation. *New Journal of Physics*, 12:083031, 2010/08/12 2010.
- [626] T. M. Hanna, E. Tiesinga, W. F. Mitchell, and P. S. Julienne. Resonant control of polar molecules in an optical lattice. *Physical Review A*, 85, 2012/2/8 2012.
- [627] A. W. Harrow, A. Natarajan, and X. Wu. Limitations of semidefinite programs for separable states and entangled games. *Commun. Math. Phys.*, 366, 03/04/2019 2019.
- [628] C. A. Hass, F. Genz, M. B. Kustusch, P.-P. A. Ouime, K. Pomian, E. C. Sayre, and J. P. Zwolak. Studying community development: a network analytical approach. 2018.
- [629] K. R. A. Hazzard, B. Gadway, M. Foss-Feig, B. Yan, S. A. Moses, J. P. Covey, N. Y. Yao, M. D. Lukin, J. Ye, D. S. Jin, and A. M. Rey. Many-body dynamics of dipolar molecules in an optical lattice. *Physical Review Letters*, 113, 2014/11/7 2014.

- [630] K. R. A. Hazzard, A. V. Gorshkov, and A. M. Rey. Spectroscopy of dipolar fermions in 2d pancakes and 3d lattices. *Physical Review A*, 84, 2011/9/6 2011.
- [631] K. R. A. Hazzard, A. V. Gorshkov, and A. M. Rey. Spectroscopy of dipolar fermions in layered two-dimensional and three-dimensional lattices. *Phys. Rev. A*, 84:033608, 2011.
- [632] K. R. A. Hazzard, S. R. Manmana, M. Foss-Feig, and A. M. Rey. Far from equilibrium quantum magnetism with ultracold polar molecules. *Physical Review Letters*, 110, 2013/2/11 2013.
- [633] K. R. A. Hazzard, M. van den Worm, M. Foss-Feig, S. R. Manmana, E. D. Torre, T. Pfau, M. Kastner, and A. M. Rey. Quantum correlations and entanglement in far-from-equilibrium spin systems. *Physical Review A*, 90, 2014/12/15 2014.
- [634] A. He, D. Lou, E. She, S. Guo, H. Watson, S. Weng, M. Perepechaenko, and R. Kuang. Fips compliant quantum secure communication using quantum permutation pad. 12/30/2022 2022.
- [635] J. W. Helton, H. Mousavi, S. S. Nezhadi, V. I. Paulsen, and T. B. Russell. Synchronous values of games. 9/29/2021 2021.
- [636] B. Hemenway, C. Miller, Y. Shi, and M. Wootters. Optimal entanglement-assisted one-shot classical communication. *Physical Review A*, 87:062301, 2013/06/03 2013.
- [637] M. K. Henry, A. V. Gorshkov, Y. S. Weinstein, P. Cappellaro, J. Emerson, N. Boulant, J. S. Hodges, C. Ramanathan, T. F. Havel, R. Martinez, and D. G. Cory. Signatures of incoherence in a quantum information processor. 2007/05/24 2007.
- [638] K. Hietala, L. Li, A. Gaur, A. Green, R. Rand, X. Wu, and M. Hicks. Expanding the voqc toolkit. In *The Second International Workshop on Programming Languages for Quantum Computing (PLanQC 2021)*, 06/2021 2021.
- [639] K. Hietala, R. Rand, S.-H. Hung, L. Li, and M. Hicks. Proving quantum programs correct. *12th International Conference on Interactive Theorem Proving (ITP 2021)*, 193:21:1–21:19, 06/2021 2021.
- [640] K. Hietala, R. Rand, S.-H. Hung, L. Li, and M. Hicks. Proving quantum programs correct. *Schloss Dagstuhl*, 7/13/2021 2021.
- [641] K. Hietala, R. Rand, S.-H. Hung, X. Wu, and M. Hicks. Verified optimization in a quantum intermediate representation. 04/12/2019 2019.
- [642] K. Hietala, R. Rand, S.-H. Hung, X. Wu, and M. Hicks. A verified optimizer for quantum circuits. *Proceedings of the ACM on Programming Languages*, 5, 11/12/2020 2021.
- [643] O. Higgott, D. Wang, and S. Brierley. Variational quantum computation of excited states. *Quantum*, 3, 06/28/2019 2019.
- [644] L. E. Hillberry, M. T. Jones, D. L. Vargas, P. Rall, N. Y. Halpern, N. Bao, S. Notarnicola, S. Montangero, and L. D. Carr. Entangled quantum cellular automata, physical complexity, and goldilocks rules. *Quantum Science and Technology*, 6:045017, 9/29/2021 2021.
- [645] L. E. Hillberry, L. Piroli, E. Vernier, N. Y. Halpern, T. Prosen, and L. D. Carr. Integrability of goldilocks quantum cellular automata. 4/3/2024 2024.
- [646] M. Hinsche, M. Ioannou, A. Nietner, J. Haferkamp, Y. Quek, D. Hangleiter, J.-P. Seifert, J. Eisert, and R. Sweke. Learnability of the output distributions of local quantum circuits. 10/11/2021 2021.
- [647] M. Hinsche, M. Ioannou, A. Nietner, J. Haferkamp, Y. Quek, D. Hangleiter, J.-P. Seifert, J. Eisert, and R. Sweke. A single t-gate makes distribution learning hard. 7/7/2022 2022.
- [648] C. L. Holloway, M. T. Simons, A. H. Haddab, C. J. Williams, and M. W. Holloway. Quantum physics meets music: A "real-time" guitar recording using rydberg-atoms and electromagnetically induced transparency. 04/01/2019 2019.
- [649] Z. Holmes, N. Coble, A. T. Sornborger, and Y. Subaşı. On nonlinear transformations in quantum computation. 12/23/2021 2021.

- [650] C.-L. Hong, T. Tsai, J.-P. Chou, P.-J. Chen, P.-K. Tsai, Y.-C. Chen, E.-J. Kuo, D. Srolovitz, A. Hu, Y.-C. Cheng, and H.-S. Goan. Accurate and efficient quantum computations of molecular properties using daubechies wavelet molecular orbitals: A benchmark study against experimental data. *PRX Quantum*, 3:020360, 5/28/2022 2022.
- [651] T. Hong, A. V. Gorshkov, D. Patterson, A. S. Zibrov, J. M. Doyle, M. D. Lukin, and M. G. Prentiss. Realization of coherent optically dense media via buffer-gas cooling. *Physical Review A*, 79, 2009/1/6 2009.
- [652] M. S. J. Horvath, R. Thomas, E. Tiesinga, A. B. Deb, and N. Kjærgaard. Above threshold scattering about a feshbach resonance for ultracold atoms in an optical collider. *Nature Communications*, 8, 2017/09/06 2017.
- [653] M.-C. Hsu, E.-J. Kuo, W.-H. Yu, J.-F. Cai, and M.-H. Hsieh. Quantum state tomography via non-convex riemannian gradient descent. 10/10/2022 2022.
- [654] A. Hu, L. Mathey, I. Danshita, E. Tiesinga, C. J. Williams, and C. W. Clark. Counterflow and paired superfluidity in one-dimensional bose mixtures in optical lattices. *Physical Review A*, 80, 2009/8/24 2009.
- [655] A. Hu, L. Mathey, E. Tiesinga, I. Danshita, C. J. Williams, and C. W. Clark. Detecting paired and counterflow superfluidity via dipole oscillations. *Physical Review A*, 84, 2011/10/27 2011.
- [656] A. Hu, L. Mathey, C. J. Williams, and C. W. Clark. Noise correlations of one-dimensional bose mixtures in optical lattices. *Physical Review A*, 81, 2010/6/2 2010.
- [657] X.-M. Hu, Y. Xie, A. S. Arora, M.-Z. Ai, K. Bharti, J. Zhang, W. Wu, P.-X. Chen, J.-M. Cui, B.-H. Liu, Y.-F. Huang, C.-F. Li, G.-C. Guo, J. Roland, A. Cabello, and L.-C. Kwek. Self-testing of a single quantum system: Theory and experiment. 3/17/2022 2022.
- [658] E. Huang, A. Pesah, C. T. Chubb, M. Vasmer, and A. Dua. Tailoring three-dimensional topological codes for biased noise. 11/3/2022 2022.
- [659] H.-Y. Huang, R. Kueng, G. Torlai, V. V. Albert, and J. Preskill. Provably efficient machine learning for quantum many-body problems. *Science*, 377, 9/26/2022 2022.
- [660] K. Huang, D. Farfurnik, A. Seif, M. Hafezi, and Y.-K. Liu. Random pulse sequences for qubit noise spectroscopy. 3/2/2023 2023.
- [661] T. S. Huang, C. L. Baldwin, M. Hafezi, and V. Galitski. Spin-mediated mott excitons. 4/22/2020 2020.
- [662] D. P. O. Huerta, P. Bienias, A. N. Craddock, M. Gullans, A. J. Hachtel, M. Kalinowski, M. E. Lyon, A. V. Gorshkov, S. L. Rolston, and J. V. Porto. Tunable three-body loss in a nonlinear rydberg medium. *Phys. Rev. Lett.*, *in press*, 9/28/2020 2021.
- [663] S.-H. Hung, K. Hietala, S. Zhu, M. Ying, M. Hicks, and X. Wu. Quantitative robustness analysis of quantum programs (extended version). *Proc. ACM Program. Lang.*, 3:Article 31, 2018/12/1 2018.
- [664] H. M. Hurst, S. Guo, and I. B. Spielman. Feedback induced magnetic phases in binary bose-einstein condensates. 7/14/2020 2020.
- [665] J. M. Hutson, E. Tiesinga, and P. S. Julienne. Avoided crossings between bound states of ultracold cesium dimers. *Physical Review A*, 78, 2008/11/5 2008.
- [666] K. Hyatt, J. R. Garrison, and B. Bauer. Extracting entanglement geometry from quantum states. *Physical Review Letters*, 119, 2017/10/06 2017.
- [667] J. T. Iosue, A. Ehrenberg, D. Hangleiter, A. Deshpande, and A. V. Gorshkov. Page curves and typical entanglement in linear optics. *Quantum*, 7:1017, 5/18/2023 2023.
- [668] J. T. Iosue, T. C. Mooney, A. Ehrenberg, and A. V. Gorshkov. Projective toric designs, difference sets, and quantum state designs. 11/22/2023 2023.
- [669] J. T. Iosue, K. Sharma, M. Gullans, and V. V. Albert. Continuous-variable quantum state designs: Theory and applications. *Phys. Rev. X*, 14:011013, 2/8/2024 2024.
- [670] M. Ippoliti, M. Gullans, S. Gopalakrishnan, D. A. Huse, and V. Khemani. Entanglement phase transitions in measurement-only dynamics. *Physical Review X*, 11, 1/2/2021 2021.

- [671] V. Iyer, S. P. Jain, M. Kovacs-Deak, V. M. Kumar, L. Schaeffer, D. Wang, and M. Whitmeyer. On the rational degree of boolean functions and applications. 10/12/2023 2023.
- [672] K. A. Jackson, C. Miller, and D. Wang. Evaluating the security of crystals-dilithium in the quantum random oracle model. In M. Joye and G. Leander, editors, *Advances in Cryptology – EUROCRYPT 2024*, Cham, 4/29/2024 2024. Springer Nature Switzerland, Springer Nature Switzerland.
- [673] R. Jain, C. Miller, and Y. Shi. Parallel device-independent quantum key distribution. *IEEE Transactions on Information Theory*, 66:5567–5584, 09/2020 2020.
- [674] S. P. Jain and V. V. Albert. High-distance codes with transversal clifford and t-gates. 8/22/2024 2024.
- [675] S. P. Jain, E. R. Hudson, W. C. Campbell, and V. V. Albert. Æ codes. 11/21/2023 2023.
- [676] S. P. Jain, J. T. Iosue, A. Barg, and V. V. Albert. Quantum spherical codes. Nature Physics, 5/15/2024 2024.
- [677] M. Jarret and S. P. Jordan. The fundamental gap for a class of schrödinger operators on path and hypercube graphs. *Journal of Mathematical Physics*, 55:052104, 2014/03/06 2014.
- [678] M. Jarret and S. P. Jordan. Adiabatic optimization without local minima. *Quantum Information and Computation*, 15:181–199, 2015/05/01 2015.
- [679] M. Jarret and S. P. Jordan. Modulus of continuity eigenvalue bounds for homogeneous graphs and convex subgraphs with applications to quantum hamiltonians. *Journal of Mathematical Analysis and Applications*, 452:1269–1290, 2017/03/03 2017.
- [680] M. Jarret, S. P. Jordan, and B. Lackey. Adiabatic optimization versus diffusion monte carlo. *Physical Review A*, 94:042318, 2016/07/12 2016.
- [681] M. Jarret and B. Lackey. Substochastic monte carlo algorithms. 2017/04/28 2017.
- [682] M. Jarret, B. Lackey, A. Liu, and K. Wan. Quantum adiabatic optimization without heuristics. 2018.
- [683] S. Jeffery and S. Kimmel. Quantum algorithms for graph connectivity and formula evaluation. 2017/04/03 2017.
- [684] F. Jendrzejewski, S. Eckel, T. G. Tiecke, G. Juzeliunas, G. K. Campbell, L. Jiang, and A. V. Gorshkov. Subwavelength-width optical tunnel junctions for ultracold atoms. *Physical Review A*, 94:063422, 2016/12/27 2016.
- [685] Z. Ji, J. Chen, Z. Wei, and M. Ying. The lu-lc conjecture is false. 2007/09/09 2007.
- [686] Z. Ji, Y.-K. Liu, and F. Song. Pseudorandom states, non-cloning theorems and quantum money. *In: Shacham H., Boldyreva A. (eds) Advances in Cryptology CRYPTO 2018. CRYPTO 2018. Lecture Notes in Computer Science.*, 10993, 2017/11/01 2018.
- [687] L. Jiang, G. K. Brennen, A. V. Gorshkov, K. Hammerer, M. Hafezi, E. Demler, M. D. Lukin, and P. Zoller. Anyonic interferometry and protected memories in atomic spin lattices. *Nature Physics*, 4:482 488, 2008/4/20 2008.
- [688] L. Jiang, M. V. G. Dutt, E. Togan, L. Childress, P. Cappellaro, J. M. Taylor, and M. D. Lukin. Coherence of an optically illuminated single nuclear spin qubit. *Physical Review Letters*, 100, 2008/2/19 2008.
- [689] L. Jiang, J. M. Taylor, and M. D. Lukin. A fast and robust approach to long-distance quantum communication with atomic ensembles. *Physical Review A*, 76, 2007/7/2 2007.
- [690] L. Jiang, E. Tiesinga, X.-J. Liu, H. Hu, and H. Pu. Spin-orbit-coupled topological fulde-ferrell states of fermions in a harmonic trap. *Physical Review A*, 90, 2014/11/7 2014.
- [691] Z. Jiang, A. Kalev, W. Mruczkiewicz, and H. Neven. Optimal fermion-to-qubit mapping via ternary trees with applications to reduced quantum states learning. *Quantum*, 4, 5/26/2020 2020.
- [692] B. R. Johnson, M. P. da Silva, C. A. Ryan, S. Kimmel, J. M. Chow, and T. A. Ohki. Demonstration of robust quantum gate tomography via randomized benchmarking. *New Journal of Physics*, 17:113019, 2015/11/05 2015.
- [693] S. P. Jordan. Fast quantum algorithm for numerical gradient estimation. *Physical Review Letters*, 95, 2005/7/28 2005.

- [694] S. P. Jordan. Fast quantum algorithms for approximating some irreducible representations of groups. 2008/11/04 2008.
- [695] S. P. Jordan. Quantum computation beyond the circuit model. 2008/09/13 2008.
- [696] S. P. Jordan. Permutational quantum computing. Quantum Information & Computation, 10:470–497, 2010/05/01 2010.
- [697] S. P. Jordan. Strong equivalence of reversible circuits is conp-complete. *Quantum Information Computation*, 14:1302–1307, 2014/11/01 2014.
- [698] S. P. Jordan. Black holes, quantum mechanics, and the limits of polynomial-time computability. *XRDS*, 23:30–33, 2016/09/20 2016.
- [699] S. P. Jordan. Fast quantum computation at arbitrarily low energy. Physical Review A, 95:032305, 2017/03/06 2017.
- [700] S. P. Jordan and E. Farhi. Perturbative gadgets at arbitrary orders. Physical Review A, 77, 2008/6/19 2008.
- [701] S. P. Jordan, E. Farhi, and P. W. Shor. Error correcting codes for adiabatic quantum computation. *Physical Review A*, 74, 2006/11/14 2006.
- [702] S. P. Jordan, D. Gosset, and P. J. Love. Qma-complete problems for stoquastic hamiltonians and markov matrices. *Physical Review A*, 81, 2010/3/29 2010.
- [703] S. P. Jordan, H. Kobayashi, D. Nagaj, and H. Nishimura. Achieving perfect completeness in classical-witness quantum merlin-arthur proof systems. *Quantum Information and Computation*, 12:461–471, 2012/05/01 2012.
- [704] S. P. Jordan, H. Krovi, K. S. M. Lee, and J. Preskill. Bqp-completeness of scattering in scalar quantum field theory. *Quantum*, 2:44, 2018/01/08 2018.
- [705] S. P. Jordan, K. S. M. Lee, and J. Preskill. Quantum algorithms for quantum field theories. *Science*, 336:1130 1133, 2012/05/31 2012.
- [706] S. P. Jordan, K. S. M. Lee, and J. Preskill. Quantum algorithms for fermionic quantum field theories. 2014/04/28 2014.
- [707] S. P. Jordan, K. S. M. Lee, and J. Preskill. Quantum computation of scattering in scalar quantum field theories. *Quantum Information and Computation*, 14:1014–1080, 2014/09/01 2014.
- [708] S. P. Jordan and Y.-K. Liu. Quantum cryptanalysis: Shor, grover, and beyond. *IEEE Security & Privacy*, 16:14–21, 2018/09 2018.
- [709] S. P. Jordan, T. Mansour, and S. Severini. On the degeneracy of su(3)k topological phases. 2010/09/01 2010.
- [710] S. P. Jordan and P. Wocjan. Efficient quantum circuits for arbitrary sparse unitaries. *Physical Review A*, 80, 2009/12/1 2009.
- [711] S. P. Jordan and P. Wocjan. Estimating jones and homfly polynomials with one clean qubit. *Quantum Information and Computation*, 9:264–289, 2009/03/01 2009.
- [712] D. Kafri, G. J. Milburn, and J. M. Taylor. Bounds on quantum communication via newtonian gravity. *New Journal of Physics*, 17:015006, 2015/01/15 2015.
- [713] D. Kafri and J. M. Taylor. Algorithmic cooling of a quantum simulator. 2012/07/30 2012.
- [714] D. Kafri and J. M. Taylor. A noise inequality for classical forces. 2013/11/18 2013.
- [715] D. Kafri, J. M. Taylor, and G. J. Milburn. A classical channel model for gravitational decoherence. *New Journal of Physics*, 16:065020, 2014/06/26 2014.
- [716] S. S. Kalantre, J. P. Zwolak, S. Ragole, X. Wu, N. M. Zimmerman, M. D. Stewart, and J. M. Taylor. Machine learning techniques for state recognition and auto-tuning in quantum dots. 2017/12/13 2017.
- [717] A. Kalev and I. Hen. Simulating hamiltonian dynamics with an off-diagonal series expansion. 6/3/2020 2020.
- [718] A. Kalev and A. Kyrillidis. Validating and certifying stabilizer states. *Phys. Rev. A*, 99, 9/16/2019 2019.

- [719] A. Kalev and C. Miller. Rigidity of the magic pentagram game. *Quantum Science and Technology*, 3:015002, 2017/11/02 2017.
- [720] M. Kalinowski, Y. Wang, P. Bienias, M. Gullans, D. P. Ornelas-Huerta, A. N. Craddock, S. L. Rolston, J. V. Porto, H. P. Büchler, and A. V. Gorshkov. Resonant enhancement of three-body loss between strongly interacting photons. 10/19/2020 2020.
- [721] H. B. Kaplan, L. Guo, W. L. Tan, A. De, F. Marquardt, G. Pagano, and C. Monroe. Many-body dephasing in a trapped-ion quantum simulator. *Phys. Rev. Lett.*, 125, 8/24/2020 2020.
- [722] I. Kassal, S. P. Jordan, P. J. Love, M. Mohseni, and A. Aspuru-Guzik. Polynomial-time quantum algorithm for the simulation of chemical dynamics. *Proceedings of the National Academy of Sciences*, 105:18681 18686, 2008/11/24 2008.
- [723] J. Katz and B. Sela. A quantum "lifting theorem" for constructions of pseudorandom generators from random oracles. 1/30/2024 2024.
- [724] O. Katz, M. Cetina, and C. Monroe. N-body interactions between trapped ion qubits via spin-dependent squeezing. *Physical Review Letters*, 129, 8/5/2022 2022.
- [725] O. Katz, L. Feng, A. Risinger, C. Monroe, and M. Cetina. Demonstration of three- and four-body interactions between trapped-ion spins. 9/12/2022 2022.
- [726] O. Katz, E. Reches, R. Shaham, A. V. Gorshkov, and O. Firstenberg. Optical quantum memory with optically inaccessible noble-gas spins. 7/17/2020 2020.
- [727] A. M. Kaufman, B. J. Lester, M. Foss-Feig, M. L. Wall, A. M. Rey, and C. A. Regal. Entangling two transportable neutral atoms via local spin exchange. *Nature*, 527:208–211, 2015/11/02 2015.
- [728] A. M. Kaufman, B. J. Lester, C. M. Reynolds, M. L. Wall, M. Foss-Feig, K. R. A. Hazzard, A. M. Rey, and C. A. Regal. Hong-ou-mandel atom interferometry in tunnel-coupled optical tweezers. *Science*, 345:306 309, 2014/06/26 2014.
- [729] Y. Kharkov, A. Ivanova, E. Mikhantiev, and A. Kotelnikov. Arline benchmarks: Automated benchmarking platform for quantum compilers. 3/28/2022 2022.
- [730] Y. Kharkov, O. Shtanko, A. Seif, P. Bienias, M. V. Regemortel, M. Hafezi, and A. V. Gorshkov. Discovering hydrodynamic equations of many-body quantum systems. 11/3/2021 2021.
- [731] Y. A. Kharkov, J. Oitmaa, and O. P. Sushkov. Quantum lifshitz criticality in a frustrated two-dimensional xy model. *Phys. Rev. B*, 101, 01/09/2020 2020.
- [732] D. Kielpinski, D. Kafri, M. J. Woolley, G. J. Milburn, and J. M. Taylor. Quantum interface between an electrical circuit and a single atom. *Physical Review Letters*, 108, 2012/3/30 2012.
- [733] I. H. Kim, B. Shi, K. Kato, and V. V. Albert. Chiral central charge from a single bulk wave function. *Phys. Rev. Lett.*, 128:176402, 4/28/2022 2022.
- [734] I. H. Kim, B. Shi, K. Kato, and V. V. Albert. Modular commutator in gapped quantum many-body systems. *Physical Review B*, 106, 8/26/2022 2022.
- [735] I. H. Kim and B. Swingle. Robust entanglement renormalization on a noisy quantum computer. 2017/11/20 2017.
- [736] S. Kim, J. M. Taylor, and G. Bahl. Dynamic suppression of rayleigh light scattering in dielectric resonators. 2018.
- [737] S. Kim, X. Xu, J. M. Taylor, and G. Bahl. Dynamically induced robust phonon transport and chiral cooling in an optomechanical system. *Nature Communications*, 8:205, 2017/06/19 2017.
- [738] S. Kimmel. Quantum adversary (upper) bound. *Chicago Journal of Theoretical Computer Science*, 19:1 14, 2013/04/05 2013.
- [739] S. Kimmel, M. P. da Silva, C. A. Ryan, B. R. Johnson, and T. Ohki. Robust extraction of tomographic information via randomized benchmarking. *Physical Review X*, 4, 2014/3/25 2014.

- [740] S. Kimmel, C. Y.-Y. Lin, and H.-H. Lin. Oracles with costs. 10th Conference on the Theory of Quantum Computation, Communication and Cryptography (TQC 2015), 44:1–26, 2015/02/07 2015.
- [741] S. Kimmel, C. Y.-Y. Lin, G. H. Low, M. Ozols, and T. J. Yoder. Hamiltonian simulation with optimal sample complexity. *npj Quantum Information*, 13, 2017/03/31 2017.
- [742] S. Kimmel and Y.-K. Liu. Quantum compressed sensing using 2-designs. 2015/10/29 2015.
- [743] S. Kimmel and Y.-K. Liu. Phase retrieval using unitary 2-designs. In SampTA 2017, 2017/07 2017.
- [744] S. Kimmel, G. H. Low, and T. J. Yoder. Robust single-qubit process calibration via robust phase estimation. *Physical Review A*, 92:062315, 2015/12/08 2015.
- [745] J. Kirchenbauer, J. Geiping, Y. Wen, J. Katz, I. Miers, and T. Goldstein. A watermark for large language models. 6/6/2023 2023.
- [746] J. Klassen, J. Chen, and B. Zeng. Universal entanglers for bosonic and fermionic systems. 2013/05/31 2013.
- [747] M. Klein, Y. Xiao, A. V. Gorshkov, M. Hohensee, C. D. Leung, M. R. Browning, D. F. Phillips, I. Novikova, and R. L. Walsworth. Optimizing slow and stored light for multidisciplinary applications. *Proc. SPIE*, 6904:69040C, 2008.
- [748] V. Kliuchnikov, D. Maslov, and M. Mosca. Practical approximation of single-qubit unitaries by single-qubit quantum clifford and t circuits. *IEEE Transactions on Computers*, 65:161 172, 2016/01/01 2016.
- [749] K. Klocke, C. D. White, and M. Buchhold. Localization crossover and subdiffusive transport in a classical facilitated network model of a disordered, interacting quantum spin chain. 9/22/2021 2021.
- [750] L. Kocia and P. Love. Measurement contextuality and planck's constant. *New Journal of Physics*, 20:073020, 2018/07/12 2018.
- [751] L. Kocia and P. Love. The non-disjoint ontic states of the grassmann ontological model, transformation contextuality, and the single qubit stabilizer subtheory. 2018.
- [752] L. Kocia and P. Love. Stationary phase method in discrete wigner functions and classical simulation of quantum circuits. 2018.
- [753] T. Koehler, E. Tiesinga, and P. S. Julienne. Spontaneous dissociation of long-range feshbach molecules. *Physical Review Letters*, 94, 2005/1/18 2005.
- [754] A. P. Koller, M. Beverland, A. V. Gorshkov, and A. M. Rey. Beyond the spin model approximation for ramsey spectroscopy. *Phys. Rev. Lett.*, 112:123001, 2014.
- [755] S. Korenblit, D. Kafri, W. C. Campbell, R. Islam, E. E. Edwards, Z.-X. Gong, G.-D. Lin, L. Duan, J. Kim, K. Kim, and C. Monroe. Quantum simulation of spin models on an arbitrary lattice with trapped ions. *New Journal of Physics*, 14:095024, 2012/09/27 2012.
- [756] S. Kotochigova, E. Tiesinga, and P. S. Julienne. Multi-channel modelling of the formation of vibrationally cold polar krb molecules. *New Journal of Physics*, 11:055043, 2009/05/14 2009.
- [757] F. Krahmer and Y.-K. Liu. Phase retrieval without small-ball probability assumptions: Stability and uniqueness. *SampTA*, pages 411–414, 2015/05/25 2015.
- [758] F. Krahmer and Y.-K. Liu. Phase retrieval without small-ball probability assumptions. *IEEE Transactions on Information Theory*, 64:485–500, 2018/01/01 2018.
- [759] F. Kranzl, A. Lasek, M. K. Joshi, A. Kalev, R. Blatt, C. F. Roos, and N. Y. Halpern. Experimental observation of thermalisation with noncommuting charges. 2/9/2022 2022.
- [760] F. Kranzl, A. Lasek, M. K. Joshi, A. Kalev, R. Blatt, C. F. Roos, and N. Y. Halpern. Experimental observation of thermalization with noncommuting charges. *PRX Quantum*, 4, 4/28/2023 2023.
- [761] E. Kubischta and I. Teixeira. A family of quantum codes with exotic transversal gates. 5/11/2023 2023.
- [762] E. Kubischta and I. Teixeira. Classification of the subgroups of the two-qubit clifford group. 9/22/2024 2024.

- [763] E. Kubischta and I. Teixeira. Flexible fault tolerant gate gadgets. 9/18/2024 2024.
- [764] E. Kubischta and I. Teixeira. Permutation-invariant quantum codes with transversal generalized phase gates. 10/4/2024 2024.
- [765] E. Kubischta and I. Teixeira. Quantum codes from twisted unitary ¡mml:math xmlns:mml="http://www.w3.org/1998/math/mathml" display="inline"¿¡mml:mi¿t¡/mml:mi¿t¡/mml:math¿-groups. Physical Review Letters, 133, 8/10/2024 2024.
- [766] J. Kunjummen, D. Carney, and J. M. Taylor. Position space decoherence from long-range interaction with background gas. *Bulletin of the American Physical Society*, 06/05/2020 2020.
- [767] J. Kunjummen, D. Carney, and J. M. Taylor. Decoherence from long-range forces in atom interferometry. *Phys. Rev. A*, 107, 3/17/2023 2023.
- [768] J. Kunjummen, M. C. Tran, D. Carney, and J. M. Taylor. Shadow process tomography of quantum channels. *Phys. Rev. A*, 107, 4/4/2023 2023.
- [769] K. A. Kuns, A. M. Rey, and A. V. Gorshkov. d-wave superfluidity in optical lattices of ultracold polar molecules. *Physical Review A*, 84, 2011/12/29 2011.
- [770] E.-J. Kuo, A. Seif, R. Lundgren, S. Whitsitt, and M. Hafezi. Decoding conformal field theories: from supervised to unsupervised learning. 7/10/2021 2021.
- [771] E.-J. Kuo, Y. Xu, D. Hangleiter, A. Grankin, and M. Hafezi. Boson sampling for generalized bosons. 5/2/2022 2022.
- [772] S. Kushnir, J. Leng, Y. Peng, L. Fan, and X. Wu. Qhdopt: A software for nonlinear optimization with quantum hamiltonian descent. 9/4/2024 2024.
- [773] J. Kwan, P. Segura, Y. Li, S. Kim, A. V. Gorshkov, A. Eckardt, B. Bakkali-Hassani, and M. Greiner. Realization of 1d anyons with arbitrary statistical phase. 6/2/2023 2023.
- [774] A. Kyprianidis, F. Machado, W. Morong, P. Becker, K. S. Collins, D. V. Else, L. Feng, P. W. Hess, C. Nayak, G. Pagano, N. Y. Yao, and C. Monroe. Observation of a prethermal discrete time crystal. 2/2/2021 2021.
- [775] A. Kyrillidis and A. Kalev. Implicit regularization and solution uniqueness in over-parameterized matrix sensing. 2018.
- [776] A. Kyrillidis, A. Kalev, D. Park, S. Bhojanapalli, C. Caramanis, and S. Sanghavi. Provable quantum state tomography via non-convex methods. 2017/11/19 2017.
- [777] B. Lackey. A Bochner Vanishing Theorem for Elliptic Complexes, page 199–226. Springer, 1998.
- [778] B. Lackey. A Lichnerowicz Vanishing Theorem for Finsler Spaces, page 227–243. Springer, 1998.
- [779] B. Lackey. A model of trophodynamics. *Nonlinear Analysis: Theory, Methods & Applications*, 35(1):37–57, 1999/01/01 1999.
- [780] B. Lackey. Metric equivalence of path spaces. Nonlinear Studies, 7(2), 2000/01/01 2000.
- [781] B. Lackey. On the gauss—bonnet formula in riemann–finsler geometry. *Bulletin of the London Mathematical Society*, 34(03):329–340, 2002/04/01 2002.
- [782] B. Lackey. Penalty models for bitstrings of constant hamming weight. 2017/04/24 2017.
- [783] B. Lackey. A belief propagation algorithm based on domain decomposition. 2018.
- [784] B. Lackey and N. Rodrigues. Nonlocal games, synchronous correlations, and bell inequalities. 2017/09/21 2017.
- [785] B. Lackey and N. Rodrigues. Morphisms in categories of nonlocal games. 2018.
- [786] T. D. Ladd, F. Jelezko, R. Laflamme, Y. Nakamura, C. Monroe, and J. L. O'Brien. Quantum computing. *Nature*, 464:45 53, 2010/3/4 2010.

- [787] O. Landon-Cardinal, Y.-K. Liu, and D. Poulin. Efficient direct tomography for matrix product states. 2010/02/24
- [788] K. A. Landsman, C. Figgatt, T. Schuster, N. M. Linke, B. Yoshida, N. Y. Yao, and C. Monroe. Verified quantum information scrambling. 2018.
- [789] K. A. Landsman, Y. Wu, P. H. Leung, D. Zhu, N. M. Linke, K. R. Brown, L. Duan, and C. R. Monroe. Two-qubit entangling gates within arbitrarily long chains of trapped ions. 05/28/2019 2019.
- [790] C. M. Langlett, Z.-C. Yang, J. Wildeboer, A. V. Gorshkov, T. Iadecola, and S. Xu. Rainbow scars: From area to volume law. 7/12/2021 2021.
- [791] A. A. Lasek, C. H. W. Barnes, and T. Ferrus. Isolation and manipulation of a single-donor detector in a silicon quantum dot. *Phys. Rev. B*, 106:125423, 9/27/2022 2022.
- [792] J. W. Z. Lau, K. H. Lim, K. Bharti, L.-C. Kwek, and S. Vinjanampathy. Convex optimization for non-equilibrium steady states on a hybrid quantum processor. 4/7/2022 2022.
- [793] A. Lavasani, M. Gullans, V. V. Albert, and M. Barkeshli. On stability of k-local quantum phases of matter. 05/29/2024 2024.
- [794] P. Lazos, F. J. Marmolejo-Cossío, X. Zhou, and J. Katz. Rpplns: Pay-per-last-n-shares with a randomised twist. 2/15/2021 2021.
- [795] M. Lemeshko, N. Y. Yao, A. V. Gorshkov, H. Weimer, S. D. Bennett, T. Momose, and S. Gopalakrishnan. Controllable quantum spin glasses with magnetic impurities embedded in quantum solids. *Physical Review B*, 88, 2013/7/24 2013.
- [796] J. Leng, E. Hickman, J. Li, and X. Wu. Quantum hamiltonian descent. 3/2/2023 2023.
- [797] J. Leng, J. Li, Y. Peng, and X. Wu. Expanding hardware-efficiently manipulable hilbert space via hamiltonian embedding. 1/16/2024 2024.
- [798] J. Leng, Y. Zheng, and X. Wu. A quantum-classical performance separation in nonconvex optimization. 11/1/2023 2023.
- [799] D. Leung, A. Nayak, A. Shayeghi, D. Touchette, P. Yao, and N. Yu. Capacity approaching codes for low noise interactive quantum communication. In *Annual ACM Symposium on the Theory of Computing STOC 2018*, 2018/01/01 2018.
- [800] P. H. Leung, K. A. Landsman, C. Figgatt, N. M. Linke, C. Monroe, and K. R. Brown. Robust two-qubit gates in a linear ion crystal using a frequency-modulated driving force. *Physical Review Letters*, 120:020501, 2018/01/09 2018.
- [801] L. Lewis, D. Zhu, A. Gheorghiu, C. Noel, O. Katz, B. Harraz, Q. Wang, A. Risinger, L. Feng, D. Biswas, L. Egan, T. Vidick, M. Cetina, and C. Monroe. Experimental implementation of an efficient test of quantumness. 9/28/2022 2022.
- [802] L. Li, L. Chang, R. Cleaveland, M. Zhu, and X. Wu. The quantum abstract machine. 2/21/2024 2024.
- [803] L. Li, F. Voichick, K. Hietala, Y. Peng, X. Wu, and M. Hicks. Verified compilation of quantum oracles. 12/13/2021 2021.
- [804] L. Li, D. J. Young, V. V. Albert, K. Noh, C.-L. Zou, and L. Jiang. Phase-engineered bosonic quantum codes. *Physical Review A*, 103:062427, 6/29/2021 2021.
- [805] L. Li, M. Zhu, R. Cleaveland, Y. Lee, L. Chang, and X. Wu. Qafny: Quantum program verification through type-guided classical separation logic. 7/12/2023 2023.
- [806] L. Li, M. Zhu, R. Cleaveland, A. Nicolellis, Y. Lee, L. Chang, and X. Wu. Qafny: A quantum-program verifier. 11/11/2022 2024.
- [807] L. Li, M. Zhu, Y. Lee, L. Chang, and X. Wu. Quantum natural proof: A new perspective of hybrid quantum-classical program verification. 11/11/2022 2022.

- [808] M. Li, A. Petrov, C. Makrides, E. Tiesinga, and S. Kotochigova. Pendular trapping conditions for ultracold polar molecules enforced by external electric fields. *Physical Review A*, 95:063422, 2017/06/26 2017.
- [809] M. Li, E. Tiesinga, and S. Kotochigova. Orbital quantum magnetism in spin dynamics of strongly interacting magnetic lanthanide atoms. 2018.
- [810] T. Li, S. Chakrabarti, and X. Wu. Sublinear quantum algorithms for training linear and kernel-based classifiers. *Proceedings of the 36th International Conference on Machine Learning (ICML 2019) PMLR*, 97:3815–3824, 04/03/2019 2019.
- [811] T. Li, Z.-X. Gong, Z. qi Yin, H. T. Quan, X. Yin, P. Zhang, L. M. Duan, and X. Zhang. Reply to comment on "space-time crystals of trapped ions. 2012/10/15 2012.
- [812] T. Li, Z.-X. Gong, Z.-Q. Yin, H. T. Quan, X. Yin, P. Zhang, L.-M. Duan, and X. Zhang. Space-time crystals of trapped ions. *Physical Review Letters*, 109:163001, 2012/10/19 2012.
- [813] T. Li, C. Wang, S. Chakrabarti, and X. Wu. Sublinear classical and quantum algorithms for general matrix games. *To appear in the Thirty-Fifth AAAI Conference on Artificial Intelligence (AAAI 2021)*, 12/11/2020 2020.
- [814] T. Li and X. Wu. Quantum query complexity of entropy estimation. *IEEE Transactions on Information Theory*, 65:2899–2921, 10/16/2017 2019.
- [815] C.-H. Liang, Y.-A. Chen, Y.-C. Liu, and W. H. Hsu. Raw image deblurring. 12/8/2020 2020.
- [816] Q.-Y. Liang, A. V. Venkatramani, S. H. Cantu, T. L. Nicholson, M. Gullans, A. V. Gorshkov, J. D. Thompson, C. Chin, M. D. Lukin, and V. Vuletic. Observation of three-photon bound states in a quantum nonlinear medium. *Science*, 359:783–786, 2018/02/16 2018.
- [817] S. Lieu, R. Belyansky, J. T. Young, R. Lundgren, V. V. Albert, and A. V. Gorshkov. Symmetry breaking and error correction in open quantum systems. *Phys. Rev. Lett.*, 125:240405, 8/6/2020 2020.
- [818] S. Lieu, Y.-J. Liu, and A. V. Gorshkov. Candidate for a self-correcting quantum memory in two dimensions. 5/19/2022 2022.
- [819] S. Lieu, Y.-J. Liu, and A. V. Gorshkov. Candidate for a passively protected quantum memory in two dimensions. 3/2/2023 2023.
- [820] S. Lieu, M. McGinley, O. Shtanko, N. R. Cooper, and A. V. Gorshkov. Kramers' degeneracy for open systems in thermal equilibrium. *Phys. Rev. B*, 105:L121104, 3/10/2022 2022.
- [821] C.-J. Lin, Z.-W. Liu, V. V. Albert, and A. V. Gorshkov. Covariant quantum error-correcting codes with metrological entanglement advantage. 9/30/2024 2024.
- [822] C. Y.-Y. Lin and H.-H. Lin. Upper bounds on quantum query complexity inspired by the elitzur-vaidman bomb tester. *Theory of Computing*, 12:1–35, 2016/11/28 2016.
- [823] C. Y.-Y. Lin and Y. Zhu. Performance of qaoa on typical instances of constraint satisfaction problems with bounded degree. 2016/01/08 2016.
- [824] N. M. Linke, M. Gutierrez, K. A. Landsman, C. Figgatt, S. Debnath, K. R. Brown, and C. Monroe. Experimental demonstration of quantum fault tolerance. 2016/11/21 2016.
- [825] F. Liu, J. R. Garrison, D.-L. Deng, Z.-X. Gong, and A. V. Gorshkov. Asymmetric particle transport and light-cone dynamics induced by anyonic statistics. *Phys. Rev. Lett*, 121, 2018/12/20 2018.
- [826] F. Liu, R. Lundgren, P. Titum, J. R. Garrison, and A. V. Gorshkov. Circuit complexity across a topological phase transition. *Physical Review Research*, 2:013323, 03/16/2020 2020.
- [827] F. Liu, R. Lundgren, P. Titum, G. Pagano, J. Zhang, C. Monroe, and A. V. Gorshkov. Confined dynamics in long-range interacting quantum spin chains. *Phys. Rev. Lett.*, 122, 04/17/2019 2019.
- [828] F. Liu, S. Whitsitt, P. Bienias, R. Lundgren, and A. V. Gorshkov. Realizing and probing baryonic excitations in rydberg atom arrays. 7/14/2020 2020.

- [829] F. Liu, Z.-C. Yang, P. Bienias, T. Iadecola, and A. V. Gorshkov. Localization and criticality in antiblockaded 2d rydberg atom arrays. 12/7/2020 2020.
- [830] J.-P. Liu, H. Ø. Kolden, H. K. Krovi, N. F. Loureiro, K. Trivisa, and A. M. Childs. Efficient quantum algorithm for dissipative nonlinear differential equations. *Proceedings of the National Academy of Sciences*, 118, 3/1/2021 2021.
- [831] M. L. Liu, N. Tantivasadakarn, and V. V. Albert. Subsystem css codes, a tighter stabilizer-to-css mapping, and goursat's lemma. 11/29/2023 2023.
- [832] Y. Liu, E. Gomez, S. E. Maxwell, L. D. Turner, E. Tiesinga, and P. D. Lett. Number fluctuations and energy dissipation in sodium spinor condensates. *Physical Review Letters*, 102, 2009/6/5 2009.
- [833] Y. Liu, S. Jung, S. E. Maxwell, L. D. Turner, E. Tiesinga, and P. D. Lett. Quantum phase transitions and continuous observation of spinor dynamics in an antiferromagnetic condensate. *Physical Review Letters*, 102, 2009/3/23 2009.
- [834] Y.-K. Liu. Consistency of local density matrices is qma-complete. Proc. RANDOM, pages 438–449, 2006/04/21 2006.
- [835] Y.-K. Liu. Gibbs states and the consistency of local density matrices. 2006/03/02 2006.
- [836] Y.-K. Liu. The complexity of the consistency and n-representability problems for quantum states. 2007/12/18 2007.
- [837] Y.-K. Liu. The local consistency problem for stoquastic and 1-d quantum systems. 2007/12/10 2007.
- [838] Y.-K. Liu. Quantum algorithms using the curvelet transform. *Proc. ACM Symposium on Theory of Computing (STOC)*, pages 391–400, 2009/10/28 2009.
- [839] Y.-K. Liu. Universal low-rank matrix recovery from pauli measurements. *Advances in Neural Information Processing Systems (NIPS)*, pages 1638–1646, 2011/03/14 2011.
- [840] Y.-K. Liu. Building one-time memories from isolated qubits. *Innovations in Theoretical Computer Science (ITCS)*, pages 269–286, 2013/04/18 2013.
- [841] Y.-K. Liu. Privacy amplification in the isolated qubits model. Eurocrypt, pages 785–814, 2014/10/15 2014.
- [842] Y.-K. Liu. Single-shot security for one-time memories in the isolated qubits model. *CRYPTO*, Part II:19–36, 2014/02/01 2014.
- [843] Y.-K. Liu. An uncertainty principle for the curvelet transform, and the infeasibility of quantum algorithms for finding short lattice vectors. 10/5/2023 2023.
- [844] Y.-K. Liu. An uncertainty principle for the curvelet transform, and the infeasibility of quantum algorithms for finding short lattice vectors. 11/7/2023 2023.
- [845] Y.-K. Liu, M. Christandl, and F. Verstraete. N-representability is qma-complete. *Phys. Rev. Lett.*, 98, 2007/03/16 2007.
- [846] Y.-K. Liu, V. Lyubashevsky, and D. Micciancio. On bounded distance decoding for general lattices. *Proc. RAN-DOM*, pages 450–461, 2006/01/01 2006.
- [847] Y.-K. Liu and D. Moody. Post-quantum cryptography and the quantum future of cybersecurity. *Phys. Rev. Appl.*, 21:040501, 4/9/2024 2024.
- [848] Y. Y. Liu, J. Stehlik, C. Eichler, M. Gullans, J. M. Taylor, and J. R. Petta. Semiconductor double quantum dot micromaser. *Science*, 347:285 287, 2015/01/15 2015.
- [849] Y.-Y. Liu, J. Stehlik, C. Eichler, X. Mi, T. R. Hartke, M. Gullans, J. M. Taylor, and J. R. Petta. Threshold dynamics of a semiconductor single atom maser. *Physical Review Letters*, 119:097702, 2017/08/31 2017.
- [850] Y. Y. Liu, J. Stehlik, M. Gullans, J. M. Taylor, and J. R. Petta. Injection locking of a semiconductor double quantum dot micromaser. *Physical Review A*, 92:053802, 2015/11/02 2015.

- [851] Z. Liu, D. Devulapalli, D. Hangleiter, Y.-K. Liu, A. J. Kollár, A. V. Gorshkov, and A. M. Childs. Efficiently verifiable quantum advantage on near-term analog quantum simulators. 3/13/2024 2024.
- [852] C. Lu, J. Chen, and R. Duan. Optimal perfect distinguishability between unitaries and quantum operations. 2010/10/12 2010.
- [853] D. Lu, T. Xin, N. Yu, Z. Ji, J. Chen, G. Long, J. Baugh, X. Peng, B. Zeng, and R. Laflamme. Tomography is necessary for universal entanglement detection with single-copy observables. *Physical Review Letters*, 116:230501, 2016/06/07 2016.
- [854] R. Lundgren, A. V. Gorshkov, and M. F. Maghrebi. On the nature of the non-equilibrium phase transition in the non-markovian driven dicke model. 2019/10/9 2019.
- [855] R. Lundgren, F. Liu, P. Laurell, and G. A. Fiete. Momentum-space entanglement after a quench in one-dimensional disordered fermionic systems. 9/11/2019 2019.
- [856] N. Lupu-Gladstein, Y. B. Yilmaz, D. R. M. Arvidsson-Shukur, A. Brodutch, A. O. T. Pang, A. M. Steinberg, and N. Y. Halpern. Negative quasiprobabilities enhance phase estimation in quantum-optics experiment. *Phys. Rev. Lett.*, 128:220504, 6/2/2022 2022.
- [857] X. Ma, T. Jackson, H. Zhou, J. Chen, D. Lu, M. D. Mazurek, K. A. Fisher, X. Peng, D. Kribs, K. J. Resch, Z. Ji, B. Zeng, and R. Laflamme. Pure-state tomography with the expectation value of pauli operators. *Physical Review A*, 93:032140, 2016/03/31 2016.
- [858] M. F. Maghrebi. A diagrammatic expansion of the casimir energy in multiple reflections: theory and applications. *Physical Review D*, 83, 2011/2/2 2011.
- [859] M. F. Maghrebi, R. Abravanel, and R. L. Jaffe. Implications of the babinet principle for casimir interactions. *Physical Review D*, 84, 2011/9/1 2011.
- [860] M. F. Maghrebi, S. Ganeshan, D. J. Clarke, A. V. Gorshkov, and J. D. Sau. Parafermionic zero modes in ultracold bosonic systems. *Physical Review Letters*, 115:065301, 2015/08/06 2015.
- [861] M. F. Maghrebi, R. Golestanian, and M. Kardar. Quantum cherenkov radiation and non-contact friction. *Physical Review A*, 88, 2013/10/21 2013.
- [862] M. F. Maghrebi, R. Golestanian, and M. Kardar. A scattering approach to the dynamical casimir effect. *Physical Review D*, 87, 2013/1/7 2013.
- [863] M. F. Maghrebi, Z.-X. Gong, M. Foss-Feig, and A. V. Gorshkov. Causality and quantum criticality in long-range lattice models. *Physical Review B*, 93:125128, 2016/03/17 2016.
- [864] M. F. Maghrebi, Z.-X. Gong, M. Foss-Feig, and A. V. Gorshkov. Causality and quantum criticality with long-range interactions. *Physical Review B*, 92:125128, 2016/03/17 2016.
- [865] M. F. Maghrebi, Z.-X. Gong, and A. V. Gorshkov. Continuous symmetry breaking and a new universality class in 1d long-range interacting quantum systems. 2015/10/05 2015.
- [866] M. F. Maghrebi and A. V. Gorshkov. Nonequilibrium many-body steady states via keldysh formalism. *Physical Review B*, 93:014307, 2016/01/27 2016.
- [867] M. F. Maghrebi, A. V. Gorshkov, and J. D. Sau. Fluctuation-induced torque on a topological insulator out of thermal equilibrium. *Phys. Rev. Lett.*, 123, 8/1/2019 2019.
- [868] M. F. Maghrebi and N. Graham. Electromagnetic casimir energies of semi-infinite planes. *EPL (Europhysics Letters)*, 95:14001, 2011/07/01 2011.
- [869] M. F. Maghrebi, M. Gullans, P. Bienias, S. Choi, I. Martin, O. Firstenberg, M. D. Lukin, H. P. Büchler, and A. V. Gorshkov. Coulomb bound states of strongly interacting photons. *Physical Review Letters*, 115:123601, 2015/09/16 2015.
- [870] M. F. Maghrebi, R. L. Jaffe, and M. Kardar. Spontaneous emission by rotating objects: A scattering approach. *Physical Review Letters*, 108, 2012/6/7 2012.

- [871] M. F. Maghrebi, R. L. Jaffe, and M. Kardar. Nonequilibrium quantum fluctuations of a dispersive medium: Spontaneous emission, photon statistics, entropy generation, and stochastic motion. *Physical Review A*, 90, 2014/7/16 2014.
- [872] M. F. Maghrebi, Y. Kantor, and M. Kardar. Entropic force of polymers on a cone tip. *EPL (Europhysics Letters)*, 96:66002, 2011/12/01 2011.
- [873] M. F. Maghrebi, Y. Kantor, and M. Kardar. Polymer-mediated entropic forces between scale-free objects. *Physical Review E*, 86, 2012/12/3 2012.
- [874] M. F. Maghrebi, M. Krüger, and M. Kardar. Flight of a heavy particle nonlinearly coupled to a quantum bath. *Physical Review B*, 93:014309, 2016/01/28 2016.
- [875] M. F. Maghrebi, S. J. Rahi, T. Emig, N. Graham, R. L. Jaffe, and M. Kardar. Casimir force between sharp-shaped conductors. *Proceedings of the National Academy of Sciences*, 108:6867 6871, 2011/04/11 2011.
- [876] M. F. Maghrebi and H. Reid. Entanglement entropy of dispersive media from thermodynamic entropy in one higher dimension. *Physical Review Letters*, 114:151602, 2015/04/16 2015.
- [877] M. F. Maghrebi, N. Y. Yao, M. Hafezi, T. Pohl, O. Firstenberg, and A. V. Gorshkov. Fractional quantum hall states of rydberg polaritons. *Physical Review A*, 91:033838, 2015/03/31 2015.
- [878] S. Majidy, U. Agrawal, S. Gopalakrishnan, A. C. Potter, R. Vasseur, and N. Y. Halpern. Critical phase and spin sharpening in su(2)-symmetric monitored quantum circuits. *Physical Review B*, 108, 8/17/2023 2023.
- [879] S. Majidy, W. F. Braasch, A. Lasek, T. Upadhyaya, A. Kalev, and N. Y. Halpern. Noncommuting conserved charges in quantum thermodynamics and beyond. *Nature Reviews Physics*, 9/7/2023 2023.
- [880] S. Majidy, A. Lasek, D. A. Huse, and N. Y. Halpern. Non-abelian symmetry can increase entanglement entropy. *Physical Review B*, 107, 1/3/2023 2023.
- [881] C. Makrides, D. S. Barker, J. A. Fedchak, J. Scherschligt, S. Eckel, and E. Tiesinga. Collisions of room-temperature helium with ultracold lithium and the van der waals bound state of heli. *Phys. Rev. A*, 101, 1/6/2020 2020.
- [882] C. Makrides, M. Li, E. Tiesinga, and S. Kotochigova. Fractal universality in near-threshold magnetic lanthanide dimers. *Science Advances*, 4:eaap8308, 2018/02/16 2018.
- [883] S. R. Manmana, E. M. Stoudenmire, K. R. A. Hazzard, A. M. Rey, and A. V. Gorshkov. Topological phases in ultracold polar-molecule quantum magnets. *Physical Review B*, 87, 2013/2/26 2013.
- [884] M. T. Manzoni, M. Moreno-Cardoner, A. Asenjo-Garcia, J. V. Porto, A. V. Gorshkov, and D. E. Chang. Optimization of photon storage fidelity in ordered atomic arrays. *New Journal of Physics*, 20, 2018/08/31 2018.
- [885] F. J. Marmolejo-Cossío, E. Brigham, B. Sela, and J. Katz. Competing (semi)-selfish miners in bitcoin. 06/11/2019 2019.
- [886] M. J. Martin, M. Bishof, M. D. Swallows, X. Zhang, C. Benko, J. von Stecher, A. V. Gorshkov, A. M. Rey, and J. Ye. A quantum many-body spin system in an optical lattice clock. *Science*, 341:632, 2013.
- [887] J. Martyn and B. Swingle. Product spectrum ansatz and the simplicity of thermal states. *Phys. Rev. A*, 100, 2019/11/18 2019.
- [888] N. Maskara, A. Deshpande, M. C. Tran, A. Ehrenberg, B. Fefferman, and A. V. Gorshkov. Complexity phase diagram for interacting and long-range bosonic hamiltonians. 06/10/2019 2019.
- [889] D. Maslov. On the advantages of using relative phase toffolis with an application to multiple control toffoli optimization. *Physical Review A*, 93:022311, 2016/02/10 2016.
- [890] D. Maslov. Optimal and asymptotically optimal nct reversible circuits by the gate types. *Quantum Information & Computation*, 16:1096–1112, 2016/08/23 2016.
- [891] D. Maslov. Basic circuit compilation techniques for an ion-trap quantum machine. *New Journal of Physics*, 19:023035, 2016/02/20 2017.

- [892] D. Maslov and Y. Nam. Use of global interactions in efficient quantum circuit constructions. *New Journal of Physics*, 2017/12/21 2017.
- [893] D. Maslov and M. Roetteler. Shorter stabilizer circuits via bruhat decomposition and quantum circuit transformations. 2017/05/25 2017.
- [894] R. Mathew, A. Kumar, S. Eckel, F. Jendrzejewski, G. K. Campbell, M. Edwards, and E. Tiesinga. Self-heterodyne detection of the *in-situ* phase of an atomic-squid. *Physical Review A*, 92:033602, 2015/09/03 2015.
- [895] R. Mathew and E. Tiesinga. Controlling the group velocity of colliding atomic bose-einstein condensates with feshbach resonances. *Physical Review A*, 87, 2013/5/10 2013.
- [896] R. Mathew and E. Tiesinga. Phase-space mixing in dynamically unstable, integrable few-mode quantum systems. *Physical Review A*, 96:013604, 2017/07/05 2017.
- [897] R. Mathew and E. Tiesinga. A semiclassical theory of phase-space dynamics of interacting bosons. 2018.
- [898] L. Mathey, E. Tiesinga, P. S. Julienne, and C. W. Clark. Collisional cooling of ultra-cold atom ensembles using feshbach resonances. *Physical Review A*, 80, 2009/9/8 2009.
- [899] P. C. Maurer, J. R. Maze, P. L. Stanwix, L. Jiang, A. V. Gorshkov, A. A. Zibrov, B. Harke, J. S. Hodges, A. S. Zibrov, A. Yacoby, D. Twitchen, S. W. Hell, R. L. Walsworth, and M. D. Lukin. Far-field optical imaging and manipulation of individual spins with nanoscale resolution. *Nature Phys.*, 6:912, 2010.
- [900] D. Mazza and N. J. Ross. Full abstraction for set-based models of the symmetric interaction combinators. *Proceedings of the 15th International Conference on Foundations of Software Science and Computation Structures*, 7213:316–330, 2012/01/01 2012.
- [901] J. Medford, J. Beil, J. M. Taylor, S. D. Bartlett, A. C. Doherty, E. I. Rashba, D. P. DiVincenzo, H. Lu, A. C. Gossard, and C. M. Marcus. Self-consistent measurement and state tomography of an exchange-only spin qubit. *Nature Nanotechnology*, 8:654 – 659, 2013/9/1 2013.
- [902] J. Medford, J. Beil, J. M. Taylor, E. I. Rashba, H. Lu, A. C. Gossard, and C. M. Marcus. The resonant exchange qubit. *Physical Review Letters*, 111, 2013/7/31 2013.
- [903] X. Mi, M. Benito, S. Putz, D. M. Zajac, J. M. Taylor, G. Burkard, and J. R. Petta. A coherent spin-photon interface in silicon. *Nature*, 555:599–603, 2018/03/29 2018.
- [904] X. Mi, M. Benito, S. Putz, D. M. Zajac, J. M. Taylor, G. Burkard, and J. R. Petta. A coherent spin—photon interface in silicon. *Nature*, 2018/02/14 2018.
- [905] C. Miller. Exponential iterated integrals and the relative solvable completion of the fundamental group of a manifold. *Topology*, 44:351 373, 2005/03/01 2005.
- [906] C. Miller. An euler–poincaré bound for equicharacteristic étale sheaves. *Algebra & Number Theory*, 4:21 45, 2010/01/14 2010.
- [907] C. Miller. Evasiveness of graph properties and topological fixed-point theorems. *Foundations and Trends in Theoretical Computer Science*, 7:337–415, 2013/05/16 2013.
- [908] C. Miller. An elementary proof of private random number generation from bell inequalities. 2017/07/20 2017.
- [909] C. Miller. The impossibility of efficient quantum weak coin flipping. STOC 2020: Proceedings of the 52nd Annual ACM SIGACT Symposium on Theory of Computing, pages 916–929, 6/2020 2020.
- [910] C. Miller. The mathematics of quantum coin-flipping. *Notices of the American Mathematical Society*, 69:1908–1917, 12/2022 2022.
- [911] C. Miller. Hidden-state proofs of quantumness. 10/8/2024 2024.
- [912] C. Miller and Y. Alnawakhtha. Perfect cheating is impossible for single-qubit position verification. 6/28/2024
- [913] C. Miller, R. Colbeck, and Y. Shi. Keyring models: an approach to steerability. *Journal of Mathematical Physics*, 59:022103, 2018/01/02 2018.

- [914] C. Miller and Y. Shi. *Optimal robust self-testing by binary nonlocal XOR games*, volume 22, page 254–262. Schloss Dagstuhl- Leibniz-Zentrum fur Informatik GmbH, Dagstuhl Publishing, 2013.
- [915] C. Miller and Y. Shi. Robust protocols for securely expanding randomness and distributing keys using untrusted quantum devices. *Journal of the ACM*, 63:33:1–33:63, 2016/10/26 2016.
- [916] C. Miller and Y. Shi. Randomness in nonlocal games between mistrustful players. *Quantum Information and Computation*, 17:0595–0610, 2017/06/15 2017.
- [917] C. Miller and Y. Shi. Universal security for randomness expansion from the spot-checking protocol. *SIAM Journal on Computing*, 46, 2017/08/01 2017.
- [918] K. Mitra, F. W. Strauch, C. J. Lobb, J. R. Anderson, F. C. Wellstood, and E. Tiesinga. Quantum behavior of the dc squid phase qubit. *Physical Review B*, 77, 2008/6/13 2008.
- [919] C. Monroe, W. C. Campbell, L. M. Duan, Z. X. Gong, A. V. Gorshkov, P. Hess, R. Islam, K. Kim, G. Pagano, P. Richerme, C. Senko, and N. Y. Yao. Programmable quantum simulations of spin systems with trapped ions. 12/17/2019 2019.
- [920] F. Monteiro, G. Afek, D. Carney, G. Krnjaic, J. Wang, and D. C. Moore. Search for composite dark matter with optically levitated sensors. *Phys. Rev. Lett.*, 125, 11/2/2020 2020.
- [921] T. C. Mooney, J. Bringewatt, and L. T. Brady. Lefschetz thimble quantum monte carlo for spin systems. 10/20/2021 2021.
- [922] A. H. Moosavian, J. R. Garrison, and S. P. Jordan. Site-by-site quantum state preparation algorithm for preparing vacua of fermionic lattice field theories. 2019/11/8 2019.
- [923] A. H. Moosavian and S. Jordan. Faster quantum algorithm to simulate fermionic quantum field theory. *Phys. Rev. A 98*, 012332 (2018), A:012332, 2018/05/04 2018.
- [924] M. E. S. Morales, P. C. S. Costa, G. Pantaleoni, D. K. Burgarth, Y. R. Sanders, and D. W. Berry. Greatly improved higher-order product formulae for quantum simulation. 7/16/2024 2024.
- [925] W. Morong, F. Liu, P. Becker, K. S. Collins, L. Feng, A. Kyprianidis, G. Pagano, T. You, A. V. Gorshkov, and C. Monroe. Observation of stark many-body localization without disorder. 2/14/2021 2021.
- [926] H. Mousavi, S. S. Nezhadi, and H. Yuen. Nonlocal games, compression theorems, and the arithmetical hierarchy. 10/9/2021 2021.
- [927] M. Mudassar, R. W. Chien, and D. Gottesman. Encoding majorana codes. *Phys. Rev. A*, 110:032430, 9/23/2024 2024.
- [928] N. Mueller, J. Carolan, A. Connelly, Z. Davoudi, E. F. Dumitrescu, and K. Yeter-Aydeniz. Quantum computation of dynamical quantum phase transitions and entanglement tomography in a lattice gauge theory. 10/6/2023 2023.
- [929] A. Munson, N. B. T. Kothakonda, J. Haferkamp, N. Y. Halpern, J. Eisert, and P. Faist. Complexity-constrained quantum thermodynamics. 3/7/2024 2024.
- [930] C. R. Murray, A. V. Gorshkov, and T. Pohl. Many-body decoherence dynamics and optimised operation of a single-photon switch. *New Journal of Physics*, 18:092001, 2016/09/13 2016.
- [931] C. R. Murray, I. Mirgorodskiy, C. Tresp, C. Braun, A. Paris-Mandoki, A. V. Gorshkov, S. Hofferberth, and T. Pohl. Photon subtraction by many-body decoherence. 2018/03/13 2018.
- [932] C. Murthy, A. Babakhani, F. Iniguez, M. Srednicki, and N. Y. Halpern. Non-abelian eigenstate thermalization hypothesis. *Phys. Rev. Lett.*, 130, 4/6/2023 2023.
- [933] P. Naidon, E. Tiesinga, and P. S. Julienne. Coherent, adiabatic and dissociation regimes in coupled atomic-molecular bose-einstein condensates. 2007/11/02 2007.
- [934] P. Naidon, E. Tiesinga, and P. S. Julienne. Two-body transients in coupled atomic-molecular becs. *Physical Review Letters*, 100, 2008/3/3 2008.

- [935] P. Naidon, E. Tiesinga, W. F. Mitchell, and P. S. Julienne. Effective-range description of a bose gas under strong one- or two-dimensional confinement. *New Journal of Physics*, 9:19 19, 2007/01/29 2007.
- [936] Y. Nam and R. Blümel. Optimal length of decomposition sequences composed of imperfect gates. *Quantum Information Processing*, 16:123, 2017/03/24 2017.
- [937] Y. Nam, J.-S. Chen, N. C. Pisenti, K. Wright, C. Delaney, D. Maslov, K. R. Brown, S. Allen, J. M. Amini, J. Apisdorf, K. M. Beck, A. Blinov, V. Chaplin, M. Chmielewski, C. Collins, S. Debnath, A. M. Ducore, K. M. Hudek, M. Keesan, S. M. Kreikemeier, J. Mizrahi, P. Solomon, M. Williams, J. D. Wong-Campos, C. Monroe, and J. Kim. Ground-state energy estimation of the water molecule on a trapped ion quantum computer. 03/07/2019 2019.
- [938] Y. Nam, N. J. Ross, Y. Su, A. M. Childs, and D. Maslov. Automated optimization of large quantum circuits with continuous parameters. *npj:Quantum Information*, 4, 2017/10/19 2018.
- [939] Y. Nam, Y. Su, and D. Maslov. Approximate quantum fourier transform with o(nlog(n)) t gates. *npj Quantum Information*, 6, 3/13/2020 2020.
- [940] J. D. Nardis, S. Gopalakrishnan, R. Vasseur, and B. Ware. Subdiffusive hydrodynamics of nearly-integrable anisotropic spin chains. 9/27/2021 2021.
- [941] J. Nelson, G. Bentsen, S. T. Flammia, and M. Gullans. Fault-tolerant quantum memory using low-depth random circuit codes. 11/29/2023 2023.
- [942] B. Neyenhuis, J. Smith, A. C. Lee, J. Zhang, P. Richerme, P. W. Hess, Z. X. Gong, A. V. Gorshkov, and C. Monroe. Observation of Prethermalization in Long-Range Interacting Spin Chains. 2016/08/02 2016.
- [943] P. Nguyen, T. Devakul, M. G. Halbasch, M. P. Zaletel, and B. Swingle. Entanglement of purification: from spin chains to holography. *Journal of High Energy Physics*, page 98, 2018/01/22 2018.
- [944] S. B. Nicholson, L. P. García-Pintos, A. del Campo, and J. R. Green. Time-information uncertainty relations in thermodynamics. *Nat. Phys.*, 09/21/2020 2020.
- [945] M. A. Nielsen, M. J. Bremner, J. L. Dodd, A. M. Childs, and C. M. Dawson. Universal simulation of hamiltonian dynamics for qudits. *Physical Review A*, 66, 2002/8/30 2002.
- [946] P. Niroula, J. Dolde, X. Zheng, J. Bringewatt, A. Ehrenberg, K. C. Cox, J. Thompson, M. J. Gullans, S. Kolkowitz, and A. V. Gorshkov. Quantum sensing with erasure qubits. *Phys. Rev. Lett.*, 133:080801, 8/19/2024 2024.
- [947] P. Niroula, S. Gopalakrishnan, and M. Gullans. Error mitigation thresholds in noisy quantum circuits. 2/8/2023 2023.
- [948] P. Niroula, S. Gopalakrishnan, and M. Gullans. Thresholds in the robustness of error mitigation in noisy quantum dynamics. 10/30/2023 2023.
- [949] P. Niroula, C. D. White, Q. Wang, S. Johri, D. Zhu, C. Monroe, C. Noel, and M. J. Gullans. Phase transition in magic with random quantum circuits. *Nature Physics*, 9/23/2024 2024.
- [950] C. Noel, P. Niroula, D. Zhu, A. Risinger, L. Egan, D. Biswas, M. Cetina, A. V. Gorshkov, M. Gullans, D. A. Huse, and C. Monroe. Observation of measurement-induced quantum phases in a trapped-ion quantum computer. 6/10/2021 2021.
- [951] I. Novikova, A. V. Gorshkov, D. F. Phillips, A. S. Sorensen, M. D. Lukin, and R. L. Walsworth. Optimal control of light pulse storage and retrieval. *Physical Review Letters*, 98, 2007/6/15 2007.
- [952] I. Novikova, A. V. Gorshkov, D. F. Phillips, Y. Xiao, M. Klein, and R. L. Walsworth. Optimization of slow and stored light in atomic vapor. *Proc. SPIE*, 6482:64820M, 2007.
- [953] I. Novikova, N. B. Phillips, and A. V. Gorshkov. Optimal light storage with full pulse shape control. *Physical Review A*, 78, 2008/8/20 2008.
- [954] I. Novikova, N. B. Phillips, and A. V. Gorshkov. Optimal light storage with full pulse-shape control. *Phys. Rev. A*, 78:021802(R), 2008.
- [955] M. Nuske, L. Mathey, and E. Tiesinga. Sudden-quench dynamics of bardeen-cooper-schrieffer states in deep optical lattices. *Physical Review A*, 94:023607, 2016/08/05 2016.

- [956] M. Nuske, E. Tiesinga, and L. Mathey. Optimization of collisional feshbach cooling of an ultracold nondegenerate gas. *Physical Review A*, 91:043626, 2015/04/20 2015.
- [957] M. J. O'Hara and D. P. O'Leary. The adiabatic theorem in the presence of noise. *Physical Review A*, 77, 2008/4/22 2008.
- [958] M. J. O'Hara and D. P. O'Leary. Quadratic fermionic interactions yield effective hamiltonians for adiabatic quantum computing. *Physical Review A*, 79, 2009/3/24 2009.
- [959] M. Ohliger, V. Nesme, D. Gross, Y.-K. Liu, and J. Eisert. Continuous-variable quantum compressed sensing. 2011/11/03 2011.
- [960] D. P. O'Leary, G. K. Brennen, and S. S. Bullock. Parallelism for quantum computation with qudits. *Physical Review A*, 74, 2006/9/28 2006.
- [961] D. P. O'Leary and S. S. Bullock. Qr factorizations using a restricted set of rotations. *Electronic Transactions on Numerical Analysis*, 21:20–27, 2005/07/11 2005.
- [962] M. Onizhuk, Y.-X. Wang, J. Nagura, A. A. Clerk, and G. Galli. Understanding central spin decoherence due to interacting dissipative spin baths. *Phys. Rev. Lett.*, 132:250401, 6/18/2024 2024.
- [963] E. Onorati, C. Rouzé, D. S. França, and J. D. Watson. Efficient learning of ground & thermal states within phases of matter. 1/30/2023 2023.
- [964] E. Onorati, C. Rouzé, D. S. França, and J. D. Watson. Provably efficient learning of phases of matter via dissipative evolutions. 11/13/2023 2023.
- [965] J. O'Reilly, G. Toh, I. Goetting, S. Saha, M. Shalaev, A. Carter, A. Risinger, A. Kalakuntla, T. Li, A. Verma, and C. Monroe. Fast photon-mediated entanglement of continuously-cooled trapped ions for quantum networking. 7/3/2024 2024.
- [966] D. P. Ornelas-Huerta, A. N. Craddock, E. A. Goldschmidt, A. J. Hachtel, Y. Wang, P. Bienias, A. V. Gorshkov, S. L. Rolston, and J. V. Porto. On-demand indistinguishable single photons from an efficient and pure source based on a rydberg ensemble. 3/4/2020 2020.
- [967] V. V. Orre, E. A. Goldschmidt, A. Deshpande, A. V. Gorshkov, V. Tamma, M. Hafezi, and S. Mittal. Interference of temporally distinguishable photons using frequency-resolved detection. *Phys. Rev. Lett.*, 123, 9/24/2019 2019.
- [968] A. Ostrander. Laplacian matrices and alexandrov topologies of digraphs. *Linear Algebra and its Applications*, 481:174 185, 2015/09/15 2015.
- [969] A. Ostrander, E. Santopinto, A. P. Szczepaniak, and A. Vassallo. Gluon chain formation in presence of static charges. *Physical Review D*, 86:114015, 2012/12/10 2012.
- [970] V. R. Overbeck, M. F. Maghrebi, A. V. Gorshkov, and H. Weimer. Multicritical behavior in dissipative Ising models. *Physical Review A*, 95:042133, 2017/04/26 2017.
- [971] S. Pabst, D. Wang, and R. Santra. Driving rabi oscillations at the giant dipole resonance in xenon. *Phys. Rev. A*, 92, 11/23/2015 2015.
- [972] G. Pagano, A. Bapat, P. Becker, K. S. Collins, A. De, P. W. Hess, H. B. Kaplan, A. Kyprianidis, W. L. Tan, C. L. Baldwin, L. T. Brady, A. Deshpande, F. Liu, S. Jordan, A. V. Gorshkov, and C. Monroe. Quantum approximate optimization with a trapped-ion quantum simulator. 06/06/2019 2019.
- [973] G. Pagano, P. W. Hess, H. B. Kaplan, W. L. Tan, P. Richerme, P. Becker, A. Kyprianidis, J. Zhang, E. Birckelbaw, M. R. Hernandez, Y. Wu, and C. Monroe. Cryogenic trapped-ion system for large scale quantum simulation. 2018.
- [974] M. Paini and A. Kalev. An approximate description of quantum states. 2019/11/13 2019.
- [975] D. Patel, S. J. S. Tan, Y. Subaşı, and A. T. Sornborger. Optimal coherent quantum phase estimation via tapering. 3/27/2024 2024.
- [976] S. Paul, P. R. Johnson, and E. Tiesinga. A hubbard model for ultracold bosonic atoms interacting via zero-point-energy induced three-body interactions. *Physical Review A*, 93:043616, 2016/04/19 2016.

- [977] S. Paul and E. Tiesinga. Formation and decay of bose-einstein condensates in an excited band of a double-well optical lattice. *Physical Review A*, 88, 2013/9/12 2013.
- [978] S. Paul and E. Tiesinga. Large effective three-body interaction in a double-well optical lattice. *Phys. Rev. A 92*, 023602, 92:023602, 2015/08/03 2015.
- [979] S. Paul and E. Tiesinga. Wannier functions using a discrete variable representation for optical lattices. *Physical Review A*, 94:033606, 2016/09/07 2016.
- [980] H. K. Pechkis, J. P. Wrubel, A. Schwettmann, P. F. Griffin, R. Barnett, E. Tiesinga, and P. D. Lett. Spinor dynamics in an antiferromagnetic spin-1 thermal bose gas. *Physical Review Letters*, 111, 2013/7/9 2013.
- [981] T. Peng, A. Harrow, M. Ozols, and X. Wu. Simulating large quantum circuits on a small quantum computer. *Phys. Rev. Lett.*, 125, 12/8/2020 2020.
- [982] Y. Peng, M. Ying, and X. Wu. Algebraic reasoning of quantum programs via non-idempotent kleene algebra. 10/13/2021 2021.
- [983] Y. Peng, J. Young, P. Liu, and X. Wu. Simuq: A domain-specific language for quantum simulation with analog compilation. 3/5/2023 2023.
- [984] Y. Peng, J. Young, P. Liu, and X. Wu. Simuq: A framework for programming quantum hamiltonian simulation with analog compilation. *Proceedings of the ACM on Programming Languages*, 8:2425–2455, 11/19/2023 2024.
- [985] A. Perdomo-Ortiz, A. Feldman, A. Ozaeta, S. V. Isakov, Z. Zhu, B. O'Gorman, H. G. Katzgraber, A. Diedrich, H. Neven, J. de Kleer, B. Lackey, and R. Biswas. On the readiness of quantum optimization machines for industrial applications. 2017/08/31 2017.
- [986] R. Perlner and Y.-K. Liu. Thermodynamic analysis of classical and quantum search algorithms. 2017/09/29 2017.
- [987] J. K. Perron, M. Gullans, J. M. Taylor, J. M. D. Stewart, and N. M. Zimmerman. Valley blockade in a silicon double quantum dot. *Physical Review B*, 96:205302, 2017/11/13 2017.
- [988] A. Petrov, E. Tiesinga, and S. Kotochigova. Anisotropy induced feshbach resonances in a quantum dipolar gas of magnetic atoms. *Physical Review Letters*, 109, 2012/9/7 2012.
- [989] T. Peyronel, O. Firstenberg, Q.-Y. Liang, S. Hofferberth, A. V. Gorshkov, T. Pohl, M. D. Lukin, and V. Vuletic. Quantum nonlinear optics with single photons enabled by strongly interacting atoms. *Nature (London)*, 488:57, 2012.
- [990] N. B. Phillips, A. V. Gorshkov, and I. Novikova. Optimal light storage in atomic vapor. *Physical Review A*, 78, 2008/8/1 2008.
- [991] N. B. Phillips, A. V. Gorshkov, and I. Novikova. Slow light propagation and amplification via electromagnetically induced transparency and four-wave mixing in an optically dense atomic vapor. *J. Mod. Opt.*, 56:1916, 2009.
- [992] N. B. Phillips, A. V. Gorshkov, and I. Novikova. Light storage in an optically thick atomic ensemble under conditions of electromagnetically induced transparency and four-wave mixing. *Physical Review A*, 83, 2011/6/20 2011.
- [993] H. Pichler, G. Zhu, A. Seif, P. Zoller, and M. Hafezi. Measurement protocol for the entanglement spectrum of cold atoms. *Phys. Rev. X*, 6(4), 2016/11/22 2016.
- [994] M. Pistoia, S. F. Ahmad, A. Ajagekar, A. Buts, S. Chakrabarti, D. Herman, S. Hu, A. Jena, P. Minssen, P. Niroula, A. Rattew, Y. Sun, and R. Yalovetzky. Quantum machine learning for finance. 9/9/2021 2021.
- [995] G. Premawardhana, J. Kunjummen, S. Subhankar, and J. M. Taylor. Feasibility of a trapped atom interferometer with accelerating optical traps. *Phys. Rev. A*, 109:053316, 5/22/2024 2024.
- [996] G. Pupillo, A. M. Rey, G. Brennen, C. J. Williams, and C. W. Clark. Scalable quantum computation in systems with bose-hubbard dynamics. *Journal of Modern Optics*, 51:2395 2404, 2004/02/15 2004.
- [997] G. Pupillo, A. M. Rey, C. J. Williams, and C. W. Clark. Pseudo-fermionization of 1-d bosons in optical lattices. *New Journal of Physics*, 8:161 161, 2006/08/30 2006.

- [998] G. Pupillo, C. J. Williams, and N. V. Prokof'ev. Effects of finite temperature on the mott insulator state. *Physical Review A*, 73, 2006/1/20 2006.
- [999] T. P. Purdy, K. E. Grutter, K. Srinivasan, and J. M. Taylor. Observation of optomechanical quantum correlations at room temperature. 2016/05/18 2016.
- [1000] K. Pushkin, C. Akerlof, D. Anbajagane, J. Armstrong, M. Arthurs, J. Bringewatt, T. Edberg, C. Hall, M. Lei, R. Raymond, M. Reh, D. Saini, A. Sander, J. Schaefer, D. Seymour, N. Swanson, Y. Wang, and W. Lorenzon. Study of radon reduction in gases for rare event search experiments. 2018.
- [1001] K. Qian, Z. Eldredge, W. Ge, G. Pagano, C. Monroe, J. V. Porto, and A. V. Gorshkov. Heisenberg-scaling measurement protocol for analytic functions with quantum sensor networks. *Phys. Rev. A*, 100, 10/7/2019 2019.
- [1002] T. Qian, J. Bringewatt, I. Boettcher, P. Bienias, and A. V. Gorshkov. Optimal measurement of field properties with quantum sensor networks. 11/2/2020 2020.
- [1003] A. Rad, A. Schuckert, E. Crane, G. Nambiar, F. Fei, J. Wyrick, R. M. Silver, M. Hafezi, Z. Davoudi, and M. Gullans. Analog quantum simulator of a quantum field theory with fermion-spin systems in silicon. 6/3/2024 2024.
- [1004] S. Ragole and J. M. Taylor. Interacting atomic interferometry for rotation sensing approaching the heisenberg limit. *Physical Review Letters*, 117:203002, 2016/11/11 2016.
- [1005] S. Ragole, H. Xu, J. Lawall, and J. M. Taylor. Thermodynamic limits for optomechanical systems with conservative potentials. *Physical Review B*, 96:184106, 2017/11/13 2017.
- [1006] J. Rajakumar, J. Golden, A. Bärtschi, and S. Eidenbenz. Trainability barriers in low-depth qaoa landscapes. In *Proceedings of the 21st ACM International Conference on Computing Frontiers*. ACM, ACM, 10/9/2024 2024.
- [1007] J. Rajakumar and J. D. Watson. Gibbs sampling gives quantum advantage at constant temperatures with o(1)-local hamiltonians. 8/6/2024 2024.
- [1008] J. Rajakumar, J. D. Watson, and Y.-K. Liu. Polynomial-time classical simulation of noisy iqp circuits with constant depth. 3/21/2024 2024.
- [1009] R. Rand. Verification logics for quantum programs. 2019.
- [1010] R. Rand, J. Paykin, D.-H. Lee, and S. Zdancewic. Reqwire: Reasoning about reversible quantum circuits. *EPTCS*, 287, 2019.
- [1011] M. V. Regemortel, Z.-P. Cian, A. Seif, H. Dehghani, and M. Hafezi. Entanglement entropy scaling transition under competing monitoring protocols. 08/19/2020 2020.
- [1012] A. M. Rey, P. B. Blakie, G. Pupillo, C. J. Williams, and C. W. Clark. Bragg spectroscopy of ultracold atoms loaded in an optical lattice. *Physical Review A*, 72, 2005/8/12 2005.
- [1013] A. M. Rey, K. Burnett, R. Roth, M. Edwards, C. J. Williams, and C. W. Clark. Bogoliubov approach to superfluidity of atoms in an optical lattice. *Journal of Physics B: Atomic, Molecular and Optical Physics*, 36:825 841, 2003/03/14 2003.
- [1014] A. M. Rey, A. V. Gorshkov, C. V. Kraus, M. J. Martin, M. Bishof, M. D. Swallows, X. Zhang, C. Benko, J. Ye, N. D. Lemke, and A. D. Ludlow. Probing many-body interactions in an optical lattice clock. *Ann. Phys.*, 340:311, 2014.
- [1015] A. M. Rey, A. V. Gorshkov, and C. Rubbo. Many-body treatment of the collisional frequency shift in fermionic atoms. *Phys. Rev. Lett.*, 103:260402, 2009.
- [1016] A. M. Rey, G. Pupillo, C. W. Clark, and C. J. Williams. Ultracold atoms confined in an optical lattice plus parabolic potential: a closed-form approach. *Physical Review A*, 72, 2005/9/22 2005.
- [1017] P. Richerme, Z.-X. Gong, A. Lee, C. Senko, J. Smith, M. Foss-Feig, S. Michalakis, A. V. Gorshkov, and C. Monroe. Non-local propagation of correlations in long-range interacting quantum systems. *Nature*, 511:198 201, 2014/7/9 2014.
- [1018] P. Richerme, C. Senko, S. Korenblit, J. Smith, A. Lee, R. Islam, W. C. Campbell, and C. Monroe. Quantum catalysis of magnetic phase transitions in a quantum simulator. *Physical Review Letters*, 111, 2013/9/5 2013.

- [1019] P. Richerme, C. Senko, J. Smith, A. Lee, S. Korenblit, and C. Monroe. Experimental performance of a quantum simulator: Optimizing adiabatic evolution and identifying many-body ground states. *Physical Review A*, 88, 2013/7/31 2013.
- [1020] B. Richman, S. Ghosh, D. Carney, G. Higgins, P. Shawhan, C. J. Lobb, and J. M. Taylor. A general approach to backaction-evading receivers with magnetomechanical and electromechanical sensors. 11/16/2023 2023.
- [1021] B. Richman and J. M. Taylor. Circulation by microwave-induced vortex transport for signal isolation. *PRX Quantum*, 2:030309, 6/14/2021 2021.
- [1022] J. Riddell, L. P. García-Pintos, and Á. M. Alhambra. Relaxation of non-integrable systems and correlation functions. 12/17/2021 2021.
- [1023] M. Ringbauer, M. Hinsche, T. Feldker, P. K. Faehrmann, J. Bermejo-Vega, C. Edmunds, L. Postler, R. Stricker, C. D. Marciniak, M. Meth, I. Pogorelov, R. Blatt, P. Schindler, J. Eisert, T. Monz, and D. Hangleiter. Verifiable measurement-based quantum random sampling with trapped ions. 7/26/2023 2023.
- [1024] D. T. Robb and A. Ostrander. Extended order parameter and conjugate field for the dynamic phase transition in a ginzburg-landau mean-field model in an oscillating field. *Physical Review E*, 89:022114, 2014/02/12 2014.
- [1025] N. Rodrigues and B. Lackey. Fully device-independent quantum key distribution using synchronous correlations. 10/27/2021 2021.
- [1026] N. Rodrigues and B. Lackey. Quantum lattice sieving. 10/26/2021 2021.
- [1027] N. J. Ross. Optimal ancilla-free clifford+v approximation of z-rotations. *Quantum Information and Computation*, 15:932–950, 2015/03/06 2015.
- [1028] N. J. Ross and P. Selinger. Optimal ancilla-free clifford+t approximation of z-rotations. *Quantum Information and Computation*, 16:901–953, 2016.
- [1029] I. Roth, R. Kueng, S. Kimmel, Y.-K. Liu, D. Gross, J. Eisert, and M. Kliesch. Recovering quantum gates from few average gate fidelities. *Phys. Rev. Lett.*, 121:170502, 2018/03/01 2018.
- [1030] A. Roulet, S. Nimmrichter, and J. M. Taylor. An autonomous single-piston engine with a quantum rotor. 2018/02/15 2018.
- [1031] S. M. Roy, A. Deshpande, and N. Sakharwade. Remote tomography and entanglement swapping via von neumann–arthurs–kelly interaction. *Physical Review A*, 89:052107, 2014/05/09 2014.
- [1032] P.-G. Rozon, M. Gullans, and K. Agarwal. Constructing quantum many-body scar hamiltonians from floquet automata. 12/22/2021 2021.
- [1033] K. Rudinger, S. Kimmel, D. Lobser, and P. Maunz. Experimental demonstration of cheap and accurate phase estimation. *Physical Review Letters*, 118:190502, 2017/05/12 2017.
- [1034] J. Rührig, T. Bäuerle, P. S. Julienne, E. Tiesinga, and T. Pfau. Photoassociation of spin polarized chromium. *Physical Review A*, 93:021406, 2016/02/29 2016.
- [1035] M. Russ, D. M. Zajac, A. J. Sigillito, F. Borjans, J. M. Taylor, J. R. Petta, and G. Burkard. High-fidelity quantum gates in si/sige double quantum dots. *Physical Review B*, 97:085421, 2018/02/15 2018.
- [1036] M. S. Safronova, C. J. Williams, and C. W. Clark. Optimizing the fast rydberg quantum gate. *Physical Review A*, 67, 2003/4/17 2003.
- [1037] M. S. Safronova, C. J. Williams, and C. W. Clark. Relativistic many-body calculations of electric-dipole matrix elements, lifetimes and polarizabilities in rubidium. *Physical Review A*, 69, 2004/2/27 2004.
- [1038] S. Saha, M. Shalaev, J. O'Reilly, I. Goetting, G. Toh, A. Kalakuntla, Y. Yu, and C. Monroe. High-fidelity remote entanglement of trapped atoms mediated by time-bin photons. 2024.
- [1039] S. Sahu and B. Swingle. Information scrambling at finite temperature in local quantum systems. 5/21/2020 2020.
- [1040] S. Sahu and B. Swingle. Information scrambling at finite temperature in local quantum systems. 5/21/2020 2020.

- [1041] S. Sahu, S. Xu, and B. Swingle. Scrambling dynamics across a thermalization-localization quantum phase transition. 2018.
- [1042] S. Santra, S. Muralidharan, M. Lichtman, L. Jiang, C. Monroe, and V. S. Malinovsky. Quantum repeaters based on two species trapped ions. *New J. Phys.*, 21, 05/02/2019 2019.
- [1043] I. I. Satija, C. L. Pando, and E. Tiesinga. Soliton dynamics of an atomic spinor condensate on a ring lattice. *Physical Review A*, 87, 2013/3/6 2013.
- [1044] B. J. Sawyer, M. S. J. Horvath, E. Tiesinga, A. B. Deb, and N. Kjærgaard. Dispersive optical detection of magnetic feshbach resonances in ultracold gases. *Physical Review A*, 96:022705, 2017/08/18 2017.
- [1045] L. Schaeffer, J. Shallit, and S. Zorcic. Beatty sequences for a quadratic irrational: Decidability and applications. 2/13/2024 2024.
- [1046] J. Scherschligt, J. A. Fedchak, D. S. Barker, S. Eckel, N. Klimov, C. Makrides, and E. Tiesinga. Development of a new uhv/xhv pressure standard (cold atom vacuum standard). *Metrologia*, 54, 2017/11/3 2017.
- [1047] T. L. Scholten, Y.-K. Liu, K. Young, and R. Blume-Kohout. Classifying single-qubit noise using machine learning. 8/30/2019 2019.
- [1048] A. Schuckert, O. Katz, L. Feng, E. Crane, A. De, M. Hafezi, A. V. Gorshkov, and C. Monroe. Observation of a finite-energy phase transition in a one-dimensional quantum simulator. 10/30/2023 2023.
- [1049] M. Schuler, S. Hesselmann, S. Whitsitt, T. C. Lang, S. Wessel, and A. M. Läuchli. Torus spectroscopy of the gross-neveu-yukawa quantum field theory: Free dirac versus chiral ising fixed point. *Phys. Rev. B*, 103:125128, 3/15/2021 2021.
- [1050] T. Schuster, B. Kobrin, P. Gao, I. Cong, E. T. Khabiboulline, N. M. Linke, M. D. Lukin, C. Monroe, B. Yoshida, and N. Y. Yao. Many-body quantum teleportation via operator spreading in the traversable wormhole protocol. *Physical Review X*, 12, 8/5/2022 2022.
- [1051] K. Seetharam, D. Biswas, C. Noel, A. Risinger, D. Zhu, O. Katz, S. Chattopadhyay, M. Cetina, C. Monroe, E. Demler, and D. Sels. Digital quantum simulation of nmr experiments. *Science Advances*, 9, 11/29/2023 2023.
- [1052] K. Seetharam, P. Titum, M. Kolodrubetz, and G. Refael. Absence of thermalization in finite isolated interacting floquet systems. *Physical Review B*, 97:014311, 2018/01/29 2018.
- [1053] A. Seif, Z.-P. Cian, S. Zhou, S. Chen, and L. Jiang. Shadow distillation: Quantum error mitigation with classical shadows for near-term quantum processors. 3/14/2022 2022.
- [1054] A. Seif, W. DeGottardi, K. Esfarjani, and M. Hafezi. Thermal management and non-reciprocal control of phonon flow via optomechanics. *Nat. Commun.*, 9(1), 2018/3/23 2018.
- [1055] A. Seif and M. Hafezi. Broadband optomechanical non-reciprocity. Nature Photon, 12:60-61, 2018/1/26 2018.
- [1056] A. Seif, M. Hafezi, and C. Jarzynski. Machine learning the thermodynamic arrow of time. *Nat. Phys.*, pages 1–9, 09/21/2020 2020.
- [1057] A. Seif, M. Hafezi, and Y.-K. Liu. Compressed sensing measurement of long-range correlated noise. 5/26/2021 2021.
- [1058] A. Seif, K. A. Landsman, N. M. Linke, C. Figgatt, C. Monroe, and M. Hafezi. Machine learning assisted readout of trapped-ion qubits. *J. Phys. B: At. Mol. Opt. Phys.*, 51, 2018/05/01 2018.
- [1059] A. Seif, Y.-X. Wang, R. Movassagh, and A. A. Clerk. Measurement and feed forward induced entanglement negativity transition. *Phys. Rev. Lett.*, 133:050402, 7/30/2024 2024.
- [1060] A. Senanian, S. Prabhu, V. Kremenetski, S. Roy, Y. Cao, J. Kline, T. Onodera, L. G. Wright, X. Wu, V. Fatemi, and P. L. McMahon. Microwave signal processing using an analog quantum reservoir computer. *Nature Communications*, 15, 9/6/2024 2024.
- [1061] F. Setiawan, A. V. Gramolin, E. S. Matekole, H. Krovi, and J. M. Taylor. Accurate and honest approximation of correlated qubit noise. 11/15/2023 2023.

- [1062] T. Sewell, A. Bapat, and S. Jordan. Estimating gate complexities for the site-by-site preparation of fermionic vacua. 07/04/2022 2022.
- [1063] T. J. Sewell and S. P. Jordan. Preparing renormalization group fixed points on nisq hardware. 9/20/2021 2021.
- [1064] T. J. Sewell and C. D. White. Mana and thermalization: Probing the feasibility of near-clifford hamiltonian simulation. *Physical Review B*, 106, 9/28/2022 2022.
- [1065] J. Shah, G. Nambiar, A. V. Gorshkov, and V. Galitski. Quantum spin ice in three-dimensional rydberg atom arrays. 6/14/2024 2024.
- [1066] L. K. Shalm, Y. Zhang, J. C. Bienfang, C. Schlager, M. J. Stevens, M. D. Mazurek, C. Abellán, W. Amaya, M. W. Mitchell, M. A. Alhejji, H. Fu, J. Ornstein, R. P. Mirin, S. W. Nam, and E. Knill. Device-independent randomness expansion with entangled photons. *Nat. Phys.*, 01/28/2021 2021.
- [1067] C. Shao and J.-P. Liu. Quantum algorithms for the polynomial eigenvalue problems. 10/28/2020 2020.
- [1068] A. F. Shaw, P. Lougovski, J. R. Stryker, and N. Wiebe. Quantum algorithms for simulating the lattice schwinger model. *Quantum*, 4, 8/5/2020 2020.
- [1069] O. Shehab, K. A. Landsman, Y. Nam, D. Zhu, N. M. Linke, M. J. Keesan, R. C. Pooser, and C. R. Monroe. Toward convergence of effective field theory simulations on digital quantum computers. 04/18/2019 2019.
- [1070] C. Shen, Z.-X. Gong, and L. Duan. Individual addressing in quantum computation through spatial refocusing. *Physical Review A*, 88, 2013/11/21 2013.
- [1071] C. Shen, R. W. Heeres, P. Reinhold, L. Jiang, Y.-K. Liu, R. J. Schoelkopf, and L. Jiang. Optimized tomography of continuous variable systems using excitation counting. *Physical Review A*, 94:052327, 2016/11/21 2016.
- [1072] N. Shettell, F. Centrone, and L. P. García-Pintos. Bounding the minimum time of a quantum measurement. 9/13/2022 2022.
- [1073] K. Shi, K. Chakraborty, W. Y. Kon, O. Amer, M. Pistoia, and C. Lim. On the relativistic zero knowledge quantum proofs of knowledge. 9/5/2024 2024.
- [1074] K. Shi, R. Herrman, R. Shaydulin, S. Chakrabarti, M. Pistoia, and J. Larson. Multi-angle qaoa does not always need all its angles. 9/23/2022 2022.
- [1075] W. Shirley, Y.-A. Chen, A. Dua, T. D. Ellison, N. Tantivasadakarn, and D. J. Williamson. Three-dimensional quantum cellular automata from chiral semion surface topological order and beyond. 2/10/2022 2022.
- [1076] S. Shivam, C. L. Baldwin, J. Barton, M. Kardar, and S. L. Sondhi. Studying viral populations with tools from quantum spin chains. 3/24/2020 2020.
- [1077] E. Shojaee, C. S. Jackson, C. A. Riofrio, A. Kalev, and I. H. Deutsch. Optimal pure-state qubit tomography via sequential weak measurements. *Phys. Rev. Lett.*, 121, 2018.
- [1078] P. W. Shor and S. P. Jordan. Estimating jones polynomials is a complete problem for one clean qubit. *Quantum Information & Computation*, 8:681–714, 2008/09/01 2008.
- [1079] H. Shrotriya, K. B. Leong-Chuan Kwek, and K. Bharti. Certifying temporal correlations. 6/13/2022 2022.
- [1080] O. Shtanko, A. Deshpande, P. S. Julienne, and A. V. Gorshkov. Limits on classical simulation of free fermions with dissipation. 5/21/2020 2020.
- [1081] O. Shtanko, A. Deshpande, P. S. Julienne, and A. V. Gorshkov. Complexity of fermionic dissipative interactions and applications to quantum computing. *PRX Quantum*, 2, 9/17/2021 2021.
- [1082] O. Shtanko, Y. A. Kharkov, L. P. García-Pintos, and A. V. Gorshkov. Classical models of entanglement in monitored random circuits. 4/14/2020 2020.
- [1083] O. Shtanko, Y.-J. Liu, S. Lieu, A. V. Gorshkov, and V. V. Albert. Bounds on autonomous quantum error correction. 8/30/2023 2023.

- [1084] O. Shtanko and R. Movassagh. Unitary subharmonic response and floquet majorana modes. *Phys. Rev. Lett.*, 125, 10/13/2020 2020.
- [1085] S. Singh, C. H. Alderete, R. Balu, C. Monroe, N. M. Linke, and C. M. Chandrashekar. Universal one-dimensional discrete-time quantum walks and their implementation on near term quantum hardware. 1/30/2020 2020.
- [1086] S. Singh, C. H. Alderete, R. Balu, C. Monroe, N. M. Linke, and C. M. Chandrashekar. Quantum circuits for the realization of equivalent forms of one-dimensional discrete-time quantum walks on near-term quantum hardware. *Physical Review A*, 104, 12/8/2021 2021.
- [1087] S. E. Sklarz, I. Friedler, D. J. Tannor, Y. B. Band, and C. J. Williams. 'flat phase' loading of a bose-einstein condensate into an optical lattice. *Physical Review A*, 66, 2002/11/26 2002.
- [1088] J. A. Smiga and J. M. Taylor. Optomechanical analogy for toy cosmology with quantized scale factor. *Entropy*, 19, 2017/09/12 2017.
- [1089] J. Smith, A. Lee, P. Richerme, B. Neyenhuis, P. W. Hess, P. Hauke, M. Heyl, D. A. Huse, and C. Monroe. Manybody localization in a quantum simulator with programmable random disorder. *Nature Physics*, 2016/06/06 2016.
- [1090] J. M. Smith, N. J. Ross, P. Selinger, and B. Valiron. Quipper: Concrete resource estimation in quantum algorithms. 2014/12/01 2014.
- [1091] N. Solmeyer, N. M. Linke, C. Figgatt, K. A. Landsman, R. Balu, G. Siopsis, and C. Monroe. Demonstration of bayesian quantum game on an ion trap quantum computer. 2018.
- [1092] G. M. Sommers, S. Gopalakrishnan, M. J. Gullans, and D. A. Huse. Zero-temperature entanglement membranes in quantum circuits. *Physical Review B*, 110, 9/8/2024 2024.
- [1093] G. M. Sommers, M. Gullans, and D. A. Huse. Self-dual quasiperiodic percolation. *Phys. Rev. E*, 107:024137, 2/27/2023 2023.
- [1094] G. M. Sommers, D. A. Huse, and M. J. Gullans. Dynamically generated concatenated codes and their phase diagrams. page 9/20/2024, 2024.
- [1095] X. Song, F. Salvati, C. Gaikwad, N. Yunger Halpern, D. R. M. Arvidsson-Shukur, and K. Murch. Agnostic phase estimation. *Phys. Rev. Lett.*, 132:260801, 6/27/2024 2024.
- [1096] X. song Ma, B. Dakic, S. Kropatsche, W. Naylor, Y. hao Chan, Z.-X. Gong, L. ming Duan, A. Zeilinger, and P. Walther. Photonic quantum simulation of ground state configurations of heisenberg square and checkerboard lattice spin systems. 2012/05/12 2012.
- [1097] A. S. Sorensen, E. Altman, M. Gullans, J. V. Porto, M. D. Lukin, and E. Demler. Adiabatic preparation of many-body states in optical lattices. *Physical Review A*, 81, 2010/6/22 2010.
- [1098] H. Sosa-Martinez, N. K. Lysne, C. H. Baldwin, A. Kalev, I. H. Deutsch, and P. S. Jessen. Experimental study of optimal measurements for quantum state tomography. *Physical Review Letters*, 119:150401, 2017/10/13 2017.
- [1099] K. Sosnova, A. Carter, and C. Monroe. The character of motional modes for entanglement and sympathetic cooling of mixed-species trapped ion chains. 4/16/2020 2020.
- [1100] V. Srinivasa and J. M. Taylor. Capacitively coupled singlet-triplet qubits in the double charge resonant regime. *Physical Review B*, 92:235301, 2015/12/01 2015.
- [1101] V. Srinivasa, J. M. Taylor, and C. Tahan. Entangling distant resonant exchange qubits via circuit quantum electrodynamics. *Physical Review B*, 94:205421, 2016/11/16 2016.
- [1102] V. Srinivasa, H. Xu, and J. M. Taylor. Tunable spin qubit coupling mediated by a multi-electron quantum dot. *Physical Review Letters*, 114:226803, 2015/06/04 2015.
- [1103] A. Stairs and J. Bub. Conditionalizing and commutativity: a note on malley. 2005/06/19 2005.
- [1104] C. Stambaugh, H. Xu, U. Kemiktarak, J. M. Taylor, and J. Lawall. From membrane-in-the-middle to mirror-in-the-middle with a high-reflectivity sub-wavelength grating. *Annalen der Physik*, 527:81 88, 2015/01/02 2015.
- [1105] T. J. Stavenger, E. Crane, K. Smith, C. T. Kang, S. M. Girvin, and N. Wiebe. Bosonic qiskit. 9/22/2022 2022.

- [1106] J. Stehlik, Y.-Y. Liu, C. Eichler, T. R. Hartke, X. Mi, M. Gullans, J. M. Taylor, and J. R. Petta. Double quantum dot floquet gain medium. *Physical Review X*, 6:041027, 2016/11/07 2016.
- [1107] J. Steinberg and B. Swingle. Thermalization and chaos in qed3. Phys. Rev. D, 99, 04/11/2019 2019.
- [1108] F. W. Strauch, M. Edwards, E. Tiesinga, C. J. Williams, and C. W. Clark. Tunneling phase gate for neutral atoms in a double-well lattice. *Physical Review A*, 77, 2008/5/12 2008.
- [1109] F. W. Strauch and C. J. Williams. Theoretical analysis of perfect quantum state transfer with superconducting qubits. *Physical Review B*, 78, 2008/9/24 2008.
- [1110] Y. Su. Framework for hamiltonian simulation and beyond: standard-form encoding, qubitization, and quantum signal processing. *Quantum Views*, 3, 08/13/2019 2019.
- [1111] Y. Su and J. Watrous. Time-reversal of rank-one quantum strategy functions. Quantum, 2, 2018/01/25 2018.
- [1112] D. G. Suarez-Forero, D. W. Session, M. J. Mehrabad, P. Knuppel, S. Faelt, W. Wegscheider, and M. Hafezi. Spin-selective strong light-matter coupling in a 2d hole gas-microcavity system. 2/12/2023 2023.
- [1113] Y. Subasi, C. H. Fleming, J. M. Taylor, and B. L. Hu. The equilibrium states of open quantum systems in the strong coupling regime. *Physical Review E*, 86, 2012/12/26 2012.
- [1114] S. Subhankar, P. Bienias, P. Titum, T.-C. Tsui, Y. Wang, A. V. Gorshkov, S. L. Rolston, and J. V. Porto. Floquet engineering of optical lattices with spatial features and periodicity below the diffraction limit. 06/18/2019 2019.
- [1115] C. Sun and J.-P. Liu. New stepsizes for the gradient method. *Optim Lett*, 1/28/2019 2019.
- [1116] A. Sundaram and B. Lackey. Mathematical methods for resource-based type theories. 2018.
- [1117] N. M. Sundaresan, R. Lundgren, G. Zhu, A. V. Gorshkov, and A. A. Houck. Interacting qubit-photon bound states with superconducting circuits. *Phys. Rev.*, X 9, 2018/01/30 2019.
- [1118] I. Sweet, D. Darais, D. Heath, W. Harris, R. Estes, and M. Hicks. Symphony: Expressive secure multiparty computation with coordination. *The Art, Science, and Engineering of Programming*, 7, 2/20/2023 2023.
- [1119] B. Swingle and N. Y. Halpern. Resilience of scrambling measurements. Phys. Rev., A, 2018/06/18 2018.
- [1120] B. Swingle and Y. Wang. Holographic complexity of einstein-maxwell-dilaton gravity. *J. High Energ. Phys.*, 106, 2018 2018.
- [1121] B. Swingle and Y. Wang. Recovery map for fermionic gaussian channels. 2018.
- [1122] S. V. Syzranov, A. V. Gorshkov, and V. Galitski. Out-of-time-order correlators in finite open systems. 2017/04/27 2017.
- [1123] S. V. Syzranov, A. V. Gorshkov, and V. M. Galitski. Interaction-induced transition in the quantum chaotic dynamics of a disordered metal. *Ann. Phys.*, 405, 03/25/2019 2019.
- [1124] K. Takeda, K. Nagasaka, A. Noguchi, R. Yamazaki, Y. Nakamura, E. Iwase, J. M. Taylor, and K. Usami. Electromechano-optical nmr detection. *Optica*, 5:152–158, 2018/02/01 2018.
- [1125] S. J. S. Tan, C. A. Pattison, M. McEwen, and J. Preskill. Resilience of the surface code to error bursts. *arXiv* preprint arXiv:2406.18897, 6/27/2024 2024.
- [1126] S. J. S. Tan and L. Stambler. Effective distance of higher dimensional hgps and weight-reduced quantum ldpc codes. 9/3/2024 2024.
- [1127] W. L. Tan, P. Becker, F. Liu, G. Pagano, K. S. Collins, A. De, L. Feng, H. B. Kaplan, A. Kyprianidis, R. Lundgren, W. Morong, S. Whitsitt, A. V. Gorshkov, and C. Monroe. Observation of domain wall confinement and dynamics in a quantum simulator. 12/23/2019 2019.
- [1128] J. M. Taylor. A quantum dot implementation of the quantum nand algorithm. 2007/08/10 2007.
- [1129] J. M. Taylor and T. Calarco. Wigner crystals of ions as quantum hard drives. *Physical Review A*, 78, 2008/12/18 2008.

- [1130] J. M. Taylor, P. Cappellaro, L. Childress, L. Jiang, D. Budker, P. R. Hemmer, A. Yacoby, R. Walsworth, and M. D. Lukin. High-sensitivity diamond magnetometer with nanoscale resolution. *Nature Physics*, 4:810 816, 2008/9/14 2008.
- [1131] J. M. Taylor, W. Dür, P. Zoller, A. Yacoby, C. M. Marcus, and M. D. Lukin. Solid-state circuit for spin entanglement generation and purification. *Physical Review Letters*, 94, 2005/6/15 2005.
- [1132] J. M. Taylor, G. Giedke, H. Christ, B. Paredes, J. I. Cirac, P. Zoller, M. D. Lukin, and A. Imamoglu. Quantum information processing using localized ensembles of nuclear spins. 2004/07/23 2004.
- [1133] J. M. Taylor, A. Imamoglu, and M. D. Lukin. Controlling a mesoscopic spin environment by quantum bit manipulation. *Physical Review Letters*, 91, 2003/12/10 2003.
- [1134] J. M. Taylor and M. D. Lukin. Dephasing of quantum bits by a quasi-static mesoscopic environment. 2005/12/07
- [1135] J. M. Taylor and M. D. Lukin. Cavity quantum electrodynamics with semiconductor double-dot molecules on a chip. 2006/05/05 2006.
- [1136] J. M. Taylor, C. M. Marcus, and M. D. Lukin. Long-lived memory for mesoscopic quantum bits. *Physical Review Letters*, 90, 2003/5/20 2003.
- [1137] J. M. Taylor, J. R. Petta, A. C. Johnson, A. Yacoby, C. M. Marcus, and M. D. Lukin. Relaxation, dephasing, and quantum control of electron spins in double quantum dots. *Physical Review B*, 76, 2007/7/13 2007.
- [1138] J. M. Taylor, A. S. Sørensen, C. M. Marcus, and E. S. Polzik. Laser cooling and optical detection of excitations in a lc electrical circuit. *Physical Review Letters*, 107, 2011/12/27 2011.
- [1139] J. M. Taylor, V. Srinivasa, and J. Medford. Electrically-protected resonant exchange qubits in triple quantum dots. *Physical Review Letters*, 111, 2013/7/31 2013.
- [1140] R. Thomas, M. Chilcott, E. Tiesinga, A. B. Deb, and N. Kjærgaard. Observation of bound state self-interaction in a nano-ev atom collider. *Nature Communications*, 9, 2018/11/20 2018.
- [1141] R. Thomas, K. O. Roberts, E. Tiesinga, A. C. Wade, P. B. Blakie, A. B. Deb, and N. Kjærgaard. Multiple scattering dynamics of fermions at an isolated p-wave resonance. *Nature Communications*, 7:12069, 2016/07/11 2016.
- [1142] T. Thomay, S. V. Polyakov, O. Gazzano, E. Goldschmidt, Z. D. Eldredge, T. Huber, V. Loo, and G. S. Solomon. Simultaneous, full characterization of a single-photon state. *Physical Review X*, 7:041036, 2017/11/15 2017.
- [1143] J. K. Thompson, O. Parekh, and K. Marwaha. An explicit vector algorithm for high-girth maxcut. 8/27/2021 2021.
- [1144] E. Tiesinga and P. R. Johnson. Quadrature interferometry for nonequilibrium ultracold bosons in optical lattices. *Physical Review A*, 87, 2013/1/22 2013.
- [1145] P. Titum, J. T. Iosue, J. R. Garrison, A. V. Gorshkov, and Z.-X. Gong. Probing ground-state phase transitions through quench dynamics. *Phys. Rev. Lett.*, 123, 9/11/2019 2019.
- [1146] P. Titum, N. H. Lindner, and G. Refael. Disorder induced transitions in resonantly driven floquet topological insulators. *Physical Review B*, 96:054207, 2017/08/16 2017.
- [1147] P. Titum, V. L. Quito, and S. V. Syzranov. Energy-level statistics in strongly disordered systems with power-law hopping. *Phys. Rev.*, B:014201, 2018/07/16 2018.
- [1148] P. Titum, K. M. Schultz, A. Seif, G. D. Quiroz, and B. D. Clader. Optimal control for quantum detectors. 5/12/2020 2020.
- [1149] Y. Tong, V. V. Albert, J. R. McClean, J. Preskill, and Y. Su. Provably accurate simulation of gauge theories and bosonic systems. *Quantum*, 6:816, 9/20/2022 2022.
- [1150] M. C. Tran, C.-F. Chen, A. Ehrenberg, A. Y. Guo, A. Deshpande, Y. Hong, Z.-X. Gong, A. V. Gorshkov, and A. Lucas. Hierarchy of linear light cones with long-range interactions. *Physical Review X*, 10, 5/29/2020 2020.
- [1151] M. C. Tran, S.-K. Chu, Y. Su, A. M. Childs, and A. V. Gorshkov. Destructive error interference in product-formula lattice simulation. *Phys. Rev. Lett.*, 124, 6/4/2020 2020.

- [1152] M. C. Tran, A. Deshpande, A. Y. Guo, A. Lucas, and A. V. Gorshkov. Optimal state transfer and entanglement generation in power-law interacting systems. 10/6/2020 2020.
- [1153] M. C. Tran, A. Ehrenberg, A. Y. Guo, P. Titum, D. A. Abanin, and A. V. Gorshkov. Locality and heating in periodically driven, power-law interacting systems. *Phys. Rev. A*, 100, 2019/11/12 2019.
- [1154] M. C. Tran, J. R. Garrison, Z.-X. Gong, and A. V. Gorshkov. Lieb-robinson bounds on n-partite connected correlation functions. *Phys. Rev. A* 96, 052334, 2017.
- [1155] M. C. Tran, J. R. Garrison, Z.-X. Gong, and A. V. Gorshkov. Lieb-robinson bounds on n-partite connected correlations. *Physical Review A*, 96, 2017/11/27 2017.
- [1156] M. C. Tran, A. Y. Guo, C. L. Baldwin, A. Ehrenberg, A. V. Gorshkov, and A. Lucas. The lieb-robinson light cone for power-law interactions. 3/29/2021 2021.
- [1157] M. C. Tran, A. Y. Guo, Y. Su, J. R. Garrison, Z. Eldredge, M. Foss-Feig, A. M. Childs, and A. V. Gorshkov. Locality and digital quantum simulation of power-law interactions. *Phys. Rev. X 9*, 031006, 9, 07/10/2019 2019.
- [1158] M. C. Tran, R. Ramanathan, M. McKague, D. Kaszlikowski, and T. Paterek. Bell monogamy relations in arbitrary qubit networks. 2018/01/09 2018.
- [1159] M. C. Tran, Y. Su, D. Carney, and J. M. Taylor. Faster digital quantum simulation by symmetry protection. *PRX Quantum*, 2, 2/14/2021 2021.
- [1160] M. C. Tran and J. M. Taylor. Blind quantum computation using the central spin hamiltonian. 2018/01/11 2018.
- [1161] M. C. Tran, M. Zuppardo, A. de Rosier, L. Knips, W. Laskowski, T. Paterek, and H. Weinfurter. Genuine n -partite entanglement without n -partite correlation functions. *Physical Review A*, 95:062331, 2017/06/26 2017.
- [1162] T. Upadhyaya, W. F. Braasch, G. T. Landi, and N. Y. Halpern. Non-abelian transport distinguishes three usually equivalent notions of entropy production. *PRX Quantum*, 5, 9/28/2024 2024.
- [1163] T. Upadhyaya, J. William F. Braasch, G. T. Landi, and N. Y. Halpern. What happens to entropy production when conserved quantities fail to commute with each other. 5/24/2023 2023.
- [1164] M. Van Regemortel, O. Shtanko, L. P. García-Pintos, A. Deshpande, H. Dehghani, A. V. Gorshkov, and M. Hafezi. Monitoring-induced entanglement entropy and sampling complexity. 1/29/2022 2022.
- [1165] R. Verdel, F. Liu, S. Whitsitt, A. V. Gorshkov, and M. Heyl. Real-time dynamics of string breaking in quantum spin chains. 2019/11/26 2019.
- [1166] D. Vodola, L. Lepori, E. Ercolessi, A. V. Gorshkov, and G. Pupillo. Kitaev chains with long-range pairing. *Physical Review Letters*, 113, 2014/10/9 2014.
- [1167] F. Voichick, L. Li, R. Rand, and M. Hicks. Qunity: A unified language for quantum and classical computing (extended version). 4/26/2022 2022.
- [1168] A. Vrajitoarea, R. Belyansky, R. Lundgren, S. Whitsitt, A. V. Gorshkov, and A. A. Houck. Ultrastrong light-matter interaction in a photonic crystal. 9/29/2022 2022.
- [1169] A. Vrajitoarea, R. Belyansky, R. Lundgren, S. Whitsitt, A. V. Gorshkov, and A. A. Houck. Ultrastrong light-matter interaction in a multimode photonic crystal. 2/21/2024 2024.
- [1170] M. Vuffray, C. Coffrin, Y. A. Kharkov, and A. Y. Lokhov. Programmable quantum annealers as noisy gibbs samplers. 12/16/2020 2020.
- [1171] E. Waks and C. Monroe. Protocol for hybrid entanglement between a trapped atom and a semiconductor quantum dot. *Physical Review A*, 80, 2009/12/30 2009.
- [1172] B. D. Walker, B. C. Lackey, J. Muller, and P. J. Schone. Language-reconfigurable universal phone recognition. In *Eighth European Conference on Speech Communication and Technology*, 2003.
- [1173] P. Walther, M. D. Eisaman, A. Nemiroski, A. V. Gorshkov, A. S. Zibrov, A. Zeilinger, and M. D. Lukin. Multiphoton entanglement: From quantum curiosity to quantum computing and quantum repeaters. *Proc. SPIE*, 6664:66640G, 2007.

- [1174] C.-H. Wang, M. Gullans, J. V. Porto, W. D. Phillips, and J. M. Taylor. Bose condensation of photons thermalized via laser cooling of atoms. 2018.
- [1175] C.-H. Wang, M. Gullans, J. V. Porto, W. D. Phillips, and J. M. Taylor. Photon thermalization via laser cooling of atoms. *Phys. Rev. A* 98, 013834, 2018 2018.
- [1176] C.-H. Wang and J. M. Taylor. Landauer formulation of photon transport in driven systems. *Physical Review B*, 94:155437, 2016/10/20 2016.
- [1177] C.-H. Wang and J. M. Taylor. A quantum model for an entropic spring. *Physical Review B*, 93:214102, 2016/06/01 2016.
- [1178] C.-H. Wang and J. M. Taylor. Optomechanical approach to controlling the temperature and chemical potential of light. *Phys. Rev. A* 97, 033850, 2018/05/18 2018.
- [1179] D. Wang. Simulating quantum circuits by classical circuits. 04/10/2019 2019.
- [1180] D. Wang, O. Higgott, and S. Brierley. Accelerated variational quantum eigensolver. *Phys. Rev. Lett.*, 122, 3/25/2019 2019
- [1181] D. Wang, A. Sundaram, R. Kothari, A. Kapoor, and M. Roetteler. Quantum algorithms for reinforcement learning with a generative model. *Proceedings of the 38th International Conference on Machine Learning, PMLR*, 139, 12/15/2021 2021.
- [1182] D. Wang, X. You, T. Li, and A. M. Childs. Quantum exploration algorithms for multi-armed bandits. *Proceedings of the 35th Conference on Artificial Intelligence (AAAI 2021)*, 35:10102–10110, 2021 2021.
- [1183] G. Wang. Quantum algorithms for curve fitting. 2014/04/02 2014.
- [1184] G. Wang. Efficient quantum algorithms for analyzing large sparse electrical networks. *Quantum Information & Computation*, 17:987–1026, 2017/07/21 2017.
- [1185] G. Wang. Quantum algorithm for linear regression. *Physical Review A*, 96:012335, 2017/07/31 2017.
- [1186] Q. Wang, Z.-P. Cian, M. Li, I. L. Markov, and Y. Nam. Ever more optimized simulations of fermionic systems on a quantum computer. 3/6/2023 2023.
- [1187] Q. Wang, M. Li, C. Monroe, and Y. Nam. Resource-optimized fermionic local-hamiltonian simulation on quantum computer for quantum chemistry. *Quantum*, 5, 7/21/2021 2021.
- [1188] Q. Wang, L. Zhukas, Q. Miao, A. S. Dalvi, P. J. Love, C. Monroe, F. T. Chong, and G. S. Ravi. Demonstration of a cafqa-bootstrapped variational quantum eigensolver on a trapped-ion quantum computer. 8/12/2024 2024.
- [1189] S. Wang, E. Fontana, M. Cerezo, K. Sharma, A. Sone, L. Cincio, and P. J. Coles. Noise-induced barren plateaus in variational quantum algorithms. *Nature Communications*, 12:6961, 11/29/2021 2021.
- [1190] X. Wang and M. M. Wilde. Exact entanglement cost of quantum states and channels under ppt-preserving operations. 2018.
- [1191] X. Wang and M. M. Wilde. α -logarithmic negativity. 04/23/2019 2019.
- [1192] X. Wang and M. M. Wilde. Resource theory of asymmetric distinguishability for quantum channels. 07/15/2019 2019.
- [1193] X. Wang, M. M. Wilde, and Y. Su. Quantifying the magic of quantum channels. *New Journal of Physics*, 21, 10/8/2019 2019.
- [1194] X. Wang, M. M. Wilde, and Y. Su. Efficiently computable bounds for magic state distillation. *Phys. Rev. Lett.*, 124, 3/6/2020 2020.
- [1195] Y. Wang, M. Gullans, A. Browaeys, J. V. Porto, D. E. Chang, and A. V. Gorshkov. Single-photon bound states in atomic ensembles. 2018.
- [1196] Y. Wang, M. Gullans, X. Na, and A. V. Gorshkov. Universality in one-dimensional scattering with general dispersion relations. *Phys. Rev. Res.*, 4, 3/17/2021 2022.

- [1197] Y. Wang, M. Gullans, X. Na, S. Whitsitt, and A. V. Gorshkov. Universal scattering with general dispersion relations. *Phys. Rev. Research*, 4, 4/6/2022 2022.
- [1198] Y. Wang, S. Subhankar, P. Bienias, M. Lacki, T.-C. Tsui, M. A. Baranov, A. V. Gorshkov, P. Zoller, J. V. Porto, and S. L. Rolston. Dark state optical lattice with sub-wavelength spatial structure. *Phys. Rev. Lett.*, 120:083601, 2018/02/20 2018.
- [1199] Y. Wang, M. C. Tran, and J. M. Taylor. Quantum simulation of ferromagnetic heisenberg model. 2017/12/14 2017.
- [1200] Y.-X. Wang, J. Bringewatt, A. Seif, A. J. Brady, C. Oh, and A. V. Gorshkov. Exponential entanglement advantage in sensing correlated noise. 10/8/2024 2024.
- [1201] B. Ware, A. Deshpande, D. Hangleiter, P. Niroula, B. Fefferman, A. V. Gorshkov, and M. Gullans. A sharp phase transition in linear cross-entropy benchmarking. 5/8/2023 2023.
- [1202] J. D. Watson, J. Bringewatt, A. F. Shaw, A. M. Childs, A. V. Gorshkov, and Z. Davoudi. Quantum algorithms for simulating nuclear effective field theories. 12/8/2023 2023.
- [1203] J. D. Watson and J. Watkins. Exponentially reduced circuit depths using trotter error mitigation. 8/26/2024 2024.
- [1204] B. J. Weber, S. S. Kalantre, T. McJunkin, J. M. Taylor, and J. P. Zwolak. Theoretical bounds on data requirements for the ray-based classification. *SN Comput. Sci.*, 3, 02/26/2022 2022.
- [1205] C. D. White, C. Cao, and B. Swingle. Conformal field theories are magical. *Physical Review B*, 103:075145, 2/25/2021 2021.
- [1206] S. Whitsitt, R. Samajdar, and S. Sachdev. Quantum field theory for the chiral clock transition in one spatial dimension. *Phys. Rev.*, B:205118, 2018/11/09 2018.
- [1207] F. Wilde, A. Kshetrimayum, I. Roth, D. Hangleiter, R. Sweke, and J. Eisert. Scalably learning quantum many-body hamiltonians from dynamical data. 9/28/2022 2022.
- [1208] J. Wildeboer, C. M. Langlett, Z.-C. Yang, A. V. Gorshkov, T. Iadecola, and S. Xu. Quantum many-body scars from einstein-podolsky-rosen states in bilayer systems. 9/12/2022 2022.
- [1209] R. M. Wilson, K. W. Mahmud, A. Hu, A. V. Gorshkov, M. Hafezi, and M. Foss-Feig. Collective phases of strongly interacting cavity photons. *Physical Review A*, 94:033801, 2016/09/01 2016.
- [1210] M. Winer, R. Barney, C. L. Baldwin, V. Galitski, and B. Swingle. Spectral form factor of a quantum spin glass. 4/4/2022 2022.
- [1211] M. Winer, S.-K. Jian, and B. Swingle. An exponential ramp in the quadratic sachdev-ye-kitaev model. 6/26/2020 2020.
- [1212] F. Witteveen, V. Scholz, B. Swingle, and M. Walter. Quantum circuit approximations and entanglement renormalization for the dirac field in 1+1 dimensions. 05/21/2019 2019.
- [1213] P. M. Wocjan, S. P. Jordan, H. Ahmadi, and J. P. Brennan. Efficient quantum processing of ideals in finite rings. 2009/07/31 2009.
- [1214] J. D. Wong-Campos, K. G. Johnson, B. Neyenhuis, J. Mizrahi, and C. Monroe. High resolution adaptive imaging of a single atom. *Nature Photonics*, pages 606–610, 2016/07/18 2016.
- [1215] J. P. Wrubel, A. Schwettmann, D. P. Fahey, Z. Glassman, H. K. Pechkis, P. F. Griffin, R. Barnett, E. Tiesinga, and P. D. Lett. A spinor bose-einstein condensate phase-sensitive amplifier for su(1,1) interferometry. *Phys. Rev*, A 98, 2018.
- [1216] D. Wu, Q. Zhao, X.-M. Gu, H.-S. Zhong, Y. Zhou, L.-C. Peng, J. Qin, Y.-H. Luo, K. Chen, L. Li, N.-L. Liu, C.-Y. Lu, and J.-W. Pan. Robust self-testing of multiparticle entanglement. *Phys. Rev. Lett.*, 127:230503, 12/7/2021 2021.
- [1217] D. Wu, Q. Zhao, C. Wang, L. Huang, Y.-F. Jiang, B. Bai, Y. Zhou, X.-M. Gu, F.-M. Liu, Y.-Q. Mao, Q.-C. Sun, M.-C. Chen, J. Zhang, C.-Z. Peng, X.-B. Zhu, Q. Zhang, C.-Y. Lu, and J.-W. Pan. Closing the locality and detection loopholes in multiparticle entanglement self-testing. *Physical Review Letters*, 128:250401, 06/23/2022 2022.

- [1218] D. H. Wu and V. V. Albert. Approximating the two-mode two-photon rabi model. *Physics Letters A*, 422, 01/17/2022 2022.
- [1219] X. Wu and J. Chen. Multiparty quantum data hiding with enhanced security and remote deletion. page 5, 2018.
- [1220] X. Wu, P. Yao, and H. Yuen. Raz-mckenzie simulation with the inner product gadget. *Electronic Colloquium on Computational Complexity (ECCC)*, 2017/01/28 2017.
- [1221] T. Xin, D. Lu, J. Klassen, N. Yu, Z. Ji, J. Chen, X. Ma, G. Long, B. Zeng, and R. Laflamme. Quantum state tomography via reduced density matrices. *Physical Review Letters*, 118:020401, 2017/01/09 2017.
- [1222] H. Xu, U. Kemiktarak, J. Fan, S. Ragole, J. Lawall, and J. M. Taylor. Observation of optomechanical buckling phase transitions. 2015/10/16 2015.
- [1223] H. Xu and J. M. Taylor. Unified approach to topological quantum computation with anyons: From qubit encoding to toffoli gate. *Physical Review A*, 84, 2011/7/26 2011.
- [1224] K. Xu, Y. Liu, J. R. Abo-Shaeer, T. Mukaiyama, J. K. Chin, D. E. Miller, W. Ketterle, K. M. Jones, and E. Tiesinga. Sodium bose-einstein condensates in an optical lattice. *Physical Review A*, 72, 2005/10/10 2005.
- [1225] S. Xu, X. Li, Y.-T. Hsu, B. Swingle, and S. D. Sarma. Butterfly effect in interacting aubry-andre model: thermalization, slow scrambling, and many-body localization. 02/19/2019 2019.
- [1226] S. Xu, L. Susskind, Y. Su, and B. Swingle. A sparse model of quantum holography. 8/5/2020 2020.
- [1227] S. Xu and B. Swingle. Locality, quantum fluctuations, and scrambling. Phys. Rev. X, 9, 9/18/2019 2019.
- [1228] S. Xu and B. Swingle. Accessing scrambling using matrix product operators. *Nature Physics*, 16:199–204, 2/2020 2020.
- [1229] X. Xu, M. Gullans, and J. M. Taylor. Quantum nonlinear optics near optomechanical instabilities. *Physical Review A*, 91:013818, 2015/01/09 2015.
- [1230] X. Xu, S. Kim, G. Bahl, and J. M. Taylor. A quasi-mode theory of chiral phonons. 2016/12/29 2016.
- [1231] X. Xu, T. Purdy, and J. M. Taylor. Cooling a harmonic oscillator by optomechanical modification of its bath. *Physical Review Letters*, 118:223602, 2017/05/31 2017.
- [1232] X. Xu and J. M. Taylor. Optomechanically-induced chiral transport of phonons in one dimension. 2017/01/10 2017.
- [1233] Y. Xu, Y. Wang, and V. V. Albert. Clifford operations and homological codes for rotors and oscillators. 11/13/2023 2023.
- [1234] Y. Xu, Y. Wang, and V. V. Albert. Multimode rotation-symmetric bosonic codes from homological rotor codes. *Phys. Rev. A*, 110:022402, 8/1/2024 2024.
- [1235] Y. Xu, Y. Wang, E.-J. Kuo, and V. V. Albert. Qubit-oscillator concatenated codes: Decoding formalism and code comparison. *PRX Quantum*, 4:020342, 6/14/2023 2023.
- [1236] W.-X. Yang and Z.-X. Gong. Practical scheme for quantum dense coding between three parties using microwave radiation in trapped ions. *Journal of Physics B: Atomic, Molecular and Optical Physics*, 40:1245 1252, 2007/03/28 2007.
- [1237] W.-X. Yang and Z.-X. Gong. Simple scheme for implementing the deutsch-jozsa algorithm in thermal cavity. *Journal of Physics A: Mathematical and Theoretical*, 40:155 161, 2007/01/05 2007.
- [1238] W.-X. Yang and Z.-X. Gong. Efficient scheme for one-way quantum computing in thermal cavities. *International Journal of Theoretical Physics*, 47:2997 3004, 2008/4/12 2008.
- [1239] Z. Yang, T. Zhang, J. Lu, Y. Su, D. Zhang, and Y. Duan. Extreme learning machines for regression based on v-matrix method. *Cognitive Neurodynamics*, 2017/06/10 2017.
- [1240] Z.-C. Yang, F. Liu, A. V. Gorshkov, and T. Iadecola. Hilbert-space fragmentation from strict confinement. *Phys. Rev. Lett.*, 124, 5/22/2020 2020.

- [1241] N. Y. Yao, S. D. Bennett, C. R. Laumann, B. L. Lev, and A. V. Gorshkov. Bilayer fractional quantum hall states with ultracold dysprosium. *Physical Review A*, 92:033609, 2015/09/10 2015.
- [1242] N. Y. Yao, Z.-X. Gong, C. R. Laumann, S. D. Bennett, L. M. Duan, M. D. Lukin, L. Jiang, and A. V. Gorshkov. Quantum logic between remote quantum registers. *Physical Review A*, 87, 2013/2/6 2013.
- [1243] N. Y. Yao, A. V. Gorshkov, C. R. Laumann, A. M. Läuchli, J. Ye, and M. D. Lukin. Realizing fractional chern insulators with dipolar spins. *Physical Review Letters*, 110, 2013/4/29 2013.
- [1244] N. Y. Yao, L. Jiang, A. V. Gorshkov, Z.-X. Gong, A. Zhai, L. M. Duan, and M. D. Lukin. Robust quantum state transfer in random unpolarized spin chains. *Physical Review Letters*, 106, 2011/1/27 2011.
- [1245] N. Y. Yao, L. Jiang, A. V. Gorshkov, P. C. Maurer, G. Giedke, J. I. Cirac, and M. D. Lukin. Scalable architecture for a room temperature solid-state quantum information processor. *Nature Communications*, 3:800, 2012/4/24 2012.
- [1246] N. Y. Yao, C. R. Laumann, A. V. Gorshkov, S. D. Bennett, E. Demler, P. Zoller, and M. D. Lukin. Topological flat bands from dipolar spin systems. *Physical Review Letters*, 109, 2012/12/26 2012.
- [1247] N. Y. Yao, C. R. Laumann, A. V. Gorshkov, H. Weimer, L. Jiang, J. I. Cirac, P. Zoller, and M. D. Lukin. Topologically protected quantum state transfer in a chiral spin liquid. *Nature Communications*, 4:1585, 2013/3/12 2013.
- [1248] J. Yi, W. Ye, D. Gottesman, and Z.-W. Liu. Complexity and order in approximate quantum error-correcting codes. *Nature Physics*, 9/19/2024 2024.
- [1249] C. Yin, V. V. Albert, and S. Zhou. Small correlation is sufficient for optimal noisy quantum metrology. 7/31/2024 2024.
- [1250] Y. Yoo, J. Lee, and B. Swingle. Non-equilibrium steady state phases of the interacting aubry-andre-harper model. 5/21/2020 2020.
- [1251] X. You, S. Chakrabarti, B. Chen, and X. Wu. Analyzing convergence in quantum neural networks: Deviations from neural tangent kernels. 3/26/2023 2023.
- [1252] X. You, S. Chakrabarti, and X. Wu. A convergence theory for over-parameterized variational quantum eigensolvers. 5/25/2022 2022.
- [1253] X. You and X. Wu. Exponentially many local minima in quantum neural networks. *Proceedings of the 38th International Conference on Machine Learning, PMLR*, 139:12144–12155, 10/5/2021 2021.
- [1254] J. Youm, J. T. Iosue, A. Ehrenberg, Y.-X. Wang, and A. V. Gorshkov. Average rényi entanglement entropy in gaussian boson sampling. 3/27/2024 2024.
- [1255] A. W. Young, W. J. Eckner, N. Schine, A. M. Childs, and A. M. Kaufman. Tweezer-programmable 2d quantum walks in a hubbard-regime lattice. *Science*, 377:885–889, 8/18/2022 2022.
- [1256] J. T. Young, P. Bienias, R. Belyansky, A. M. Kaufman, and A. V. Gorshkov. Asymmetric blockade and multi-qubit gates via dipole-dipole interactions. 6/3/2020 2020.
- [1257] J. T. Young, T. Boulier, E. Magnan, E. A. Goldschmidt, R. M. Wilson, S. L. Rolston, J. V. Porto, and A. V. Gorshkov. Dissipation induced dipole blockade and anti-blockade in driven rydberg systems. *Phys. Rev. A*, 97:023424, 2018/02/28 2018.
- [1258] J. T. Young, A. V. Gorshkov, M. Foss-Feig, and M. F. Maghrebi. Non-equilibrium fixed points of coupled ising models. *Phys. Rev. X*, 10, 2/26/2020 2020.
- [1259] J. T. Young, A. V. Gorshkov, and I. B. Spielman. Feedback-stabilized dynamical steady states in the bose-hubbard model. *Phys. Rev. Research*, 3:043075, 12/15/2021 2021.
- [1260] R. Yousefzadeh and D. P. O'Leary. Interpreting neural networks using flip points. 03/20/2019 2019.
- [1261] R. Yousefzadeh and D. P. O'Leary. Investigating decision boundaries of trained neural networks. 8/7/2019 2019.
- [1262] R. Yousefzadeh and D. P. O'Leary. A probabilistic framework and a homotopy method for real-time hierarchical freight dispatch decisions. 2019/12/8 2019.

- [1263] R. Yousefzadeh and D. P. O'Leary. Refining the structure of neural networks using matrix conditioning. 8/6/2019 2019.
- [1264] R. Yousefzadeh and D. P. O'Leary. Auditing and debugging deep learning models via decision boundaries: Individual-level and group-level analysis. 1/2/2020 2020.
- [1265] J. Yu, Y.-A. Chen, and S. D. Sarma. Euler-obstructed cooper pairing: Nodal superconductivity and hinge majorana zero modes. *Physical Review B*, 105, 3/29/2022 2022.
- [1266] X. Yuan, J. Sun, J. Liu, Q. Zhao, and Y. Zhou. Quantum simulation with hybrid tensor networks. 7/2/2020 2020.
- [1267] X. Yuan, J. Sun, J. Liu, Q. Zhao, and Y. Zhou. Quantum simulation with hybrid tensor networks. *Physical Review Letters*, 127, 8/31/2021 2021.
- [1268] X. Yuan, P. Zeng, M. Gao, and Q. Zhao. One-shot dynamical resource theory. 12/4/2020 2020.
- [1269] A. Zabalo, M. Gullans, J. H. Wilson, R. Vasseur, A. W. W. Ludwig, S. Gopalakrishnan, D. A. Huse, and J. H. Pixley. Operator scaling dimensions and multifractality at measurement-induced transitions. *Physical Review Letters*, 128, 2/11/2022 2022.
- [1270] A. Zabalo, J. H. Wilson, M. Gullans, R. Vasseur, S. Gopalakrishnan, D. A. Huse, and J. H. Pixley. Infinite-randomness criticality in monitored quantum dynamics with static disorder. 5/27/2022 2022.
- [1271] D. M. Zajac, A. J. Sigillito, M. Russ, F. Borjans, J. M. Taylor, G. Burkard, and J. R. Petta. Resonantly driven cnot gate for electron spins. *Science*, 359:439–442, 2018/01/26 2018.
- [1272] M. P. Zaletel, M. Lukin, C. Monroe, C. Nayak, F. Wilczek, and N. Y. Yao. Colloquium: Quantum and classical discrete time crystals. 5/15/2023 2023.
- [1273] R. Zektzer, X. Lu, K. T. Hoang, R. Shrestha, S. Austin, F. Zhou, A. Chanana, G. Holland, D. Westly, P. Lett, A. V. Gorshkov, and K. Srinivasan. Strong interactions between integrated microresonators and alkali atomic vapors: towards single-atom, single-photon operation. 4/5/2024 2024.
- [1274] E. Zeuthen, M. Gullans, M. F. Maghrebi, and A. V. Gorshkov. Correlated photon dynamics in dissipative rydberg media. *Physical Review Letters*, 119:043602, 2017/07/26 2017.
- [1275] E. Zeuthen, A. Schliesser, A. S. Sørensen, and J. M. Taylor. Figures of merit for quantum transducers. 2016/10/04 2016.
- [1276] E. Zeuthen, A. Schliesser, J. M. Taylor, and A. S. Sørensen. Electro-optomechanical equivalent circuits for quantum transduction. 2018/10/15 2018.
- [1277] B. Zhan, S. Kimmel, and A. Hassidim. Super-polynomial quantum speed-ups for boolean evaluation trees with hidden structure. *ITCS '12 Proceedings of the 3rd Innovations in Theoretical Computer Science Conference*, pages 249–265, 2012/01/08 2012.
- [1278] C. Zhang, J. Leng, and T. Li. Quantum algorithms for escaping from saddle points. Quantum, 5, 8/19/2021 2021.
- [1279] J. Zhang, G. Pagano, P. W. Hess, A. Kyprianidis, P. Becker, H. Kaplan, A. V. Gorshkov, Z. X. Gong, and C. Monroe. Observation of a many-body dynamical phase transition with a 53-qubit quantum simulator. *Nature*, 551:601–604, 2017/11/29 2017.
- [1280] Y. Zhang, H. Fu, and E. Knill. Efficient randomness certification by quantum probability estimation. *Phys. Rev. Research*, 2, 1/7/2020 2020.
- [1281] Y. Zhang, L. K. Shalm, J. C. Bienfang, M. J. Stevens, M. D. Mazurek, S. W. Nam, C. Abellán, W. Amaya, M. W. Mitchell, H. Fu, C. Miller, A. Mink, and E. Knill. Experimental low-latency device-independent quantum randomness. *Phys. Rev. Lett.*, 124, 12/24/2019 2020.
- [1282] E. Zhao, N. Bray-Ali, C. J. Williams, I. B. Spielman, and I. I. Satija. Chern numbers hiding in time-of-flight images. *Physical Review A*, 84, 2011/12/21 2011.
- [1283] Q. Zhao and X. Yuan. Exploiting anticommutation in hamiltonian simulation. 3/14/2021 2021.
- [1284] Q. Zhao and Y. Zhou. Constructing multipartite bell inequalities from stabilizers. 2/5/2020 2020.

- [1285] Q. Zhao, Y. Zhou, and A. M. Childs. Entanglement accelerates quantum simulation. 6/4/2024 2024.
- [1286] Q. Zhao, Y. Zhou, A. F. Shaw, T. Li, and A. M. Childs. Hamiltonian simulation with random inputs. *Phys. Rev. Lett.* 129, 270502, 129, 12/30/2022 2022.
- [1287] W. Zhong, J. M. Gold, S. Marzen, J. L. England, and N. Y. Halpern. Machine learning outperforms thermodynamics in measuring how well a many-body system learns a drive. *Scientific Reports*, 11, 10/22/2021 2021.
- [1288] J. Zhou, J. Criswell, and M. Hicks. Fat pointers for temporal memory safety of c. *Proceedings of the ACM on Programming Languages*, 7:316–347, 3/20/2023 2023.
- [1289] T. Zhou, S. Xu, X. Chen, A. Guo, and B. Swingle. The operator lévy flight: light cones in chaotic long-range interacting systems. *Phys. Rev. Lett.*, 124, 7/6/2020 2020.
- [1290] Y. Zhou, B. Xiao, M.-D. Li, Q. Zhao, Z.-S. Yuan, X. Ma, and J.-W. Pan. A scheme to create and verify scalable entanglement in optical lattice. *npj Quantum Information*, 8, 9/4/2022 2022.
- [1291] B. Zhu, B. Gadway, M. Foss-Feig, J. Schachenmayer, M. Wall, K. R. A. Hazzard, B. Yan, S. A. Moses, J. P. Covey, D. S. Jin, J. Ye, M. Holland, and A. M. Rey. Suppressing the loss of ultracold molecules via the continuous quantum zeno effect. *Physical Review Letters*, 112, 2014/2/20 2014.
- [1292] D. Zhu, Z.-P. Cian, C. Noel, A. Risinger, D. Biswas, L. Egan, Y. Zhu, A. M. Green, C. H. Alderete, N. H. Nguyen, Q. Wang, A. Maksymov, Y. Nam, M. Cetina, N. M. Linke, M. Hafezi, and C. Monroe. Cross-platform comparison of arbitrary quantum computations. 7/27/2021 2021.
- [1293] D. Zhu, S. Johri, N. H. Nguyen, C. H. Alderete, K. A. Landsman, N. M. Linke, C. Monroe, and A. Y. Matsuura. Probing many-body localization on a noisy quantum computer. 6/22/2020 2020.
- [1294] D. Zhu, G. D. Kahanamoku-Meyer, L. Lewis, C. Noel, O. Katz, B. Harraz, Q. Wang, A. Risinger, L. Feng, D. Biswas, L. Egan, A. Gheorghiu, Y. Nam, T. Vidick, U. Vazirani, N. Y. Yao, M. Cetina, and C. Monroe. Interactive protocols for classically-verifiable quantum advantage. 12/9/2021 2021.
- [1295] S. Zhu, S.-H. Hung, S. Chakrabarti, and X. Wu. On the principles of differentiable quantum programming languages. 4/2/2020 2020.
- [1296] L. A. Zhukas, Q. Wang, O. Katz, C. Monroe, and I. Marvian. Observation of the symmetry-protected signature of 3-body interactions. 8/202/204 2024.
- [1297] J. Ziegler, T. McJunkin, E. Joseph, S. S. Kalantre, B. Harpt, D. Savage, M. Lagally, M. Eriksson, J. M. Taylor, and J. P. Zwolak. Toward robust autotuning of noisy quantum dot devices. *Physical Review Applied*, 17, 02/26/2022 2022.
- [1298] T. Zolkin, Y. Kharkov, and S. Nagaitsev. Machine-assisted discovery of integrable symplectic mappings. 3/22/2022
- [1299] J. P. Zwolak, S. S. Kalantre, T. McJunkin, B. J. Weber, and J. M. Taylor. Ray-based classification framework for high-dimensional data. *Proceedings of the Machine Learning and the Physical Sciences Workshop at NeurIPS* 2020, Vancouver, Canada, 10/1/2020 2020.
- [1300] J. P. Zwolak, S. S. Kalantre, X. Wu, S. Ragole, and J. M. Taylor. Qflow lite dataset: A machine-learning approach to the charge states in quantum dot experiments. *PLOS ONE*, 13:e0205844, 2018 2018.
- [1301] J. P. Zwolak, T. McJunkin, S. S. Kalantre, J. P. Dodson, E. R. MacQuarrie, D. E. Savage, M. G. Lagally, S. N. Coppersmith, M. A. Eriksson, and J. M. Taylor. Auto-tuning of double dot devices in situ with machine learning. *Phys. Rev. Applied*, 13, 4/1/2020 2020.
- [1302] J. P. Zwolak, T. McJunkin, S. S. Kalantre, S. F. Neyens, E. R. MacQuarrie, M. A. Eriksson, and J. M. Taylor. Ray-based framework for state identification in quantum dot devices. *PRX Quantum*, 2, 06/17/2021 2021.
- [1303] J. P. Zwolak and J. M. Taylor. Colloquium: Advances in automation of quantum dot devices control. *Reviews of Modern Physics*, 95, 2/17/2023 2023.

[1304] J. P. Zwolak, J. M. Taylor, R. Andrews, J. Benson, G. Bryant, D. Buterakos, A. Chatterjee, S. D. Sarma, M. A. Eriksson, E. Greplová, M. Gullans, F. Hader, T. J. Kovach, P. S. Mundada, M. Ramsey, T. Rasmussen, B. Severin, A. Sigillito, B. Undseth, and B. Weber. Data needs and challenges of quantum dot devices automation: Workshop report. 12/21/2023 2023.

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