

Publication List

Peter B. Denton

Updated: July 28, 2020^{*†}

Articles

- [1] P. B. Denton and Y. Kini, “Ultra-High-Energy Tau Neutrino Cross Sections with GRAND and POEMMA,” [arXiv:2007.10334](#) [[astro-ph.HE](#)].
- [2] H. Davoudiasl, P. B. Denton, and J. Gehrlein, “An Attractive Scenario for Light Dark Matter Direct Detection,” [arXiv:2007.04989](#) [[hep-ph](#)].
- [3] P. B. Denton and R. Pestes, “The Impact of Different Parameterizations on the Interpretation of CP Violation in Neutrino Oscillations,” [arXiv:2006.09384](#) [[hep-ph](#)].
- [4] 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](#)].
- [5] P. B. Denton, “A Return To Neutrino Normalcy,” [arXiv:2003.04319](#) [[hep-ph](#)].
- [6] **FASER** Collaboration, H. Abreu *et al.*, “Technical Proposal: FASERnu,” [arXiv:2001.03073](#) [[physics.ins-det](#)].
- [7] 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](#)].
- [8] P. B. Denton, S. J. Parke, T. Tao, and X. Zhang, “Eigenvectors from Eigenvalues,” [arXiv:1908.03795](#) [[math.RA](#)].
- [9] **FASER** Collaboration, H. Abreu *et al.*, “Detecting and Studying High-Energy Collider Neutrinos with FASER at the LHC,” *Eur. Phys. J. C* **80** no. 1, (2020) 61, [arXiv:1908.02310](#) [[hep-ex](#)].
- [10] C. A. Argüelles *et al.*, “White Paper on New Opportunities at the Next-Generation Neutrino Experiments (Part 1: BSM Neutrino Physics and Dark Matter),” [arXiv:1907.08311](#) [[hep-ph](#)].

^{*}For the latest version see: [peterdenton.github.io](#)

[†]Most author lists are in alphabetical order.

- [11] 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 \[hep-ph\]](#).
- [12] 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.
- [13] 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 \[astro-ph.CO\]](#).
- [14] G. A. Barenboim, P. B. Denton, and I. M. Oldengott, “Inflation meets neutrinos,” *Phys. Rev.* **D99** (2019) 083515, [arXiv:1903.02036 \[astro-ph.CO\]](#).
- [15] 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 \[hep-ph\]](#).
- [16] 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 \[hep-ph\]](#).
- [17] 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 \[hep-ph\]](#).
- [18] **GRAND** Collaboration, J. Álvarez Muñiz *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 \[astro-ph.HE\]](#).
- [19] 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 \[astro-ph.HE\]](#).
- [20] P. B. Denton and S. J. Parke, “The Effective Δm_{ee}^2 in Matter,” *Phys. Rev.* **D98** (2018) 093001, [arXiv:1808.09453 \[hep-ph\]](#).
- [21] 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 \[hep-ph\]](#).
- [22] 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 \[hep-ph\]](#).
- [23] 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 \[hep-ph\]](#).

- [24] K. Moller, 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 \[astro-ph.HE\]](#).
- [25] 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 \[astro-ph.HE\]](#).
- [26] P. B. Denton and S. J. Parke, “Addendum to “Compact perturbative expressions for neutrino oscillations in matter”,” *JHEP* **06** (2018) 109, [arXiv:1801.06514 \[hep-ph\]](#).
- [27] 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 \[astro-ph.HE\]](#).
- [28] 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 \[astro-ph.HE\]](#).
- [29] 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 \[hep-ph\]](#).
- [30] P. B. Denton, H. Minakata, and S. J. Parke, “Compact Perturbative Expressions For Neutrino Oscillations in Matter,” *JHEP* **06** (2016) 051, [arXiv:1604.08167 \[hep-ph\]](#).
- [31] 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 \[astro-ph.HE\]](#).
- [32] 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 \[astro-ph.HE\]](#).
- [33] 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 \[hep-ph\]](#).
- [34] 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 \[hep-ph\]](#).
- [35] N. Arsene, L. I. Caramete, P. B. Denton, and O. Micu, “Quantum Black Holes Effects on the Shape of Extensive Air Showers,” [arXiv:1310.2205 \[hep-ph\]](#).

Conference Proceedings

- [1] S. J. Parke, P. B. Denton, and H. Minakata, “Analytic Neutrino Oscillation Probabilities in Matter: Revisited,” [arXiv:1801.00752 \[hep-ph\]](#).
- [2] **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 \[astro-ph.IM\]](#).

Talks

- [1] “Astrophysical Neutrino Decay.” <https://indico.cern.ch/event/868940/contributions/3899680/>. Talk at ICHEP July 2020 in Prague (virtual).
- [2] “Visible Decay of Astrophysical Neutrinos.” <https://indico.bnl.gov/event/7985/>. Talk at BNL HET Group May 2020.
- [3] “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 2019 in Pittsburgh, PA (virtual).
- [4] “Beyond the Standard Model physics with accelerator neutrino experiments.” <https://aps-april.onlineeventpro.freeman.com/sessions/15336169/subsession/25117238/B> **Invited plenary** at APS April Meeting 2020 (virtual).
- [5] “LMA-Dark: Large New Physics Effects in Neutrino Oscillations.” <https://indico.bnl.gov/event/7665/>. Talk at BNL HET Group February 2020.
- [6] “Motivation for neutrino precision in oscillations.” <https://indico.bnl.gov/event/7282/>. **Invited** talk at BNL Snowmass Intensity Frontier & Astrophysics Workshop February 2020.
- [7] “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.
- [8] “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.
- [9] “Recent results in neutrino oscillation theory.” <https://physics.osu.edu/events/high-energy-physics-seminar-peter-dentonbrookhaven-> **Invited** seminar at OSU November 2019.

- [10] “New physics probes in future neutrino experiments.”
<https://indico.bnl.gov/event/6652/>. **Invited** colloquium at BNL October 2019.
- [11] “Recent results in neutrino oscillation theory.”
<https://indico.cern.ch/event/800930/contributions/3557081/>. Talk at CERN Neutrino Platform October 2019.
- [12] “Neutrino theory in the coming years.” <https://indico.bnl.gov/event/6710/>.
Invited talk at BNL Snowmass Discussion October 2019.
- [13] “Recent results in neutrino oscillation theory.”
<https://theory.fnal.gov/events/event/tbd-neutrinos/>. **Invited** theory seminar at Fermilab September 2019.
- [14] “Exact neutrino oscillation probabilities in matter.”
<https://indico.ific.uv.es/event/3649/contributions/11349/>. Talk given at TomFest at Vanderbilt August 2019.
- [15] “Neutrino oscillation probabilities in matter.”
<https://indico.cern.ch/event/782953/contributions/3444777/>. Talk given at the 2019 DPF meeting at Northeastern July 2019.
- [16] “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.
- [17] “Partial neutrino decay resolves icecube’s track and cascade tension.”
<https://indico.bnl.gov/event/5875/>. Talk at BNL HET Group May 2019.
- [18] “Neutrino Oscillation Probabilities in Matter.”
<http://theory.physics.uci.edu/seminars.html>. **Invited** seminar at UC Irvine May 2019.
- [19] “Neutrino Oscillation Probabilities in Matter.”
<http://www.theory.caltech.edu/people/carol/seminar.html>. Seminar at Caltech May 2019.
- [20] “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.
- [21] “Neutrino Oscillation Probabilities in Matter.”
<https://www.phys.psu.edu/seminars/all-seminars>. **Invited** seminar at Penn State April 2019.
- [22] “Neutrino Oscillation Probabilities in Matter.”
<https://www.phys.vt.edu/Talks/NeutrinoPhysicsSeminar.html>. **Invited** seminar at Virginia Tech February 2019.

- [23] “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.
- [24] “Finding the Unexpected in IceCube.”. **Invited** N-Talk at Niels Bohr International Academy September 2018 in Copenhagen.
- [25] “High Energy Neutrino Parameter Estimation.”. **Invited** talk at GRAND workshop at IAP August 2018.
- [26] “New Neutrino Interactions: Breaking Degeneracies and Relaxing Sterile Tensions.”. **Invited** seminar at BNL August 2018.
- [27] “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.
- [28] “Gamma Ray Bursts, Supernovae, Neutrinos, and IceCube.”. **Invited** talk at IIHE April 2018 in Brussels.
- [29] “Gamma Ray Bursts, Supernovae, Neutrinos, and IceCube.”. **Invited** talk at DESY January 2018 in Zeuthen.
- [30] “Gamma Ray Bursts, Supernovae, Neutrinos, and IceCube.”. **Invited** talk at Arizona State University January 2018.
- [31] “Supernova - Gamma Ray Burst - Neutrino Connection.”. **Invited** SUPER-STARs talk at DARK Cosmology Center November 2017 in Copenhagen.
- [32] “Gamma Ray Bursts, Supernovae, Neutrinos, and IceCube.”. **Invited** N-Talk at Niels Bohr International Academy November 2017 in Copenhagen.
- [33] “Analytic and compact perturbative expressions for neutrino oscillations in matter.”. **Invited** seminar at Campinas State University October 2017.
- [34] “COHERENT and the LMA-Dark NSI Solution.”
<https://indico.uu.se/event/324/session/20/contribution/182>. **Invited** talk at the NUFAC 2017 workshop September 2017 in Uppsala.
- [35] “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.
- [36] “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.

- [37] “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.
- [38] “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.
- [39] “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.
- [40] “The Standard Neutrino Oscillation Parameters and a Surprising Alternative Solution.”. **Invited** N-Talk at Niels Bohr International Academy September 2016 in Copenhagen.
- [41] “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.
- [42] “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.
- [43] “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.
- [44] “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.
- [45] “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.
- [46] “Cosmic Ray Anisotropy with Partial Sky Exposure.”. **Invited** seminar November 2015 at CCAPP.
- [47] “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.
- [48] “Particle Physics at the Highest Energies.”. **Invited** seminar December 2014 at the University of Wisconsin – Madison.

- [49] “Sensitivity of orbiting JEM-EUSO to large-scale cosmic-ray anisotropies.”. Talk at the Cosmic Ray Anisotropy Workshop September 2013 in Madison, WI.
- [50] “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.

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, “Peterdenton/nu-pert-compare: v1.0.0,” Jan., 2019.
<https://doi.org/10.5281/zenodo.2547029>.
<https://github.com/PeterDenton/Nu-Pert-Compare>.
- [2] P. B. Denton, “ANA v1.0.0: Astrophysical Neutrino Anisotropy,” Mar., 2017.
<https://doi.org/10.5281/zenodo.438675>.
<https://github.com/PeterDenton/ANA>.
- [3] 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.*, “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.
- [2] 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.
<http://etd.library.vanderbilt.edu/available/etd-07052016-131020/>.