

Publication List

Peter B. Denton

Updated: February 18, 2025^{*†}

Articles (71)

- [1] P. B. Denton, “Neutrino Oscillations in the Three Flavor Paradigm,” [arXiv:2501.08374](#) [[hep-ph](#)].
- [2] P. B. Denton and Y. Kini, “Individual Neutrino Masses From a Supernova,” [arXiv:2411.13634](#) [[hep-ph](#)].
- [3] H. Davoudiasl and P. B. Denton, “How fast can protons decay?,” *PRD (in press)* (10, 2024) , [arXiv:2410.19045](#) [[hep-ph](#)].
- [4] P. B. Denton, A. Giarnetti, and D. Meloni, “Solar neutrinos and the strongest oscillation constraints on scalar NSI,” *JHEP* **01** (2025) 097, [arXiv:2409.15411](#) [[hep-ph](#)].
- [5] P. B. Denton and J. Gehrlein, “A modern look at the oscillation physics case for a neutrino factory,” *Nucl. Phys. B* **1012** (2025) 116818, [arXiv:2407.02572](#) [[hep-ph](#)].
- [6] J. F. Acevedo, J. Berger, and P. B. Denton, “Dark matter raining on DUNE and other large volume detectors,” *JHEP* **11** (2024) 011, [arXiv:2407.01670](#) [[hep-ph](#)].
- [7] P. B. Denton and S. J. Parke, “Fast and accurate algorithm for calculating long-baseline neutrino oscillation probabilities with matter effects,” *Phys. Rev. D* **110** no. 7, (2024) 073005, [arXiv:2405.02400](#) [[hep-ph](#)].
- [8] P. B. Denton and S. J. Parke, “Smallness of matter effects in long-baseline muon neutrino disappearance,” *Phys. Rev. D* **109** no. 5, (2024) 053002, [arXiv:2401.10326](#) [[hep-ph](#)].
- [9] P. B. Denton, “Probing CP Violation with Neutrino Disappearance Alone,” *Phys. Rev. Lett.* **133** no. 3, (2024) 031801, [arXiv:2309.03262](#) [[hep-ph](#)].

^{*}For the latest version see: peterdenton.github.io

[†]Most author lists are in alphabetical order as that is the standard in particle physics.

- [10] P. B. Denton and J. Gehrlein, “Survey of neutrino flavor predictions and the neutrinoless double beta decay funnel,” *Phys. Rev. D* **109** no. 5, (2024) 055028, [arXiv:2308.09737 \[hep-ph\]](#).
- [11] P. B. Denton and J. Gehrlein, “Neutrino constraints and the ATOMKI X17 anomaly,” *Phys. Rev. D* **108** no. 1, (2023) 015009, [arXiv:2304.09877 \[hep-ph\]](#).
- [12] P. B. Denton and J. Gehrlein, “Here Comes the Sun: Solar Parameters in Long-Baseline Accelerator Neutrino Oscillations,” *JHEP* **06** (2023) 090, [arXiv:2302.08513 \[hep-ph\]](#).
- [13] P. B. Denton, “Techniques for solving static Klein-Gordon equation with self-interaction $\lambda\phi^4$ and arbitrary spherical source terms,” *Phys. Lett. B* **855** (2024) 138860, [arXiv:2301.11106 \[physics.comp-ph\]](#).
- [14] H. Davoudiasl and P. B. Denton, “Sterile neutrino shape shifting caused by dark matter,” *Phys. Rev. D* **108** no. 3, (2023) 035013, [arXiv:2301.09651 \[hep-ph\]](#).
- [15] P. B. Denton, M. Friend, M. D. Messier, H. A. Tanaka, S. Böser, J. a. A. B. Coelho, M. Perrin-Terrin, and T. Stuttard, “Snowmass Neutrino Frontier: NF01 Topical Group Report on Three-Flavor Neutrino Oscillations,” [arXiv:2212.00809 \[hep-ph\]](#).
- [16] P. Huber *et al.*, “Snowmass Neutrino Frontier Report,” 11, 2022. [arXiv:2211.08641 \[hep-ex\]](#).
- [17] P. B. Denton, A. Giarnetti, and D. Meloni, “How to identify different new neutrino oscillation physics scenarios at DUNE,” *JHEP* **02** (2023) 210, [arXiv:2210.00109 \[hep-ph\]](#).
- [18] A. de Gouvêa *et al.*, “Theory of Neutrino Physics – Snowmass TF11 (aka NF08) Topical Group Report,” [arXiv:2209.07983 \[hep-ph\]](#).
- [19] A. Coleman *et al.*, “Ultra high energy cosmic rays The intersection of the Cosmic and Energy Frontiers,” *Astropart. Phys.* **149** (2023) 102819, [arXiv:2205.05845 \[astro-ph.HE\]](#).
- [20] P. B. Denton and J. Gehrlein, “New reactor data improves robustness of neutrino mass ordering determination,” *Phys. Rev. D* **106** (2022) 015022, [arXiv:2204.09060 \[hep-ph\]](#).
- [21] C. A. Argüelles *et al.*, “Snowmass white paper: beyond the standard model effects on neutrino flavor: Submitted to the proceedings of the US community study on the future of particle physics (Snowmass 2021),” *Eur. Phys. J. C* **83** no. 1, (2023) 15, [arXiv:2203.10811 \[hep-ph\]](#).
- [22] M. Ackermann *et al.*, “High-energy and ultra-high-energy neutrinos: A Snowmass white paper,” *JHEAp* **36** (2022) 55–110, [arXiv:2203.08096 \[hep-ph\]](#).

- [23] M. Abdullah *et al.*, “Coherent elastic neutrino-nucleus scattering: Terrestrial and astrophysical applications,” in *2022 Snowmass Summer Study*. 3, 2022.
[arXiv:2203.07361](#) [[hep-ph](#)].
- [24] M. A. Acero *et al.*, “White paper on light sterile neutrino searches and related phenomenology,” *J. Phys. G* **51** no. 12, (2024) 120501,
[arXiv:2203.07323](#) [[hep-ex](#)].
- [25] E. Abdalla *et al.*, “Cosmology intertwined: A review of the particle physics, astrophysics, and cosmology associated with the cosmological tensions and anomalies,” *JHEAp* **34** (2022) 49–211, [arXiv:2203.06142](#) [[astro-ph.CO](#)].
- [26] P. B. Denton* *et al.*, “Tau neutrinos in the next decade: from GeV to EeV,” *J. Phys. G* **49** no. 11, (2022) 110501, [arXiv:2203.05591](#) [[hep-ph](#)]. *Co-Editor.
- [27] J. L. Feng *et al.*, “The Forward Physics Facility at the High-Luminosity LHC,” *J. Phys. G* **50** no. 3, (2023) 030501, [arXiv:2203.05090](#) [[hep-ex](#)].
- [28] J. M. Berryman *et al.*, “Neutrino self-interactions: A white paper,” *Phys. Dark Univ.* **42** (2023) 101267, [arXiv:2203.01955](#) [[hep-ph](#)].
- [29] D. Caratelli *et al.*, “Low-Energy Physics in Neutrino LArTPCs,” 3, 2022.
[arXiv:2203.00740](#) [[physics.ins-det](#)].
- [30] P. B. Denton, “Sterile Neutrino Search with MicroBooNE’s Electron Neutrino Disappearance Data,” *Phys. Rev. Lett.* **129** no. 6, (2022) 061801,
[arXiv:2111.05793](#) [[hep-ph](#)].
- [31] P. B. Denton and R. Pestes, “Neutrino oscillations through the Earth’s core,” *Phys. Rev. D* **104** no. 11, (2021) 113007, [arXiv:2110.01148](#) [[hep-ph](#)].
- [32] P. B. Denton, “Tau neutrino identification in atmospheric neutrino oscillations without particle identification or unitarity,” *Phys. Rev. D* **104** no. 11, (2021) 113003,
[arXiv:2109.14576](#) [[hep-ph](#)].
- [33] P. B. Denton and J. Gehrlein, “New oscillation and scattering constraints on the tau row matrix elements without assuming unitarity,” *JHEP* **06** (2022) 135,
[arXiv:2109.14575](#) [[hep-ph](#)].
- [34] L. A. Anchordoqui *et al.*, “The Forward Physics Facility: Sites, experiments, and physics potential,” *Phys. Rept.* **968** (2022) 1–50, [arXiv:2109.10905](#) [[hep-ph](#)].
- [35] H. Davoudiasl, P. B. Denton, and J. Gehrlein, “Connecting the Extremes: A Story of Supermassive Black Holes and Ultralight Dark Matter,” *Phys. Rev. Lett.* **128** no. 8, (2022) 081101, [arXiv:2109.01678](#) [[astro-ph.CO](#)].
- [36] P. B. Denton and S. J. Parke, “Parameter symmetries of neutrino oscillations in vacuum, matter, and approximation schemes,” *Phys. Rev. D* **105** no. 1, (2022) 013002, [arXiv:2106.12436](#) [[hep-ph](#)].

- [37] H. Davoudiasl, P. B. Denton, and D. A. McGady, “Ultralight Fermionic Dark Matter,” *Phys. Rev. D* **103** (2021) 055014, [arXiv:2008.06505 \[hep-ph\]](#).
- [38] P. B. Denton and J. Gehrlein, “A Statistical Analysis of the COHERENT Data and Applications to New Physics,” *JHEP* **04** (2021) 266, [arXiv:2008.06062 \[hep-ph\]](#).
- [39] P. B. Denton, J. Gehrlein, and R. Pestes, “CP-Violating Neutrino Non-Standard Interactions in Long-Baseline-Accelerator Data,” *Phys. Rev. Lett.* **126** (2021) 051801, [arXiv:2008.01110 \[hep-ph\]](#).
- [40] P. B. Denton and Y. Kini, “Ultra-High-Energy Tau Neutrino Cross Sections with GRAND and POEMMA,” *Phys. Rev. D* **102** (2020) 123019, [arXiv:2007.10334 \[astro-ph.HE\]](#).
- [41] H. Davoudiasl, P. B. Denton, and J. Gehrlein, “An Attractive Scenario for Light Dark Matter Direct Detection,” *Phys. Rev. D* **102** (7, 2020) 091701, [arXiv:2007.04989 \[hep-ph\]](#).
- [42] P. B. Denton and R. Pestes, “The Impact of Different Parameterizations on the Interpretation of CP Violation in Neutrino Oscillations,” *JHEP* **05** (2021) 139, [arXiv:2006.09384 \[hep-ph\]](#).
- [43] A. Abdullahi and P. B. Denton, “Visible Decay of Astrophysical Neutrinos at IceCube,” *Phys. Rev. D* **102** no. 2, (2020) 023018, [arXiv:2005.07200 \[hep-ph\]](#).
- [44] P. B. Denton, “A Return To Neutrino Normalcy,” [arXiv:2003.04319 \[hep-ph\]](#).
- [45] P. B. Denton, S. J. Parke, and X. Zhang, “Fibonacci Fast Convergence for Neutrino Oscillations in Matter,” *Phys. Lett. B* **807** (2020) 135592, [arXiv:1909.02009 \[hep-ph\]](#).
- [46] P. B. Denton, S. J. Parke, T. Tao, and X. Zhang, “Eigenvectors from Eigenvalues: a survey of a basic identity in linear algebra,” *Bull. Am. Math. Soc.* (8, 2019) , [arXiv:1908.03795 \[math.RA\]](#).
- [47] C. A. Argüelles *et al.*, “New opportunities at the next-generation neutrino experiments I: BSM neutrino physics and dark matter,” *Rept. Prog. Phys.* **83** no. 12, (2020) 124201, [arXiv:1907.08311 \[hep-ph\]](#).
- [48] P. B. Denton, S. J. Parke, and X. Zhang, “Eigenvalues: the Rosetta Stone for Neutrino Oscillations in Matter,” *Phys. Rev. D* **101** (2020) 093001, [arXiv:1907.02534 \[hep-ph\]](#).
- [49] P. Bhupal Dev*, K. Babu*, P. B. Denton*, P. A. Machado*, *et al.*, “Neutrino Non-Standard Interactions: A Status Report,” *SciPost Phys. Proc.* **2** (2019) 001, [arXiv:1907.00991 \[hep-ph\]](#). *Co-Editors.
- [50] H. Davoudiasl and P. B. Denton, “Ultra Light Boson Dark Matter and Event Horizon Telescope Observations of M87*,” *Phys. Rev. Lett.* **123** (2019) 021102, [arXiv:1904.09242 \[astro-ph.CO\]](#).

- [51] G. A. Barenboim, P. B. Denton, and I. M. Oldengott, “Inflation meets neutrinos,” *Phys. Rev.* **D99** (2019) 083515, [arXiv:1903.02036 \[astro-ph.CO\]](#).
- [52] P. B. Denton and S. J. Parke, “Simple and Precise Factorization of the Jarlskog Invariant for Neutrino Oscillations in Matter,” *Phys. Rev.* **D100** (2019) 053004, [arXiv:1902.07185 \[hep-ph\]](#).
- [53] G. Barenboim, P. B. Denton, S. J. Parke, and C. A. Ternes, “Neutrino oscillation probabilities through the looking glass,” *Phys. Lett.* **B791** (2019) 351–360, [arXiv:1902.00517 \[hep-ph\]](#).
- [54] P. B. Denton, Y. Farzan, and I. M. Shoemaker, “Activating the fourth neutrino of the 3+1 scheme,” *Phys. Rev.* **D99** no. 3, (2019) 035003, [arXiv:1811.01310 \[hep-ph\]](#).
- [55] K. Møller, P. B. Denton, and I. Tamborra, “Cosmogenic Neutrinos Through the GRAND Lens Unveil the Nature of Cosmic Accelerators,” *JCAP* **1905** (2019) 047, [arXiv:1809.04866 \[astro-ph.HE\]](#).
- [56] P. B. Denton and S. J. Parke, “The Effective Δm_{ee}^2 in Matter,” *Phys. Rev.* **D98** (2018) 093001, [arXiv:1808.09453 \[hep-ph\]](#).
- [57] P. B. Denton, S. J. Parke, and X. Zhang, “Rotations Versus Perturbative Expansions for Calculating Neutrino Oscillation Probabilities in Matter,” *Phys. Rev.* **D98** no. 3, (2018) 033001, [arXiv:1806.01277 \[hep-ph\]](#).
- [58] P. B. Denton and I. Tamborra, “Invisible Neutrino Decay Resolves IceCube’s Track and Cascade Tension,” *Phys. Rev. Lett.* **121** no. 12, (2018) 121802, [arXiv:1805.05950 \[hep-ph\]](#).
- [59] P. B. Denton, Y. Farzan, and I. M. Shoemaker, “Testing large non-standard neutrino interactions with arbitrary mediator mass after COHERENT data,” *JHEP* **07** (2018) 037, [arXiv:1804.03660 \[hep-ph\]](#).
- [60] K. Møller, A. M. Suliga, I. Tamborra, and P. B. Denton, “Measuring the supernova unknowns at the next-generation neutrino telescopes through the diffuse neutrino background,” *JCAP* **1805** (2018) 066, [arXiv:1804.03157 \[astro-ph.HE\]](#).
- [61] P. B. Denton and I. Tamborra, “The Bright and Choked Gamma-Ray Burst Contribution to the IceCube and ANTARES Low-Energy Excess,” *JCAP* **1804** no. 04, (2018) 058, [arXiv:1802.10098 \[astro-ph.HE\]](#).
- [62] P. B. Denton and S. J. Parke, “Addendum to “Compact perturbative expressions for neutrino oscillations in matter”,,” *JHEP* **06** (2018) 109, [arXiv:1801.06514 \[hep-ph\]](#).
- [63] P. B. Denton and I. Tamborra, “Exploring the Properties of Choked Gamma-ray Bursts with IceCube’s High-energy Neutrinos,” *Astrophys. J.* **855** no. 1, (2018) 37, [arXiv:1711.00470 \[astro-ph.HE\]](#).

- [64] P. B. Denton, D. Marfatia, and T. J. Weiler, “The Galactic Contribution to IceCube’s Astrophysical Neutrino Flux,” *JCAP* **1708** no. 08, (2017) 033, [arXiv:1703.09721 \[astro-ph.HE\]](#).
- [65] P. Coloma, P. B. Denton, M. C. Gonzalez-Garcia, M. Maltoni, and T. Schwetz, “Curtailling the Dark Side in Non-Standard Neutrino Interactions,” *JHEP* **04** (2017) 116, [arXiv:1701.04828 \[hep-ph\]](#).
- [66] P. B. Denton, H. Minakata, and S. J. Parke, “Compact Perturbative Expressions For Neutrino Oscillations in Matter,” *JHEP* **06** (2016) 051, [arXiv:1604.08167 \[hep-ph\]](#).
- [67] P. B. Denton and T. J. Weiler, “Sensitivity of full-sky experiments to large scale cosmic ray anisotropies,” *JHEAp* **8** (2015) 1–9, [arXiv:1505.03922 \[astro-ph.HE\]](#).
- [68] P. B. Denton and T. J. Weiler, “The Fortuitous Latitude of the Pierre Auger Observatory and Telescope Array for Reconstructing the Quadrupole Moment,” *Astrophys.J.* **802** no. 1, (2015) 25, [arXiv:1409.0883 \[astro-ph.HE\]](#).
- [69] L. A. Anchordoqui, P. B. Denton, H. Goldberg, T. C. Paul, L. H. M. Da Silva, B. J. Vlcek, and T. J. Weiler, “Weinberg’s Higgs portal confronting recent LUX and LHC results together with upper limits on B^+ and K^+ decay into invisibles,” *Phys. Rev.* **D89** no. 8, (2014) 083513, [arXiv:1312.2547 \[hep-ph\]](#).
- [70] P. B. Denton and T. J. Weiler, “Using Integral Dispersion Relations to Extend the LHC Reach for New Physics,” *Phys. Rev.* **D89** no. 3, (2014) 035013, [arXiv:1311.1248 \[hep-ph\]](#).
- [71] N. Arsene, L. I. Caramete, P. B. Denton, and O. Micu, “Quantum Black Holes Effects on the Shape of Extensive Air Showers,” *Rom. Rep. Phys.* **69** (2017) 105, [arXiv:1310.2205 \[hep-ph\]](#).

Conference Proceedings

- [1] **GRAND** Collaboration, R. Alves Batista *et al.*, “The Giant Radio Array for Neutrino Detection (GRAND) Collaboration – Contributions to the 38th International Cosmic Ray Conference (ICRC 2023),” in *38th International Cosmic Ray Conference*. 7, 2023. [arXiv:2308.00120 \[hep-ex\]](#).
- [2] **UHECR** Collaboration, F. Schroeder *et al.*, “Snowmass UHECR Whitepaper: Requirements on Future Instrumentation,” *PoS ICRC2023* (2023) 206.
- [3] **GRAND** Collaboration, K. Kotera, “The Giant Radio Array for Neutrino Detection (GRAND) Project,” 7, 2021. [arXiv:2108.00032 \[astro-ph.HE\]](#).
- [4] S. J. Parke, P. B. Denton, and H. Minakata, “Analytic Neutrino Oscillation Probabilities in Matter: Revisited,” [arXiv:1801.00752 \[hep-ph\]](#).

- [5] **JEM-EUSO** Collaboration, P. B. Denton, L. A. Anchordoqui, A. A. Berlind, M. Richardson, and T. J. Weiler, “Sensitivity of orbiting JEM-EUSO to large-scale cosmic-ray anisotropies,” *J.Phys.Conf.Ser.* **531** (2014) 012004, [arXiv:1401.5757 \[astro-ph.IM\]](#).

Collaboration Papers

- [1] **DUNE** Collaboration, A. Abed Abud *et al.*, “The hypothetical track-length fitting algorithm for energy measurement in liquid argon TPCs,” [arXiv:2409.18288 \[physics.ins-det\]](#).
- [2] **DUNE** Collaboration, A. Abed Abud *et al.*, “DUNE Phase II: Scientific Opportunities, Detector Concepts, Technological Solutions,” [arXiv:2408.12725 \[physics.ins-det\]](#).
- [3] **GRAND** Collaboration, R. Alves Batista *et al.*, “GRANDlib: A simulation pipeline for the Giant Radio Array for Neutrino Detection (GRAND),” [arXiv:2408.10926 \[astro-ph.IM\]](#).
- [4] **DUNE** Collaboration, A. Abed Abud *et al.*, “First Measurement of the Total Inelastic Cross-Section of Positively-Charged Kaons on Argon at Energies Between 5.0 and 7.5 GeV,” [arXiv:2408.00582 \[hep-ex\]](#).
- [5] **DUNE** Collaboration, A. Abed Abud *et al.*, “Supernova Pointing Capabilities of DUNE,” [arXiv:2407.10339 \[hep-ex\]](#).
- [6] **DUNE** Collaboration, A. Abed Abud *et al.*, “Performance of a modular ton-scale pixel-readout liquid argon time projection chamber,” [arXiv:2403.03212 \[physics.ins-det\]](#).
- [7] **DUNE** Collaboration, A. Abed Abud *et al.*, “Doping liquid argon with xenon in ProtoDUNE Single-Phase: effects on scintillation light,” *JINST* **19** no. 08, (2024) P08005, [arXiv:2402.01568 \[physics.ins-det\]](#).
- [8] **DUNE** Collaboration, A. Abed Abud *et al.*, “The DUNE Far Detector Vertical Drift Technology. Technical Design Report,” *JINST* **19** no. 08, (2024) T08004, [arXiv:2312.03130 \[hep-ex\]](#).
- [9] D. Ayzenberg *et al.*, “Fundamental Physics Opportunities with the Next-Generation Event Horizon Telescope,” [arXiv:2312.02130 \[astro-ph.HE\]](#).
- [10] **DUNE** Collaboration, A. Abed Abud *et al.*, “Impact of cross-section uncertainties on supernova neutrino spectral parameter fitting in the Deep Underground Neutrino Experiment,” *Phys. Rev. D* **107** no. 11, (2023) 112012, [arXiv:2303.17007 \[hep-ex\]](#).

- [11] **DUNE** Collaboration, A. Abed Abud *et al.*, “Highly-parallelized simulation of a pixelated LArTPC on a GPU,” *JINST* **18** no. 04, (2023) P04034, [arXiv:2212.09807 \[physics.comp-ph\]](#).
- [12] **FASER** Collaboration, H. Abreu *et al.*, “Technical Proposal: FASERnu,” [arXiv:2001.03073 \[physics.ins-det\]](#).
- [13] **FASER** Collaboration, H. Abreu *et al.*, “Detecting and Studying High-Energy Collider Neutrinos with FASER at the LHC,” *Eur. Phys. J.* **C80** no. 1, (2020) 61, [arXiv:1908.02310 \[hep-ex\]](#).
- [14] **GRAND** Collaboration, J. Álvarez Muñoz *et al.*, “The Giant Radio Array for Neutrino Detection (GRAND): Science and Design,” *Sci. China Phys. Mech. Astron.* **63** no. 1, (2020) 219501, [arXiv:1810.09994 \[astro-ph.HE\]](#).

Talks (107 including 68 invited)

- [1] “CP Violation with Neutrino Disappearance.” <https://indico.cern.ch/event/1454726/contributions/6376522/>. Talk at the CERN Neutrino Platform Pheno Week, February 2025.
- [2] “Neutrino Oscillations: Unveiling Mysteries.” **Invited** colloquium at Virginia Tech, February 2025.
- [3] “Individual Neutrino Masses From a Supernova.” <https://indico.bnl.gov/event/25821/>. Talk at the BNL HET Group, January 2024.
- [4] “Connecting the Extremes: A Story of Supermassive Black Holes and Ultralight Dark Matter.” https://physics.ucsd.edu/events/seminars-colloquia/event?event_id=1396. **Invited** seminar at UCSD, October 2024.
- [5] “Dark Matter Raining on DUNE and Other Large Volume Detectors.” <https://indico.bnl.gov/event/24793/>. Talk at the BNL HET Group, October 2024.
- [6] “Unitarity Violation in Neutrino Physics: Brief Pedagogy.” <https://indico.fnal.gov/event/66471/>. **Invited** talk at DUNE collaboration call, October 2024.
- [7] “Modern Neutrino Oscillation Theory.” <https://indico.fnal.gov/event/63406/contributions/297152/>. **Invited** keynote plenary at NuFact, Argonne, September 2024.

- [8] “NuFast: Fast and Accurate Algorithm for Calculating Long-Baseline Neutrino Oscillation Probabilities with Matter Effects.”
<https://agenda.infn.it/event/39753/contributions/240076/>. **Invited** talk at NOW, Otranto Italy, August 2024.
- [9] “CP-Violation with Neutrino Disappearance and NuFast.”
<https://indico.sanfordlab.org/event/69/timetable/#132-talk-dark-matter-raining-o>. **Invited** talk at the Center for Theoretical Underground Physics and Related Areas (CETUP*) workshop, Lead SD, July 2023.
- [10] “NuFast: Fast and Accurate Algorithm for Calculating Long-Baseline Neutrino Oscillation Probabilities with Matter Effects.”
<https://indico.fnal.gov/event/60082/contributions/291412/>. Talk at DUNE Collaboration Meeting at Fermilab, May 2024.
- [11] “CP Violation with Neutrino Disappearance.”. **Invited** seminar at Rice University, April 2024.
- [12] “CP Violation with Neutrino Disappearance.”. **Invited** seminar at Colorado State University, March 2024.
- [13] “CP Violation with Neutrino Disappearance.”
<https://indico.bnl.gov/event/21760/>. Talk at the BNL HET Group, March 2024.
- [14] “CP Violation with Neutrino Disappearance.”
<https://indico.fnal.gov/event/63560/>. Talk at the DUNE LBL WG, March 2024.
- [15] “Knowns and Unknowns in Neutrinos.”
<https://web.mit.edu/lms/news/archives/index.html>. **Invited** colloquium at MIT, Boston, October 2023.
- [16] “LMA-Dark: Large New Physics Effects in Neutrino Oscillations.”. **Invited** talk at the COHERENT collaboration, August 2023.
- [17] “Testing Unitarity of the Leptonic Mixing Matrix with Oscillations: A Focus on Tau Neutrinos.” <https://ifirse.icise.vn/nugroup/nuworkshop2023/program.html>. **Invited** plenary at the 19th Rencontres du Vietnam, July 2023.
- [18] “Light Sterile Neutrinos: A Modern Picture and a Model to Evade Cosmology.”
<https://indico.ihep.ac.cn/event/18269/contributions/135575/>. **Invited** talk at WIN, July 2023.
- [19] “Light Sterile Neutrinos: A Modern Picture and a Model to Evade Cosmology.”
<https://indico.sanfordlab.org/event/53/contributions/822/>. **Invited** talk at the Center for Theoretical Underground Physics and Related Areas (CETUP*) workshop, Lead SD, July 2023.

- [20] “Here Comes the Sun: Solar Parameters in Long-Baseline Accelerator Neutrino Oscillations.”
<https://indico.cern.ch/event/1218225/contributions/5384272/>. Talk at Pheno, Pittsburgh, May 2023.
- [21] “Light Sterile Neutrinos: A Modern Picture and a Model to Evade Cosmology.”
<https://indico.cern.ch/event/1258338/contributions/5307365/>. **Invited** talk at University of Cape Town, April 2023.
- [22] “Knowns and Unknowns in Neutrinos.”. **Invited** colloquium at University of Wisconsin, Madison, April 2023.
- [23] “Neutrinos at Snowmass.”. **Invited** seminar at Kings College London, January 2023.
- [24] “Knowns and Unknowns in Neutrinos.”. **Invited** colloquium at Stony Brook University, New York, October 2022.
- [25] “Light (Fermionic?) Dark Matter.”
<https://indico.cern.ch/event/1189979/contributions/5012521/>. **Invited** talk at the International Conference on Neutrinos and Dark Matter in Egypt, October 2022.
- [26] “Connecting the Extremes: A Story of Supermassive Black Holes and Ultralight Dark Matter.”. **Invited** talk at Dark Matter in Compact Objects, Stars, and in Low Energy Experiments at INT, Seattle, August 2022.
- [27] “Tau Neutrinos: from GeV to EeV.”
<https://indico.fnal.gov/event/22303/contributions/246362/>. **Invited** talk at Snowmass, Seattle, July 2022.
- [28] “Sterile neutrinos at 1 eV.”
https://www.mpi-hd.mpg.de/lin/seminar_theory.en.php. **Invited** seminar at MPI Heidelberg, July 2022.
- [29] “Connecting the Extremes: Story of Supermassive Black Holes and Ultralight Dark Matter.” <https://n3as.berkeley.edu/p/event/su22-jun14/>. **Invited** seminar at UC Berkeley via N3AS, June 2022.
- [30] “Connecting the Extremes: Story of Supermassive Black Holes and Ultralight Dark Matter.” <https://theory.tifr.res.in/~sotu/previous.php>. **Invited** seminar at Tata Institute of Fundamental Research, India, June 2022.
- [31] “Flavor mixing, CP violation, and Unitarity.”
https://neutrino2022.org/program/detail_program. **Invited** plenary talk at Neutrino 2022, Seoul Korea, June 2022.
- [32] “CP Violation at Long-Baseline Neutrino Experiments.”
<https://indico.cern.ch/event/1125426/contributions/4868720/>. **Invited** plenary talk at the Mitchell Conference on Collider, Dark Matter, and Neutrino Physics; Texas A&M, College Station TX, May 2022.

- [33] “Neutrino Theory Overview.”
<https://indico.sanfordlab.org/event/28/contributions/310/>. **Invited**
 plenary talk at the Conference on Science at the Sanford Underground Research
 Facility (CoSSURF), May 2022.
- [34] “Nu physics: Theory and practice.”
<https://indico.cern.ch/event/1089132/contributions/4863585/>. **Invited**
 plenary talk at the Phenomenology Symposium, Pittsburgh, May 2022.
- [35] “CP Violation at Long-Baseline Neutrino Experiments.”
[https://lawphysics.wordpress.com/2022/04/20/w131-peter-denton-cp-violation-at-long-](https://lawphysics.wordpress.com/2022/04/20/w131-peter-denton-cp-violation-at-long-baseline-neutrino-experiments/)
Invited seminar in the Latin American Webinar Physics series, April 2022.
- [36] “CP Violation at Long-Baseline Neutrino Experiments.”. **Invited** seminar at
 Harvard, April 2022.
- [37] “Connecting the Extremes: Story of Supermassive Black Holes and Ultralight Dark
 Matter.”. **Invited** seminar at MIT, April 2022.
- [38] “New Perspectives on Atmospheric Neutrinos.”. **Invited** seminar at INFN Torino,
 March 2022.
- [39] “Tau Neutrino Identification at IceCube for Unitary Violation Tests.”
<https://indico.cern.ch/event/1103445/contributions/4724172/>. Talk at
 Snowmass BSM neutrino workshop, February 2022.
- [40] “Neutrinos and Cosmic Rays at Snowmass.”
<https://indico.bnl.gov/event/13887/>. Talk at BNL Snowmass Retreat,
 December 2021.
- [41] “Astrophysical Neutrino Decay.”
<https://indico.ipmu.jp/event/397/contributions/6390/>. **Invited** talk at Dark
 Sectors of Astroparticle Physics at IPMU, Japan December 2021.
- [42] “Neutrino Oscillations at FPF.”
<https://indico.cern.ch/event/1076733/contributions/4577119/>. Talk at
 Third Forward Physics Facility October 2021.
- [43] “Astrophysical Neutrino Decay.”
<https://indico.ific.uv.es/event/6178/contributions/15526/>. Talk at TAUP
 August 2021.
- [44] “Astrophysical Neutrino Decay.”
<https://indico.desy.de/event/28202/contributions/105961/>. Talk at
 EPS-HEP July 2021.
- [45] “CP-Violating Neutrino Non-Standard Interactions in Long-Baseline-Accelerator
 Data.” <https://indico.cern.ch/event/1034469/contributions/4430079/>. Talk
 at DPF at FSU July 2021.

- [46] “CP-Violating Neutrino Non-Standard Interactions in Long-Baseline-Accelerator Data.” <https://indico.ibs.re.kr/event/357/timetable/>. Talk at PASCOS in IBS Koreas June 2021.
- [47] “CP-Violating Neutrino Non-Standard Interactions in Long-Baseline-Accelerator Data.” <https://indico.cern.ch/event/982783/contributions/4362341/>. Talk at Pheno May 2021.
- [48] “Neutrino Oscillations in Matter and Linear Algebra.”. **Invited** colloquium at Illinois Institute of Technology April 2021.
- [49] “CP Violation at Long-Baseline Neutrino Experiments.”. **Invited** seminar at Michigan State University March 2021.
- [50] “Astrophysical Neutrino Decay.” <https://agenda.infn.it/event/24250/contributions/129755/>. Talk at the XIX International Workshop on Neutrino Telescopes February 2021.
- [51] “CP Violation at Long-Baseline Neutrino Experiments.” <https://indico.cern.ch/event/1001277/>. **Invited** seminar at Sydney CPPC February 2021.
- [52] “Ultralight Fermionic Dark Matter.”. **Invited** talk at Asymptotic Safety and Dark Matter workshop at OSU December 2020.
- [53] “Ultralight Fermionic Dark Matter.” <https://www.ictp-saifr.org/dmw2020/>. Talk at 3rd South American Dark Matter Workshop at ICTP in Sao Paulo December 2020.
- [54] “3+1+NSI and CP Violation.”. **Invited** seminar at KIAS November 2020.
- [55] “CP Violation at Long-Baseline Neutrino Experiments.” <https://indico.bnl.gov/event/8008/>. Talk at BNL HET Group October 2020.
- [56] “CP Violation at Long-Baseline Neutrino Experiments.” <https://npc.fnal.gov/neutrino-seminar-series/>. **Invited** Neutrino Physics Center seminar October 2020 at Fermilab.
- [57] “The Lightest Dark Matter.”. **Invited** seminar October 2020 at University of Sussex.
- [58] “Astrophysical Neutrino Decay.” <https://indico.cern.ch/event/868940/contributions/3899680/>. Talk at ICHEP July 2020 in Prague (virtual).
- [59] “Visible Decay of Astrophysical Neutrinos.” <https://indico.bnl.gov/event/7985/>. Talk at BNL HET Group May 2020.
- [60] “Ultralight Boson Dark Matter Constraints from Superradiance Leveraging the Event Horizon Telescope Collaboration’s Observations of M87*.” <https://indico.cern.ch/event/858682/contributions/3837326/>. Talk at Pheno May 2020 in Pittsburgh, PA (virtual).

- [61] “Beyond the Standard Model physics with accelerator neutrino experiments.”
<https://aps-april.onlineeventpro.freeman.com/sessions/15336169/subsession/25117238/>
Invited plenary at APS April Meeting 2020 (virtual).
- [62] “LMA-Dark: Large New Physics Effects in Neutrino Oscillations.”
<https://indico.bnl.gov/event/7665/>. Talk at BNL HET Group February 2020.
- [63] “Motivation for neutrino precision in oscillations.”
<https://indico.bnl.gov/event/7282/>. **Invited** talk at BNL Snowmass Intensity Frontier & Astrophysics Workshop February 2020.
- [64] “Recent results in neutrino oscillation theory.”
<https://www.physics.umass.edu/events/2019-11-15-recent-results-neutrino-oscillation>
Invited seminar at UMass Amherst November 2019.
- [65] “Realizing the physics goals at DUNE.”
<https://indico.fnal.gov/event/21535/other-view>. **Invited** talk at Modules Of Opportunity for DUNE workshop at BNL November 2019.
- [66] “Recent results in neutrino oscillation theory.”
<https://physics.osu.edu/events/high-energy-physics-seminar-peter-dentonbrookhaven->
Invited seminar at OSU November 2019.
- [67] “New physics probes in future neutrino experiments.”
<https://indico.bnl.gov/event/6652/>. **Invited** colloquium at BNL October 2019.
- [68] “Recent results in neutrino oscillation theory.”
<https://indico.cern.ch/event/800930/contributions/3557081/>. Talk at CERN Neutrino Platform October 2019.
- [69] “Neutrino theory in the coming years.” <https://indico.bnl.gov/event/6710/>.
Invited talk at BNL Snowmass Discussion October 2019.
- [70] “Recent results in neutrino oscillation theory.”
<https://theory.fnal.gov/events/event/tbd-neutrinos/>. **Invited** theory seminar at Fermilab September 2019.
- [71] “Exact neutrino oscillation probabilities in matter.”
<https://indico.ific.uv.es/event/3649/contributions/11349/>. Talk given at TomFest at Vanderbilt August 2019.
- [72] “Neutrino oscillation probabilities in matter.”
<https://indico.cern.ch/event/782953/contributions/3444777/>. Talk given at the 2019 DPF meeting at Northeastern July 2019.
- [73] “Neutrino self interactions in the early universe.”
<https://indico.cern.ch/event/812851/contributions/3432032/>. **Invited** talk at NTN NSI Workshop at Wash U May 2019.

- [74] “Partial neutrino decay resolves icecube’s track and cascade tension.”
<https://indico.bnl.gov/event/5875/>. Talk at BNL HET Group May 2019.
- [75] “Neutrino Oscillation Probabilities in Matter.”
<http://theory.physics.uci.edu/seminars.html>. **Invited** seminar at UC Irvine May 2019.
- [76] “Neutrino Oscillation Probabilities in Matter.”
<http://www.theory.caltech.edu/people/carol/seminar.html>. Seminar at Caltech May 2019.
- [77] “Partial Neutrino Decay Addresses the Track – Cascade Tension at IceCube.”
<https://indico.cern.ch/event/777988/contributions/3410555/>. Talk at Pheno May 2019 in Pittsburgh, PA.
- [78] “Neutrino Oscillation Probabilities in Matter.”
<https://www.phys.psu.edu/seminars/all-seminars>. **Invited** seminar at Penn State April 2019.
- [79] “Neutrino Oscillation Probabilities in Matter.”
<https://www.phys.vt.edu/Talks/NeutrinoPhysicsSeminar.html>. **Invited** seminar at Virginia Tech February 2019.
- [80] “Analytic and Compact Expressions for Neutrino Oscillations in Matter.”
<https://dx.doi.org/10.5281/zenodo.2642372>. **Invited** talk at PONDD workshop at Fermilab December 2018.
- [81] “Finding the Unexpected in IceCube.”. **Invited** N-Talk at Niels Bohr International Academy September 2018 in Copenhagen.
- [82] “High Energy Neutrino Parameter Estimation.”. **Invited** talk at GRAND workshop at IAP August 2018.
- [83] “New Neutrino Interactions: Breaking Degeneracies and Relaxing Sterile Tensions.”. **Invited** seminar at BNL August 2018.
- [84] “Analytic and compact perturbative expressions for neutrino oscillations in matter.”
<https://indico.cern.ch/event/686555/contributions/2977525/>. Talk at the International Conference of High Energy Physics (ICHEP) July 2018 in Seoul.
- [85] “Gamma Ray Bursts, Supernovae, Neutrinos, and IceCube.”. **Invited** talk at IIHE April 2018 in Brussels.
- [86] “Gamma Ray Bursts, Supernovae, Neutrinos, and IceCube.”. **Invited** talk at DESY January 2018 in Zeuthen.
- [87] “Gamma Ray Bursts, Supernovae, Neutrinos, and IceCube.”. **Invited** talk at Arizona State University January 2018.

- [88] “Supernova - Gamma Ray Burst - Neutrino Connection.”. **Invited** SUPER-STARs talk at DARK Cosmology Center November 2017 in Copenhagen.
- [89] “Gamma Ray Bursts, Supernovae, Neutrinos, and IceCube.”. **Invited** N-Talk at Niels Bohr International Academy November 2017 in Copenhagen.
- [90] “Analytic and compact perturbative expressions for neutrino oscillations in matter.”. **Invited** seminar at Campinas State University October 2017.
- [91] “COHERENT and the LMA-Dark NSI Solution.”
<https://indico.uu.se/event/324/session/20/contribution/182>. **Invited** talk at the NUFACT 2017 workshop September 2017 in Uppsala.
- [92] “What We Can Tell About the Sources of IceCube’s Neutrinos, and What IceCube Can Tell Us About Gamma Ray Bursts.”
<http://astro.fnal.gov/events/event/tbd-35/>. Astrophysics theory seminar at Fermilab August 2017 in Batavia, IL.
- [93] “The Galactic Contribution to IceCube’s Astrophysical Neutrino Flux.”
<https://indico.cern.ch/event/615891/contributions/2608935/>. Talk at TeV Particle Astrophysics at CCAPP in Columbus, OH.
- [94] “Finding Anisotropies in Cosmic Rays and Neutrinos.”
<http://nbia.nbi.ku.dk/nbia-seminars/nbia-seminar-peter-denton/>. **Invited** seminar at the Niels Bohr International Academy astroparticle seminar April 2017 in Copenhagen.
- [95] “Analytic and compact perturbative expressions for neutrino oscillations in matter.”. Talk at the Center of Excellence for Particle Physics at the Terascale at the University of Melbourne December 2016.
- [96] “Spherical Harmonics as a Tool for Finding Anisotropies in UHECR and Astrophysical Neutrino Fluxes.”. **Invited** talk at the Danish Astroparticle Physics Meeting October 2016 in Odense.
- [97] “The Standard Neutrino Oscillation Parameters and a Surprising Alternative Solution.”. **Invited** N-Talk at Niels Bohr International Academy September 2016 in Copenhagen.
- [98] “Analytic and compact perturbative expressions for neutrino oscillations in matter.”
<http://indico.cern.ch/event/432527/contributions/1071859/>. Talk at the International Conference of High Energy Physics (ICHEP) August 2016 in Chicago, IL.
- [99] “Analytic and compact perturbative expressions for neutrino oscillations in matter.”
<http://theory.fnal.gov/seminars/seminars.html>. **Invited** talk at the Fermilab theory seminar July 2016 in Batavia, IL.

- [100] “Methods for Probing New Physics at High Energies.”
<https://events.vanderbilt.edu/index.php?eID=90084>. Successful dissertation defense at Vanderbilt University June 2016 in Nashville, TN.
- [101] “Analytic and compact perturbative expressions for neutrino oscillations in matter.”
<http://www.ccsem.infn.it/issp2016/index.html>. Talk at the International School of Subnuclear Physics May 2016 in Erice, Sicily.
- [102] “Analytic and compact perturbative expressions for neutrino oscillations in matter.”
<https://indico.cern.ch/event/489180/contributions/2158195/>. Talk at Pheno May 2016 in Pittsburgh, PA.
- [103] “Cosmic Ray Anisotropy with Partial Sky Exposure.”. **Invited** seminar November 2015 at CCAPP.
- [104] “The Effect of a Maximum Lepton Energy on the Stability of Pions and Cosmic Ray Physics.” <http://meetings.aps.org/link/BAPS.2015.APR.M14.1>. Talk at the APS April meeting 2015 in Baltimore, MD.
- [105] “Particle Physics at the Highest Energies.”. **Invited** seminar December 2014 at the University of Wisconsin – Madison.
- [106] “Sensitivity of orbiting JEM-EUSO to large-scale cosmic-ray anisotropies.”. Talk at the Cosmic Ray Anisotropy Workshop September 2013 in Madison, WI.
- [107] “Using dispersion relations to look for new physics in pp elastic scattering at the LHC.” <http://meetings.aps.org/link/BAPS.2013.APR.H12.8>. Talk at the APS April meeting 2013 in Denver, CO.

Lectures

- [1] “Neutrino Oscillations and Theory Biases.”. Lecture for students at the CETUP workshop in Lead SD, July 2023.
- [2] “Neutrino Oscillations and Theory Biases.”
<https://indico.bnl.gov/event/19465/timetable/>. Lecture for students at BNL, June 2023.
- [3] “Neutrino Oscillations and Theory Biases.”
<https://indico.bnl.gov/event/15829/timetable/>. Lecture for students at BNL, June 2022.
- [4] “Neutrino Oscillations.”. Two lectures for undergraduates at TIFR, May 2021.

Notes

- [1] P. B. Denton, H. Minakata, and S. J. Parke, “Comment on 1801.10488v3,”
<https://zenodo.org/record/1177535>.

Code

- [1] P. B. Denton and S. J. Parke, “NuFast.”
<https://github.com/PeterDenton/NuFast/>.
- [2] A. Abdullahi and P. B. Denton, “Astro-Nu-Decay.”
<https://github.com/PeterDenton/Astro-Nu-Decay>.
- [3] P. B. Denton, “Peterdenton/nu-pert-compare: v1.0.0,” Jan., 2019.
<https://doi.org/10.5281/zenodo.2547029>.
<https://github.com/PeterDenton/Nu-Pert-Compare>.
- [4] P. B. Denton, “ANA v1.0.0: Astrophysical Neutrino Anisotropy,” Mar., 2017.
<https://doi.org/10.5281/zenodo.438675>.
<https://github.com/PeterDenton/ANA>.
- [5] P. B. Denton, “Nu-Pert v0.2.2: Analytic and compact perturbative expressions for neutrino oscillations in matter,” June, 2016.
<https://doi.org/10.5281/zenodo.54629>.
<https://github.com/PeterDenton/Nu-Pert>.

Miscellaneous

- [1] P. B. Denton* *et al.*, “Neutrino Non-Standard Interactions.” Snowmass 2021: LOI, August, 2020.
https://www.snowmass21.org/docs/files/summaries/NF/SNOWMASS21-NF3_NF1-CF7_CF0-TF11_
*Editor.
- [2] P. B. Denton* and S. J. Parke, “Direct Probes of the Matter Effect in Neutrino Oscillations.” Snowmass 2021: LOI, August, 2020.
https://www.snowmass21.org/docs/files/summaries/NF/SNOWMASS21-NF1_NF3-TF0_TF0_Peter
*Editor.
- [3] M. Bustamante*, P. B. Denton*,
S. Wissel*, *et al.*, “Ultra-High-Energy Neutrinos.” Snowmass 2021: LOI, August, 2020.
https://www.snowmass21.org/docs/files/summaries/NF/SNOWMASS21-NF4_NF6-CF7_CF3-TF9_T
*Editor.
- [4] P. B. Denton* *et al.*, “Computing Neutrino Oscillations in Matter Efficiently.”
Snowmass 2021: LOI, July, 2020.
<https://www.snowmass21.org/docs/files/summaries/NF/SNOWMASS21-NF8-CompF2-005.pdf>.
*Editor.
- [5] L. A. Anchordoqui, M. Bustamante, *et al.*, “Cosmic Neutrino Probes of Fundamental Physics.” Snowmass 2021: LOI, August, 2020.
https://www.snowmass21.org/docs/files/summaries/CF/SNOWMASS21-CF7_CF1-NF4_NF3-TF11_

- [6] L. A. Anchordoqui *et al.*, “Symmetry of astro-particle physics and collider physics.” Snowmass 2021: LOI, August, 2020.
https://www.snowmass21.org/docs/files/summaries/CF/SNOWMASS21-CF7_CF0-EF6_EF7-NF5_N
- [7] D. Soldin *et al.*, “Studies of the Muon Excess in Cosmic Ray Air Showers.” Snowmass 2021: LOI, August, 2020.
https://www.snowmass21.org/docs/files/summaries/CF/SNOWMASS21-CF7_CF0-EF6_EF7-AF4_A
- [8] J. L. Feng, F. Kling, *et al.*, “Forward Physics Facility.” Snowmass 2021: LOI, August, 2020.
https://www.snowmass21.org/docs/files/summaries/EF/SNOWMASS21-EF9_EF6_EF10_EF5-NF6_N
- [9] L. Johns *et al.*, “Supernova neutrinos and particle-physics opportunities.” Snowmass 2021: LOI, August, 2020.
https://www.snowmass21.org/docs/files/summaries/NF/SNOWMASS21-NF8_NF4-CF3_CF7-TF9_T
- [10] K. Scholberg *et al.*, “Neutrino Opportunities at the ORNL Second Target Station.” Snowmass 2021: LOI, August, 2020.
https://www.snowmass21.org/docs/files/summaries/NF/SNOWMASS21-NF6_NF9-CF1_CF0-TF11_T
- [11] M. Hostert *et al.*, “Opportunities and signatures of non-minimal Heavy Neutral Leptons.” Snowmass 2021: LOI, August, 2020.
https://www.snowmass21.org/docs/files/summaries/NF/SNOWMASS21-NF2_NF3-EF9_EF0-RF4_R
- [12] D. A. Sierra *et al.*, “Coherent elastic neutrino-nucleus scattering: Theoretical and experimental impact.” Snowmass 2021: LOI, May, 2020.
<https://www.snowmass21.org/docs/files/summaries/NF/SNOWMASS21-NF0-002.pdf>.

Thesis

- [1] P. B. Denton, *Methods for Probing New Physics at High Energies*. PhD thesis, Vanderbilt U., 2016-12-18. <https://ir.vanderbilt.edu/handle/1803/12817>.