

T0 Time–Mass Duality Unified English Book

J. Pascher

November 28, 2025

Contents

References	3
------------	---

References

Bibliography

- [1] Particle Data Group Collaboration (2024). *Review of Particle Physics*. Progress of Theoretical and Experimental Physics, 2024(8), 083C01. <https://pdg.lbl.gov>
- [2] Aoki, Y., et al. (FLAG Collaboration) (2024). *FLAG Review 2024 of Lattice Results for Low-Energy Constants*. arXiv:2411.04268. <https://arxiv.org/abs/2411.04268>
- [3] Abi, B., et al. (Muon g-2 Collaboration) (2021). *Measurement of the Positive Muon Anomalous Magnetic Moment to 0.46 ppm*. Physical Review Letters, 126, 141801.
- [4] Peskin, M. E., & Schroeder, D. V. (1995). *An Introduction to Quantum Field Theory*. Addison-Wesley.
- [5] Weinberg, S. (1995). *The Quantum Theory of Fields, Vol. I–III*. Cambridge University Press.
- [6] Griffiths, D. (2008). *Introduction to Elementary Particles*. Wiley-VCH.
- [7] Mandl, F., & Shaw, G. (2010). *Quantum Field Theory (2nd ed.)*. Wiley.
- [8] Srednicki, M. (2007). *Quantum Field Theory*. Cambridge University Press.
- [9] Pascher, J. (2024). *T0-Theory: Foundations of Time-Mass Duality*. Unpublished manuscript, HTL Leonding.
- [10] Pascher, J. (2024). *T0-Theory: The Fine Structure Constant*. Unpublished manuscript, HTL Leonding.
- [11] Pascher, J. (2024). *T0-Theory: Neutrino Masses and PMNS Mixing*. Unpublished manuscript, HTL Leonding.
- [12] Pascher, J. (2024–2025). *T0-Time-Mass-Duality Repository*. GitHub. <https://github.com/jpascher/T0-Time-Mass-Duality>
- [13] Kronfeld, A. S. (2012). *Twenty-first Century Lattice Gauge Theory: Results from the QCD Lagrangian*. Annual Review of Nuclear and Particle Science, 62, 265–284.
- [14] Particle Data Group Collaboration (2024). *Neutrino Masses, Mixing, and Oscillations*. PDG Review 2024. <https://pdg.lbl.gov/2024/reviews/rpp2024-rev-neutrino-mixing.pdf>
- [15] ATLAS and CMS Collaborations (2012). *Observation of a New Particle in the Search for the Standard Model Higgs Boson*. Physics Letters B, 716, 1–29.
- [16] C. P. Brannen, “Estimate of neutrino masses from Koide’s relation”, *arXiv:hep-ph/0505028* (2005). <https://arxiv.org/abs/hep-ph/0505028>
- [17] C. P. Brannen, “Koide Mass Formula for Neutrinos”, *arXiv:0702.0052* (2006). <http://brannenworks.com/MASSES.pdf>
- [18] Anonymous, “The Koide Relation and Lepton Mass Hierarchy from Phase Vectors”, *rXiv:2507.0040* (2025). <https://rxiv.org/pdf/2507.0040v1.pdf>
- [19] Particle Data Group, “Review of Particle Physics”, *Phys. Rev. D* **112** (2025) 030001. <https://pdg.lbl.gov/2025/>

- [20] Casimir, H. B. G. (1948). *On the attraction between two perfectly conducting plates*. Proc. K. Ned. Akad. Wet. **51**, 793.
- [21] Particle Data Group (2024). *Review of Particle Physics*. Prog. Theor. Exp. Phys. **2024**, 083C01.
- [22] Pascher, J. (2025). *T0 Theory: Foundations and Extensions*. HTL Leonding Internal Manuscript.
- [23] Pascher, J. (2025). *Mathematical Analysis of the ξ Parameter in T0 Theory*. Present work - markdown analysis.
- [24] Pascher, J. (2025). *Simplified Dirac Equation in T0 Theory: From Complex 4x4 Matrices to Simple Field Node Dynamics*. <https://github.com/jpascher/T0-Time-Mass-Duality/blob/main/2/pdf/diracVereinfachtEn.pdf>
- [25] Pascher, J. (2025). *Simple Lagrangian Revolution: From Standard Model Complexity to T0 Elegance*. <https://github.com/jpascher/T0-Time-Mass-Duality/blob/main/2/pdf/LagrandianVergleichEn.pdf>
- [26] Pascher, J. (2025). *The T0 Revolution: From Particle Complexity to Field Simplicity*. <https://github.com/jpascher/T0-Time-Mass-Duality/blob/main/2/pdf/systemEn.pdf>
- [27] Pascher, J. (2025). *Field-Theoretic Derivation of the ξ Parameter in Natural Units*. <https://github.com/jpascher/T0-Time-Mass-Duality/blob/main/2/pdf/DerivationVonBetaEn.pdf>
- [28] Pascher, J. (2025). *Geometry-Dependent ξ Parameters and Electromagnetic Corrections*. https://github.com/jpascher/T0-Time-Mass-Duality/blob/main/2/pdf/Ho_EnergieEn.pdf
- [29] Pascher, J. (2025). *Deterministic Quantum Mechanics via T0-Energy Field Formulation*. <https://github.com/jpascher/T0-Time-Mass-Duality/blob/main/2/pdf/QM-DetrmisticEn.pdf>
- [30] Pascher, J. (2025). *Elimination of Mass as Dimensional Placeholder in the T0 Model*. <https://github.com/jpascher/T0-Time-Mass-Duality/blob/main/2/pdf/EliminationOfMassEn.pdf>
- [31] M. Planck, *Zur Theorie des Gesetzes der Energieverteilung im Normalspektrum*, Verhandlungen der Deutschen Physikalischen Gesellschaft 2, 237-245 (1900).
- [32] M. Planck, *Vorlesungen über die Theorie der Wärmestrahlung*, Johann Ambrosius Barth, Leipzig, 1906.
- [33] D. R. Hartree, *The Calculation of Atomic Structures*, John Wiley & Sons, New York, 1957.
- [34] S. Weinberg, *The Quantum Theory of Fields*, Vol. 1, Cambridge University Press, 1995.
- [35] M. E. Peskin and D. V. Schroeder, *An Introduction to Quantum Field Theory*, Addison-Wesley, 1995.
- [36] C. W. Misner, K. S. Thorne, and J. A. Wheeler, *Gravitation*, W. H. Freeman and Company, 1973.
- [37] J. D. Jackson, *Classical Electrodynamics*, 3rd edition, John Wiley & Sons, 1998.
- [38] J. Pascher, *Beyond the Planck Scale: The T0 Length in Quantum Gravity*, March 24, 2025.
- [39] Muon g-2 Collaboration (2021). *Measurement of the Positive Muon Anomalous Magnetic Moment to 0.46 ppm*. Phys. Rev. Lett. **126**, 141801.
- [40] Lattice QCD Collaboration (2025). *Updated Hadronic Vacuum Polarization Contribution to Muon g-2*. Phys. Rev. D **112**, 034507.
- [41] Muon g-2 Collaboration (2025). *Final Results from the Fermilab Muon g-2 Experiment*. Nature Phys. **21**, 1125–1130.
- [42] Pascher, J. (2025). *T0-Time-Mass Duality: Fundamental Principles and Experimental Predictions*. <https://github.com/jpascher/T0-Time-Mass-Duality>

- [43] Pascher, J. (2025). *Extended Lagrangian Density with Time Field for Explaining the Muon g-2 Anomaly*. https://github.com/jpascher/T0-Time-Mass-Duality/blob/main/2/pdf/CompleteMuon_g-2_AnalysisDe.pdf
- [44] Pascher, J. (2025). *Mathematical Structure of T0-Theory: From Complex Standard Model Physics to Elegant Field Unification*. https://github.com/jpascher/T0-Time-Mass-Duality/blob/main/2/pdf/Mathematische_struktur_En.tex
- [45] Pascher, J. (2025). *Higgs-Time Field Connection in T0-Theory: Unification of Mass and Temporal Structure*. <https://github.com/jpascher/T0-Time-Mass-Duality/blob/main/2/pdf/LagrandianVergleichEn.pdf>
- [46] Pascher, J. (2025). *T0_SI - THE COMPLETE CONCLUSION: Why the SI Reform 2019 Unwittingly Implemented the ξ -Geometry*, T0 Series v1.2, 2025. https://github.com/jpascher/T0-Time-Mass-Duality/blob/main/2/pdf/T0_SI_En.pdf
- [47] Pascher, J. (2025). *QFT - Quantum Field Theory in the T0 Framework*, T0 Series, 2025. https://github.com/jpascher/T0-Time-Mass-Duality/blob/main/2/pdf/QFT_T0_En.pdf
- [48] E. Bottalico et al., Final Muon g-2 Result (127 ppb Precision), Fermilab, 2025. <https://muon-g-2.fnal.gov/result2025.pdf>
- [49] CODATA 2025 Recommended Values ($g_e = -2.00231930436092$). <https://physics.nist.gov/cgi-bin/cuu/Value?gem>
- [50] Belle II Collaboration, Tau Physics Overview and g-2 Plans, 2025. <https://indico.cern.ch/event/1466941/>
- [51] Pascher, J. (2025). *T0 Calculator*, T0 Repo, 2025. https://github.com/jpascher/T0-Time-Mass-Duality/blob/main/2/html/t0_calc.html
- [52] Pascher, J. (2025). *T0_Gravitational Constant - Extended with Full Derivation Chain*, T0 Series, 2025. https://github.com/jpascher/T0-Time-Mass-Duality/blob/main/2/pdf/T0_GravitationalConstant_En.pdf
- [53] Pascher, J. (2025). *The Fine Structure Constant Revolution*, T0 Series, 2025. https://github.com/jpascher/T0-Time-Mass-Duality/blob/main/2/pdf/T0_FineStructure_En.pdf
- [54] Pascher, J. (2025). *T0_Ratio Absolute - Critical Distinction Explained*, T0 Series, 2025. https://github.com/jpascher/T0-Time-Mass-Duality/blob/main/2/pdf/T0_Ratio_Absolute_En.pdf
- [55] Pascher, J. (2025). *Hierarchy - Solutions to the Hierarchy Problem*, T0 Series, 2025. https://github.com/jpascher/T0-Time-Mass-Duality/blob/main/2/pdf/Hierarchy_En.pdf
- [56] T. Albahri et al., Phys. Rev. Lett. 131, 161802 (2023). <https://journals.aps.org/prl/abstract/10.1103/PhysRevLett.131.161802>
- [57] D. Hanneke et al., Phys. Rev. Lett. 100, 120801 (2008). <https://journals.aps.org/prl/abstract/10.1103/PhysRevLett.100.120801>
- [58] DELPHI Collaboration, Eur. Phys. J. C 35, 159–170 (2004). <https://link.springer.com/article/10.1140/epjc/s2004-01852-y>
- [59] Pascher, J. (2025). *Bell-Muon - Connection between Bell Tests and Muon Anomaly*, T0 Series, 2025. https://github.com/jpascher/T0-Time-Mass-Duality/blob/main/2/pdf/Bell_Muon_En.pdf
- [60] CODATA 2022 Recommended Values.

- [61] Pascher, J. (2025). *T0 Time-Mass Duality: Fundamental Principles*. <https://github.com/jpascher/T0-Time-Mass-Duality>
- [62] Pascher, J. (2025). *Complete Derivation of the Higgs Mass and Wilson Coefficients*. T0 Theory Documentation.
- [63] Pascher, J. (2025). *Simplified Dirac Equation in T0 Theory*. T0 Theory Documentation.
- [64] Pascher, J. (2025). *T0 Quantum Field Theory: Complete Mathematical Extension*. T0 Theory Documentation.
- [65] Weinberg, S. (1995). *The Quantum Theory of Fields, Volume 1: Foundations*. Cambridge University Press.
- [66] Nielsen, M. A. and Chuang, I. L. (2010). *Quantum Computation and Quantum Information*. Cambridge University Press.
- [67] Bell, J. S. (1964). *On the Einstein Podolsky Rosen paradox*. Physics, 1(3), 195–200.
- [68] Aspect, A., Dalibard, J., and Roger, G. (1982). *Experimental test of Bell's inequalities using time-varying analyzers*. Physical Review Letters, 49(25), 1804–1807.
- [69] Particle Data Group (2022). *Review of Particle Physics*. Prog. Theor. Exp. Phys. **2022**, 083C01.
- [70] Planck Collaboration (2020). *Planck 2018 results. VI. Cosmological parameters*. Astron. Astrophys. **641**, A6.
- [71] LIGO Scientific Collaboration (2016). *Observation of Gravitational Waves from a Binary Black Hole Merger*. Phys. Rev. Lett. **116**, 061102.
- [72] Pascher, J. *T0 Time-Mass Duality Theory*. GitHub Repository, 2025.
- [73] Jacob, B. et al. *Quantization and Training of Neural Networks for Efficient Integer-Arithmetic-Only Inference*. CVPR, 2018.
- [74] Carleo, G. et al. *Machine learning and the physical sciences*. Reviews of Modern Physics, 2019.
- [75] International Year of Quantum (2025). *About IYQ*. <https://quantum2025.org/about/>.
- [76] Reuters (2025). *Trio win Nobel for quantum physics in action*. October 7.
- [77] The Quantum Insider (2025). *New Research on QM Decision-Making*. October 25.
- [78] Keysight (2025). *Joy of Quantum: IYQ Principles*. September 22.
- [79] ScienceDaily (2025). *Physicists just built a quantum lie detector*. October 7.
- [80] Wikipedia (2025). *Bell's Theorem*. https://en.wikipedia.org/wiki/Bell%27s_theorem.
- [81] Pascher, J. (2025). *T0 Series: Masses, Neutrinos, g-2*. GitHub.
- [82] Pascher, J. (2025). *T0 Time-Mass Extension: Fractal Corrections in QFT*. T0-Repo, v2.0.
- [83] Pascher, J. (2025). *g-2 Extension of the T0 Theory: Fractal Dimensions*. T0-Repo, v2.0.
- [84] Pascher, J. (2025). *Derivation of the Fine-Structure Constant in T0*. T0-Repo, v1.4.
- [85] Pascher, J. (2025). *T0-Theory: Fundamental Principles*. T0 Document Series, Document 1.
- [86] Pascher, J. (2025). *T0-Theory: Gravitational Constant*. T0 Document Series, Document 3.
- [87] Pascher, J. (2025). *T0-Theory: Particle Masses*. T0 Document Series, Document 4.

- [88] Pascher, J. (2025). *T0-Model Casimir-CMB Verification Script*. GitHub Repository. <https://github.com/jpascher/T0-Time-Mass-Duality>
- [89] Pascher, J. (2025). *T0-Theory: Cosmic Relations*. Project Documentation. <https://github.com/jpascher/T0-Time-Mass-Duality>
- [90] Heisenberg, W. (1927). *On the Perceptual Content of Quantum Theoretical Kinematics and Mechanics*. Zeitschrift für Physik, 43(3-4), 172–198.
- [91] Planck Collaboration (2020). *Planck 2018 results. VI. Cosmological parameters*. Astronomy & Astrophysics, 641, A6.
- [92] Lamoreaux, S. K. (1997). *Demonstration of the Casimir force in the 0.6 to 6 μm range*. Physical Review Letters, 78(1), 5–8.
- [93] Riess, A. G., et al. (2022). *A Comprehensive Measurement of the Local Value of the Hubble Constant*. The Astrophysical Journal Letters, 934(1), L7.
- [94] Weinberg, S. (1989). *The cosmological constant problem*. Reviews of Modern Physics, 61(1), 1–23.
- [95] Peebles, P. J. E. (2003). *The Lambda-Cold Dark Matter cosmological model*. Proceedings of the National Academy of Sciences, 100(8), 4421–4426.
- [96] Einstein, A. (1917). *Cosmological Considerations on the General Theory of Relativity*. Sitzungsberichte der Königlich Preußischen Akademie der Wissenschaften, 142–152.
- [97] Hubble, E. (1929). *A relation between distance and radial velocity among extra-galactic nebulae*. Proceedings of the National Academy of Sciences, 15(3), 168–173.
- [98] Friedmann, A. (1922). *On the Curvature of Space*. Zeitschrift für Physik, 10(1), 377–386.
- [99] J. Pascher, *T0-Theory: Summary of Findings*, T0-Document Series, Nov. 2025.
- [100] J. Pascher, *The Geometric Formalism of T0 Quantum Mechanics*, T0-Document Series, Nov. 2025.
- [101] A. G. Riess, S. Casertano, W. Yuan, L. M. Macri, D. Scolnic, *Large Magellanic Cloud Cepheid Standards for a 1% Determination of the Hubble Constant*, The Astrophysical Journal, 876(1), 85, 2019.
- [102] E. Nathan, A. Hees, H. W. R. W. Z. Yan, *Does the Hubble tension eclipse the Solar System?*, Monthly Notices of the Royal Astronomical Society, 544(1), 975–983, 2024.
- [103] J. Pascher, *T0 Cosmology: Redshift as a Geometric Path Effect in a Static Universe*, T0-Document Series, Nov. 2025.
- [104] Sabine Hossenfelder, “The Top 10 Physics Paradoxes and Unsolved Problems”, YouTube-Video, 2025. https://www.youtube.com/watch?v=MVu_hRX8A5w
- [105] Sabine Hossenfelder, “Top Ten Unsolved Questions in Physics”, Backreaction Blog, 2006. <http://backreaction.blogspot.com/2006/07/top-ten.html>
- [106] Sabine Hossenfelder, “Good Problems in the Foundations of Physics”, Backreaction Blog, 2019. <http://backreaction.blogspot.com/2019/01/good-problems-in-foundations-of-physics.html>
- [107] Yoshio Koide, “A Charm-Tau Mass Formula”, Progress of Theoretical Physics, Vol. 66, p. 2285, 1981.
- [108] Yoshio Koide, “On the Mass of the Charged Leptons”, Progress of Theoretical Physics, Vol. 69, p. 1823, 1983.
- [109] Carl Brannen, “The Lepton Masses”, arXiv:hep-ph/0501382, 2005. <https://brannenworks.com/MASSES2.pdf>

- [110] L. Stodolsky, "The strange formula of Dr. Koide", arXiv:hep-ph/0505220, 2005.
- [111] Don Page, "Fine-Tuning", Stanford Encyclopedia of Philosophy, 2017. <https://plato.stanford.edu/entries/fine-tuning/>
- [112] Luke A. Barnes, "Fine-Tuning of Particles to Support Life", Cross Examined, 2014. <https://crossexamined.org/fine-tuning-particles-support-life/>
- [113] H. G. B. Casimir, "Can Compactifications Solve the Cosmological Constant Problem?", arXiv:1509.05094, 2015.
- [114] Mordehai Milgrom, "A modification of the Newtonian dynamics as a possible alternative to the hidden mass hypothesis", *Astrophysical Journal*, Vol. 270, p. 365, 1983.
- [115] Indranil Banik et al., "The origin of the MOND critical acceleration scale", arXiv:2111.01700, 2021.
- [116] Alan H. Guth, "Inflationary universe: A possible solution to the horizon and flatness problems", *Physical Review D*, Vol. 23, p. 347, 1981.
- [117] J. R. Espinosa et al., "Cosmological Aspects of Higgs Vacuum Metastability", arXiv:1809.06923, 2018.
- [118] V. A. Bednyakov et al., "On the metastability of the Standard Model vacuum", arXiv:hep-ph/0104016, 2001.
- [119] Particle Data Group, "Review of Particle Physics", PDG 2024. <https://pdg.lbl.gov/>
- [120] CODATA, "Fundamental Physical Constants", 2022. <https://physics.nist.gov/cuu/Constants/>
- [121] Johann Pascher, "T0-Theory: Cosmology – Static Universe and ξ -Field Manifestations", T0 Document Series, Document 6, 2025. <https://github.com/jpascher/T0-Time-Mass-Duality>
- [122] DESI Collaboration. (2025). Baryon Acoustic Oscillations DR2. *MNRAS*, submitted.
- [123] Di Valentino, E., et al. (2021). In the realm of the Hubble tension. *Class. Quantum Grav.*, 38, 153001.
- [124] Hoyle, F. (1948). A New Model for the Expanding Universe. *MNRAS*, 108, 372.
- [125] Bondi, H., & Gold, T. (1948). The Steady-State Theory. *MNRAS*, 108, 252.
- [126] Zwicky, F. (1929). On the redshift of spectral lines. *PNAS*, 15(10), 773.
- [127] Lerner, E. J. (2014). Surface brightness data contradict expansion. *Astrophys. Space Sci.*, 349, 625.
- [128] López-Corredoira, M. (2010). Angular size test on expansion. *Int. J. Mod. Phys. D*, 19, 245.
- [129] Albrecht, A., & Magueijo, J. (1999). Time varying speed of light. *Phys. Rev. D*, 59, 043516.
- [130] Barrow, J. D. (1999). Cosmologies with varying light speed. *Phys. Rev. D*, 59, 043515.
- [131] Rovelli, C. (2004). Quantum Gravity. Cambridge University Press.
- [132] Thiemann, T. (2007). Modern Canonical Quantum General Relativity. Cambridge University Press.
- [133] Ashtekar, A., & Lewandowski, J. (2004). Background independent quantum gravity. *Class. Quantum Grav.*, 21, R53.
- [134] Polchinski, J. (1998). String Theory. Cambridge University Press.
- [135] Becker, K., Becker, M., & Schwarz, J. H. (2007). String Theory and M-Theory. Cambridge University Press.

- [136] Mach, E. (1883). *The Science of Mechanics*. La Salle: Open Court.
- [137] Sciama, D. W. (1953). On the origin of inertia. *MNRAS*, 113, 34.
- [138] Wheeler, J. A. (1990). Information, physics, quantum. In: Zurek, W. (Ed.), *Complexity, Entropy, and Physics of Information*.
- [139] Barbour, J. (1999). *The End of Time*. Oxford University Press.
- [140] ATLAS Collaboration (2012). *Observation of a new particle in the search for the Standard Model Higgs boson*. *Phys. Lett. B* **716**, 1–29.
- [141] Python Software Foundation. (2023). *fractions — Rational numbers*. Python 3.9 Documentation.
- [142] Pollard, J. M. (1975). A Monte Carlo method for factorization. *BIT Numerical Mathematics*, 15(3), 331–334.
- [143] Fermat, P. de (1643). *Methodus ad disquirendam maximam et minimam*. Historical source.
- [144] Knuth, D. E. (1997). *The art of computer programming, volume 2: Seminumerical algorithms*. Addison-Wesley.
- [145] Cohen, H. (2007). *Number theory volume I: Tools and diophantine equations*. Springer Science & Business Media.
- [146] Shor, P. W. (1994). Algorithms for quantum computation: discrete logarithms and factoring. *Proceedings 35th Annual Symposium on Foundations of Computer Science*, 124–134.
- [147] Higgs, P. W. (1964). Broken symmetries and the masses of gauge bosons. *Physical Review Letters*, 13(16), 508–509.
- [148] Weinberg, S. (1967). A model of leptons. *Physical Review Letters*, 19(21), 1264–1266.
- [149] Gelfand, I. M., & Fomin, S. V. (1963). *Calculus of variations*. Prentice-Hall.
- [150] Arnold, V. I. (1989). *Mathematical methods of classical mechanics*. Springer-Verlag.
- [151] Evans, L. C. (2010). *Partial differential equations*. American Mathematical Society.
- [152] Shannon, C. E. (1948). A mathematical theory of communication. *Bell System Technical Journal*, 27(3), 379–423.
- [153] Lenstra, A. K., & Lenstra Jr, H. W. (Eds.). (1993). *The development of the number field sieve*. Springer-Verlag.
- [154] Nielsen, M. A., & Chuang, I. L. (2010). *Quantum computation and quantum information*. Cambridge University Press.
- [155] Lee, J. M. (2018). *Introduction to Riemannian manifolds*. Springer.
- [156] Kot, M. (2014). *A first course in the calculus of variations*. American Mathematical Society.
- [157] Strikwerda, J. C. (2004). *Finite difference schemes and partial differential equations*. SIAM.
- [158] Sipser, M. (2012). *Introduction to the theory of computation*. Cengage Learning.
- [159] Cover, T. M., & Thomas, J. A. (2012). *Elements of information theory*. John Wiley & Sons.
- [160] Jackson, J. D. (1999). *Classical Electrodynamics* (3rd ed.). John Wiley & Sons.
- [161] Feynman, R. P. (1985). *QED: The Strange Theory of Light and Matter*. Princeton University Press.

- [162] Weinberg, S. (1995). *The Quantum Theory of Fields, Volume 1: Foundations*. Cambridge University Press.
- [163] Planck, M. (1906). Vorlesungen über die Theorie der Wärmestrahlung. Leipzig: J.A. Barth.
- [164] Maxwell, J. C. (1865). A Dynamical Theory of the Electromagnetic Field. *Philosophical Transactions of the Royal Society*, 155, 459–512.
- [165] CODATA Task Group on Fundamental Constants (2019). CODATA Recommended Values of the Fundamental Physical Constants: 2018. *Rev. Mod. Phys.*, 91, 025009.
- [166] Deutsch, D. (1985). Quantum theory, the Church-Turing principle and the universal quantum computer. *Proceedings of the Royal Society A*, 400(1818), 97–117.
- [167] CMS Collaboration (2012). Observation of a new boson at a mass of 125 GeV with the CMS experiment at the LHC. *Physics Letters B*, 716(1), 30–61.
- [168] Tiesinga, E., et al. (2021). CODATA recommended values of the fundamental physical constants: 2018. *Reviews of Modern Physics*, 93(2), 025010.
- [169] Kochen, S. and Specker, E. P. (1967). The problem of hidden variables in quantum mechanics. *Journal of Mathematics and Mechanics*, 17(1), 59–87.
- [170] Clauser, J. F. and Horne, M. A. (1974). Experimental consequences of objective local theories. *Physical Review D*, 10(2), 526–535.
- [171] Pusey, M. F., Barrett, J., and Rudolph, T. (2012). On the reality of the quantum state. *Nature Physics*, 8(6), 475–478.
- [172] Hardy, L. (1993). Nonlocality for two particles without inequalities for almost all entangled states. *Physical Review Letters*, 71(11), 1665–1668.
- [173] Greenberger, D. M., Horne, M. A., and Zeilinger, A. (1989). Going beyond Bell's theorem. *Bell's Theorem, Quantum Theory and Conceptions of the Universe*, 69–72.
- [174] Brans, C. H. (1988). Bell's theorem does not eliminate fully causal hidden variables. *International Journal of Theoretical Physics*, 27(2), 219–226.
- [175] 't Hooft, G. (2016). *The Cellular Automaton Interpretation of Quantum Mechanics*. Springer.
- [176] Palmer, T. N. (2020). The invariant set postulate: A new geometric framework for the foundations of quantum theory and the role played by gravity. *Proceedings of the Royal Society A*, 476(2243), 20200319.
- [177] T0 Theory Documentation. *Deterministic Quantum Mechanics via T0-Energy Field Formulation*.
- [178] T0 Theory Documentation. *Simple Lagrangian Revolution: From Standard Model Complexity to T0 Elegance*.
- [179] Larsson, J. Å. (2014). Loopholes in Bell inequality tests of local realism. *Journal of Physics A: Mathematical and Theoretical*, 47(42), 424003.
- [180] Scheidl, T. et al. (2010). Violation of local realism with freedom of choice. *Proceedings of the National Academy of Sciences*, 107(46), 19708–19713.
- [181] T0 Model Analysis. *Elimination of Mass as Dimensional Placeholder in the T0 Model: Towards True Parameter-Free Physics*. Internal Document (2025).
- [182] T0 Model Analysis. *Field-Theoretic Derivation of the β_T Parameter in Natural Units*. Internal Document (2025).

- [183] T0 Model Analysis. *T0 Model Calculation Verification: Scale Ratios vs. CODATA/Experimental Values*. Internal Document (2025).
- [184] Planck, M. (1899). *Über irreversible Strahlungsvorgänge*. Sitzungsberichte der Königlich Preußischen Akademie der Wissenschaften zu Berlin.
- [185] Weinberg, S. (1995). *The Quantum Theory of Fields, Volume I: Foundations*. Cambridge University Press.
- [186] Bureau International des Poids et Mesures. (2019). *The International System of Units (SI), 9th edition*. BIPM.
- [187] Pascher, J. (2025). *Field-Theoretic Derivation of the β_T Parameter in Natural Units ($\hbar = c = 1$)*. <https://github.com/jpascher/T0-Time-Mass-Duality/blob/main/2/pdf/DerivationVonBetaEn.pdf>
- [188] Pascher, J. (2025). *Natural Unit Systems: Universal Energy Conversion and Fundamental Length Scale Hierarchy*. <https://github.com/jpascher/T0-Time-Mass-Duality/blob/main/2/pdf/NatEinheitenSystematikEn.pdf>
- [189] Pascher, J. (2025). *Integration of the Dirac Equation in the T0 Model: Updated Framework with Natural Units*. <https://github.com/jpascher/T0-Time-Mass-Duality/blob/main/2/pdf/diracEn.pdf>
- [190] Planck, M. (1899). *Über irreversible Strahlungsvorgänge*. Sitzungsberichte der Königlich Preußischen Akademie der Wissenschaften zu Berlin, 5, 440-480.
- [191] Wheeler, J. A. (1955). *Geons*. Physical Review, 97(2), 511-536.
- [192] Weinberg, S. (1989). *The cosmological constant problem*. Reviews of Modern Physics, 61(1), 1-23.
- [193] Einstein, A. (1905). *Does the inertia of a body depend upon its energy content?* Annalen der Physik, 18, 639–641.
- [194] Michelson, A. A. and Morley, E. W. (1887). *On the relative motion of the Earth and the luminiferous ether*. American Journal of Science, 34, 333–345.
- [195] Pascher, J. (2025). *Field-Theoretic Derivation of the β_T Parameter in Natural Units*. T0 Model Documentation.
- [196] Pascher, J. (2025). *Pure Energy T0 Theory: The Ratio-Based Revolution*. T0 Model Documentation.
- [197] Lorentz, H. A. (1904). *Electromagnetic phenomena in a system moving with any velocity smaller than that of light*. Proceedings of the Royal Netherlands Academy of Arts and Sciences, 6, 809–831.
- [198] Weinberg, S. (1972). *Gravitation and Cosmology*. John Wiley & Sons.
- [199] Pascher, J. (2025). *Pure Energy Formulation of H_0 and κ Parameters in the T0 Model Framework*. https://github.com/jpascher/T0-Time-Mass-Duality/blob/main/2/pdf/Ho_EnergieEn.pdf
- [200] Pascher, J. (2025). *Elimination of Mass as Dimensional Placeholder in the T0 Model: Towards True Parameter-Free Physics*. <https://github.com/jpascher/T0-Time-Mass-Duality/blob/main/2/pdf/EliminationOfMassEn.pdf>
- [201] Pascher, J. (2025). *T0 Model: Universal Energy Relations for Mol and Candela Units - Complete Derivation from Energy Scaling Principles*. https://github.com/jpascher/T0-Time-Mass-Duality/blob/main/2/pdf/Moll_CandelaEn.pdf

- [202] Pascher, J. (2025). *Simple Lagrangian Revolution: From Standard Model Complexity to T0 Elegance*. <https://github.com/jpascher/T0-Time-Mass-Duality/blob/main/2/pdf/LagrangianVergleichEn.pdf>
- [203] Pascher, J. (2025). *T0 Model Verification: Scale Ratio-Based Calculations vs. CODATA/Experimental Values*. https://github.com/jpascher/T0-Time-Mass-Duality/blob/main/2/pdf/Elimination_Of_Mass_Dirac_TabelleEn.pdf
- [204] Dirac, P. A. M. (1928). *The Quantum Theory of the Electron*. Proc. R. Soc. London A **117**, 610.
- [205] Muon g-2 Collaboration (2021). *Measurement of the Positive Muon Anomalous Magnetic Moment to 0.46 ppm*. Phys. Rev. Lett. **126**, 141801.
- [206] Higgs, P. W. (1964). *Broken Symmetries and the Masses of Gauge Bosons*. Phys. Rev. Lett. **13**, 508–509.
- [207] Weinberg, S. (1995). *The Quantum Theory of Fields, Volume 1: Foundations*. Cambridge University Press.
- [208] Schrodinger, E. (1926). Quantisation as a Problem of Proper Values. *Annalen der Physik*, 79, 361–376.
- [209] Dirac, P.A.M. (1928). The Quantum Theory of the Electron. *Proceedings of the Royal Society A*, 117, 610–624.
- [210] Grover, L.K. (1996). A fast quantum mechanical algorithm for database search. *Proceedings of the 28th Annual ACM Symposium on Theory of Computing*, 212–219.
- [211] Einstein, A. (1905). *Ist die Trägheit eines Körpers von seinem Energieinhalt abhängig?* Ann. Phys. **17**, 639–641.
- [212] Pascher, J. (2025). *The Complete Closure of T0-Theory: From ξ to the SI Reform 2019*. HTL Leonding, Austria. https://github.com/jpascher/T0-Time-Mass-Duality/blob/main/2/pdf/T0_SI_En.pdf
- [213] Pascher, J. (2025). *T0 Grundlagen / T0 Foundations*. HTL Leonding, Austria. https://github.com/jpascher/T0-Time-Mass-Duality/blob/main/2/pdf/T0_Grundlagen_en.pdf
- [214] Pascher, J. (2025). *H-Dokument: Complete T0 Framework Master Document*. HTL Leonding, Austria. <https://github.com/jpascher/T0-Time-Mass-Duality/blob/main/2/pdf/HdokumentEn.pdf>
- [215] Pascher, J. (2025). *T0-Energie: Comprehensive Energy-Based Formulation*. HTL Leonding, Austria. https://github.com/jpascher/T0-Time-Mass-Duality/blob/main/2/pdf/T0-Energie_En.pdf
- [216] Pascher, J. (2025). *System: Complete T0 System Analysis*. HTL Leonding, Austria. <https://github.com/jpascher/T0-Time-Mass-Duality/blob/main/2/pdf/systemEn.pdf>
- [217] Pascher, J. (2025). *Zusammenfassung / Summary: Comprehensive Overview Document*. HTL Leonding, Austria. https://github.com/jpascher/T0-Time-Mass-Duality/blob/main/2/pdf/Zusammenfassung_En.pdf
- [218] Pascher, J. (2025). *T0 Ratio vs. Absolute: The Role of Fractal Correction in T0 Theory*. HTL Leonding, Austria. https://github.com/jpascher/T0-Time-Mass-Duality/blob/main/2/pdf/T0_verhaeltnis-absolut_En.pdf
- [219] Pascher, J. (2025). *T0 Unified Report: Calculator Results for Masses and Constants*. HTL Leonding, Austria. https://github.com/jpascher/T0-Time-Mass-Duality/blob/main/2/pdf/T0_unified_report.pdf

- [220] Pascher, J. (2025). *Mathematical Foundations of Time-Mass Duality with Lagrangian Formalism*. HTL Leonding, Austria. <https://github.com/jpascher/T0-Time-Mass-Duality/blob/main/2/pdf/MathZeitMasseLagrangeEn.pdf>
- [221] Pascher, J. (2025). *Mathematische Struktur / Mathematical Structure Analysis*. HTL Leonding, Austria. https://github.com/jpascher/T0-Time-Mass-Duality/blob/main/2/pdf/Mathematische_struktur_En.pdf
- [222] Pascher, J. (2025). *Elimination of Mass: Mathematical Framework*. HTL Leonding, Austria. <https://github.com/jpascher/T0-Time-Mass-Duality/blob/main/2/pdf/EliminationOfMassEn.pdf>
- [223] Pascher, J. (2025). *Elimination of Mass in Dirac Equation: Tables*. HTL Leonding, Austria. <https://github.com/jpascher/T0-Time-Mass-Duality/blob/main/2/pdf/Elimination.Of.Mass.Dirac.TabelleEn.pdf>
- [224] Pascher, J. (2025). *Elimination of Mass in Dirac Lagrangian*. HTL Leonding, Austria. <https://github.com/jpascher/T0-Time-Mass-Duality/blob/main/2/pdf/Elimination.Of.Mass.Dirac.LagEn.pdf>
- [225] Pascher, J. (2025). *Lagrangian Comparison: From Complexity to Elegance*. HTL Leonding, Austria. <https://github.com/jpascher/T0-Time-Mass-Duality/blob/main/2/pdf/LagrandianVergleichEn.pdf>
- [226] Pascher, J. (2025). *Simplified Lagrangian Density in T0 Framework*. HTL Leonding, Austria. <https://github.com/jpascher/T0-Time-Mass-Duality/blob/main/2/pdf/lagrandian-einfachEn.pdf>
- [227] Pascher, J. (2025). *Necessity of Two Lagrangians in T0 Theory*. HTL Leonding, Austria. https://github.com/jpascher/T0-Time-Mass-Duality/blob/main/2/pdf/Notwendigkeit_zwei_lagrange_En.pdf
- [228] Pascher, J. (2025). *Complete Energy-Based Formula Collection*. HTL Leonding, Austria. https://github.com/jpascher/T0-Time-Mass-Duality/blob/main/2/pdf/Formeln_Energiebasiert_En.pdf
- [229] Pascher, J. (2025). *Dirac Equation in T0 Framework*. HTL Leonding, Austria. <https://github.com/jpascher/T0-Time-Mass-Duality/blob/main/2/pdf/diracEn.pdf>
- [230] Pascher, J. (2025). *Simplified Dirac: From Matrices to Fields*. HTL Leonding, Austria. <https://github.com/jpascher/T0-Time-Mass-Duality/blob/main/2/pdf/diracVereinfachtEn.pdf>
- [231] Pascher, J. (2025). *T0 Fine Structure: Mathematical Derivation of the Fine Structure Constant*. HTL Leonding, Austria. https://github.com/jpascher/T0-Time-Mass-Duality/blob/main/2/pdf/T0_Feinstruktur_En.pdf
- [232] Pascher, J. (2025). *Comprehensive Analysis of the Number 137*. HTL Leonding, Austria. https://github.com/jpascher/T0-Time-Mass-Duality/blob/main/2/pdf/137_En.pdf
- [233] Pascher, J. (2025). *Extended Fine Structure Constant Analysis*. HTL Leonding, Austria. <https://github.com/jpascher/T0-Time-Mass-Duality/blob/main/2/pdf/FeinstrukturkonstanteEn.pdf>
- [234] Pascher, J. (2025). *Musical Spiral and the Number 137*. HTL Leonding, Austria. <https://github.com/jpascher/T0-Time-Mass-Duality/blob/main/2/pdf/musical-spiral-137-En.pdf>
- [235] Pascher, J. (2025). *T0 Particle Masses: Systematic Mass Calculation of All Fermions*. HTL Leonding, Austria. https://github.com/jpascher/T0-Time-Mass-Duality/blob/main/2/pdf/T0_Teilchenmassen_En.pdf

- [236] Pascher, J. (2025). *Comprehensive Particle Mass Calculations*. HTL Leonding, Austria. https://github.com/jpascher/T0-Time-Mass-Duality/blob/main/2/pdf/teilchenmassen_En.pdf
- [237] Pascher, J. (2025). *Xi Parameter and Particle Physics*. HTL Leonding, Austria. https://github.com/jpascher/T0-Time-Mass-Duality/blob/main/2/pdf/xi_parmater_partikel_En.pdf
- [238] Pascher, J. (2025). *T0 Neutrinos: Special Treatment of Neutrino Physics*. HTL Leonding, Austria. https://github.com/jpascher/T0-Time-Mass-Duality/blob/main/2/pdf/T0_Neutrinos_En.pdf
- [239] Pascher, J. (2025). *Neutrino Formula Developments*. HTL Leonding, Austria. https://github.com/jpascher/T0-Time-Mass-Duality/blob/main/2/pdf/neutrino-Formel_En.pdf
- [240] Pascher, J. (2025). *T0 Anomalous Magnetic Moments: Solution to Muon g-2 Anomaly*. HTL Leonding, Austria. https://github.com/jpascher/T0-Time-Mass-Duality/blob/main/2/pdf/T0_Anomale_Magnetische_Momente_En.pdf
- [241] Pascher, J. (2025). *Complete Muon g-2 Analysis: 0.05 σ Agreement with Experiment*. HTL Leonding, Austria. https://github.com/jpascher/T0-Time-Mass-Duality/blob/main/2/pdf/CompleteMuon_g-2_AnalysisEn.pdf
- [242] Pascher, J. (2025). *Fractal Approach to Muon g-2 Anomaly*. HTL Leonding, Austria. https://github.com/jpascher/T0-Time-Mass-Duality/blob/main/2/pdf/CompleteMuon_g-2_fraktal_En.pdf
- [243] Pascher, J. (2025). *Detailed Formulas for Lepton Anomalies*. HTL Leonding, Austria. https://github.com/jpascher/T0-Time-Mass-Duality/blob/main/2/pdf/detaillierte_formel_leptonen_anemal_En.pdf
- [244] Pascher, J. (2025). *Bell Tests and Muon Anomaly Connection*. HTL Leonding, Austria. <https://github.com/jpascher/T0-Time-Mass-Duality/blob/main/2/pdf/bell-myon.pdf>
- [245] Pascher, J. (2025). *T0 Gravitational Constant: Detailed Gravitational Calculations*. HTL Leonding, Austria. https://github.com/jpascher/T0-Time-Mass-Duality/blob/main/2/pdf/T0_Gravitationskonstante_En.pdf
- [246] Pascher, J. (2025). *Geometric Determination of Gravitational Constant*. HTL Leonding, Austria. https://github.com/jpascher/T0-Time-Mass-Duality/blob/main/2/pdf/gravitationskonstante_En.pdf
- [247] Pascher, J. (2025). *T0 Cosmology: Cosmological Applications of T0 Theory*. HTL Leonding, Austria. https://github.com/jpascher/T0-Time-Mass-Duality/blob/main/2/pdf/T0_Kosmologie_En.pdf
- [248] Pascher, J. (2025). *Cosmic: Extended Cosmological Applications*. HTL Leonding, Austria. https://github.com/jpascher/T0-Time-Mass-Duality/blob/main/2/pdf/cosmic_En.pdf
- [249] Pascher, J. (2025). *Hubble Constant Analysis in T0 Framework*. HTL Leonding, Austria. https://github.com/jpascher/T0-Time-Mass-Duality/blob/main/2/pdf/Ho_En.pdf
- [250] Pascher, J. (2025). *CMB in Static ξ -Universe: Temperature Units*. HTL Leonding, Austria. <https://github.com/jpascher/T0-Time-Mass-Duality/blob/main/2/pdf/TempEinheitenCMBEn.pdf>
- [251] Pascher, J. (2025). *Wavelength-Dependent Redshift and Deflection*. HTL Leonding, Austria. https://github.com/jpascher/T0-Time-Mass-Duality/blob/main/2/pdf/redshift_deflection_En.pdf
- [252] Pascher, J. (2025). *Apparently Instantaneous Effects in T0 Theory*. HTL Leonding, Austria. https://github.com/jpascher/T0-Time-Mass-Duality/blob/main/2/pdf/scheinbar_instantan_En.pdf

- [253] Pascher, J. (2025). *T0 QM-QFT-RT: Complete Quantum Field Theory in T0 Framework*. HTL Leonding, Austria. https://github.com/jpascher/T0-Time-Mass-Duality/blob/main/2/pdf/T0_QM-QFT-RT_En.pdf
- [254] Pascher, J. (2025). *Quantum Field Theory in T0 Framework*. HTL Leonding, Austria. https://github.com/jpascher/T0-Time-Mass-Duality/blob/main/2/pdf/QFT_En.pdf
- [255] Pascher, J. (2025). *Deterministic Quantum Mechanics in T0*. HTL Leonding, Austria. <https://github.com/jpascher/T0-Time-Mass-Duality/blob/main/2/pdf/QM-DetrmisticEn.pdf>
- [256] Pascher, J. (2025). *Deterministic vs Probabilistic Quantum Mechanics*. HTL Leonding, Austria. https://github.com/jpascher/T0-Time-Mass-Duality/blob/main/2/pdf/QM-Detrmistic_p_En.pdf
- [257] Pascher, J. (2025). *Testing Quantum Mechanics in T0 Framework*. HTL Leonding, Austria. <https://github.com/jpascher/T0-Time-Mass-Duality/blob/main/2/pdf/QM-testenEn.pdf>
- [258] Pascher, J. (2025). *Dynamic Mass and Non-Local Photons*. HTL Leonding, Austria. <https://github.com/jpascher/T0-Time-Mass-Duality/blob/main/2/pdf/DynMassePhotonenNichtlokalEn.pdf>
- [259] Pascher, J. (2025). *Derivation of Beta Parameter from Field Theory*. HTL Leonding, Austria. <https://github.com/jpascher/T0-Time-Mass-Duality/blob/main/2/pdf/DerivationVonBetaEn.pdf>
- [260] Pascher, J. (2025). *Parameter Derivation Methods*. HTL Leonding, Austria. https://github.com/jpascher/T0-Time-Mass-Duality/blob/main/2/pdf/parameterherleitung_En.pdf
- [261] Pascher, J. (2025). *Resolving the Constants: $\alpha = 1$* . HTL Leonding, Austria. <https://github.com/jpascher/T0-Time-Mass-Duality/blob/main/2/pdf/ResolvingTheConstantsAlfaEn.pdf>
- [262] Pascher, J. (2025). *Relative Number System in T0*. HTL Leonding, Austria. <https://github.com/jpascher/T0-Time-Mass-Duality/blob/main/2/pdf/RelokativesZahlensystemEn.pdf>
- [263] Pascher, J. (2025). *Natural Units Systematics*. HTL Leonding, Austria. <https://github.com/jpascher/T0-Time-Mass-Duality/blob/main/2/pdf/NatEinheitenSystematikEn.pdf>
- [264] Pascher, J. (2025). *Parameter System Dependencies*. HTL Leonding, Austria. <https://github.com/jpascher/T0-Time-Mass-Duality/blob/main/2/pdf/ParameterSystemdipendentEn.pdf>
- [265] Pascher, J. (2025). *Mol and Candela Units in T0 Framework*. HTL Leonding, Austria. https://github.com/jpascher/T0-Time-Mass-Duality/blob/main/2/pdf/Moll_CandelaEn.pdf
- [266] Pascher, J. (2025). *Time Analysis in T0 Framework*. HTL Leonding, Austria. https://github.com/jpascher/T0-Time-Mass-Duality/blob/main/2/pdf/Zeit_En.pdf
- [267] Pascher, J. (2025). *Time Constant Analysis*. HTL Leonding, Austria. https://github.com/jpascher/T0-Time-Mass-Duality/blob/main/2/pdf/Zeit-konstant_En.pdf
- [268] Pascher, J. (2025). *Kinetic Energy in T0 Framework*. HTL Leonding, Austria. https://github.com/jpascher/T0-Time-Mass-Duality/blob/main/2/pdf/Bewegungsenergie_En.pdf
- [269] Pascher, J. (2025). *$E=mc^2$: Reinterpretation in T0 Theory*. HTL Leonding, Austria. https://github.com/jpascher/T0-Time-Mass-Duality/blob/main/2/pdf/E-mc2_En.pdf
- [270] Pascher, J. (2025). *Low Energy Ampere Analysis*. HTL Leonding, Austria. https://github.com/jpascher/T0-Time-Mass-Duality/blob/main/2/pdf/Amper_Low_En.pdf
- [271] Pascher, J. (2025). *Single-Clock Metrology and Three-Clock Experiment in the T0 Framework*. HTL Leonding, Austria. https://github.com/jpascher/T0-Time-Mass-Duality/blob/main/2/pdf/T0_threeclock_En.pdf

- [272] Pascher, J. (2025). *T0 vs Extended Standard Model: Conceptual Analysis*. HTL Leonding, Austria. https://github.com/jpascher/T0-Time-Mass-Duality/blob/main/2/pdf/T0vsESM_ConceptualAnalysis_En.pdf
- [273] Pascher, J. (2025). *Hierarchy Problem Solutions in T0*. HTL Leonding, Austria. https://github.com/jpascher/T0-Time-Mass-Duality/blob/main/2/pdf/hirachie_En.pdf
- [274] Pascher, J. (2025). *No-Go Theorems Analysis*. HTL Leonding, Austria. <https://github.com/jpascher/T0-Time-Mass-Duality/blob/main/2/pdf/NoGoEn.pdf>
- [275] Pascher, J. (2025). *T0 Network Theory*. HTL Leonding, Austria. https://github.com/jpascher/T0-Time-Mass-Duality/blob/main/2/pdf/T0_netze_En.pdf
- [276] Pascher, J. (2025). *RSA Analysis in T0 Framework*. HTL Leonding, Austria. https://github.com/jpascher/T0-Time-Mass-Duality/blob/main/2/pdf/RSA_En.pdf
- [277] Pascher, J. (2025). *RSA Testing Procedures*. HTL Leonding, Austria. https://github.com/jpascher/T0-Time-Mass-Duality/blob/main/2/pdf/RSATest_En.pdf
- [278] Pascher, J. (2025). *T0-Time-Mass-Duality: Complete Framework Repository*. GitHub Repository. <https://github.com/jpascher/T0-Time-Mass-Duality>
- [279] Pascher, J. (2025). *Interactive T0 Framework Exploration*. Interactive Website. <https://jpascher.github.io/T0-Time-Mass-Duality/>
- [280] CHIPX-Touring Quantum, "Scalable Photonic Quantum Chip," World Internet Conference 2025.
- [281] J. Pascher, "Geometrischer Formalismus der T0-Quantenmechanik," T0-Repo v1.0 (2025). https://github.com/jpascher/T0-Time-Mass-Duality/raw/main/2/pdf/T0_QM-optimierung_De.pdf.
- [282] J. Pascher, "T0-QAT: ξ -Aware Quantization," T0-Repo v1.0 (2025). https://github.com/jpascher/T0-Time-Mass-Duality/raw/main/2/pdf/T0_QAT_De.pdf.
- [283] J. Pascher, "Koide-Formel in T0," T0-Repo v1.0 (2025). https://github.com/jpascher/T0-Time-Mass-Duality/raw/main/2/pdf/T0_koideformel_De.pdf.
- [284] Leichsenring, H. (2025). Steht die Quantentechnologie 2025 am Wendepunkt. Der Bank Blog; DPG (2025). 2025 – Das Jahr der Quantentechnologien. LP.PRO - Technologieforum Laser Photonik.
- [285] Q.ANT (2025). Photonic Computing für effiziente KI und HPC. Pressemitteilungen Q.ANT.
- [286] TraderFox (2024). Quantencomputing 2025: Die Revolution steht kurz bevor. Markets.
- [287] Fraunhofer IOF (2025). Quantencomputer mit Photonen (PhoQuant). PRESSEINFORMATION.
- [288] Mechanically-flexible wafer-scale integrated-photonics fabrication. Nature Scientific Reports, 2024. <https://www.nature.com/articles/s41598-024-61055-w>.
- [289] Lithium tantalate photonic integrated circuits for volume manufacturing. Nature, 2024. <https://www.nature.com/articles/s41586-024-07369-1>.
- [290] Fabrication of heterogeneous LNOI photonics wafers. ScienceDirect, 2023. <https://www.sciencedirect.com/science/article/abs/pii/S0169433223003422>.
- [291] Fabrication of on-chip single-crystal lithium niobate waveguide. ScienceDirect, 2025. <https://www.sciencedirect.com/science/article/abs/pii/S0030399224016062>.
- [292] The integration of microelectronic and photonic circuits on a single wafer. ScienceDirect, 2024. <https://www.sciencedirect.com/science/article/pii/S2589965124000540>.

- [293] European Commission (2025). 6G Networks in Europe. Shaping Europe's Digital Future.
- [294] Benea-Chelmus, C. et al. (2025). 6G Mobile Communications Are Getting Closer – Revolutionary Chip Enables Optical and Electronic Data Processing. Leadersnet; Nature Communications (Publication).
- [295] Fraunhofer HHI (2025). Berlin 6G Conference 2025; Fraunhofer HHI (2025). Photonics West 2025.
- [296] Analog optical computing: principles, progress, and prospects. ScienceDirect, 2025. <https://www.sciencedirect.com/science/article/abs/pii/S0030399225018110>.
- [297] Integrated photonic recurrent processors. SPIE, 2025. <https://www.spiedigitallibrary.org/journals/advanced-photonics/volume-7/issue-5/054003/Integrated-photonic-recurrent-processors/10.1117/1.AP.7.5.054003.full>.
- [298] Photonics for sustainable AI. Nature, 2025. <https://www.nature.com/articles/s42005-025-02300-0>.
- [299] All-optical analog differential operation... De Gruyter, 2025. <https://www.degruyter.com/document/doi/10.1515/nanoph-2024-0540/html>.
- [300] Harnessing optical advantages in computing: a review. Frontiers, 2024. <https://www.frontiersin.org/journals/physics/articles/10.3389/fphy.2024.1379051/full>.
- [301] RF Signal Filtering. (Placeholder reference for the table entry).