

Mehr Un Nisa

Department of Physics and Astronomy
Michigan State University
East Lansing, Michigan 48824
U.S.A.

nisamehr@msu.edu
<https://icecube.wisc.edu/~mnisa>

Date of Birth: 03/21/1989
Gender: Female

Fields of Research Interest

Neutrino Astronomy, Gamma-ray Astrophysics, Dark Matter, Cosmic rays.

Employment

Assistant Professor
Michigan State University, East Lansing, MI.

August 2023 – Present

Postdoctoral Research Associate
Michigan State University, East Lansing, MI.

2019 – August 2023

Education

Ph.D, Physics 2013 – 2018
University of Rochester, Rochester, NY.
Dissertation: "Constraining TeV-scale Astrophysical Foregrounds for Dark Matter Searches with HAWC."
Advisor: Segev BenZvi

Bachelor of Science, Physics 2008 – 2012
LUMS School of Science and Engineering, Lahore, Pakistan.

Research Leadership

Working Group Lead: Beyond Standard Model Physics 2023 – Present
IceCube Collaboration

Level 3 lead for Photo-detector Systems (SWG0-A) 2025– Present
SWG0 Collaboration

Technical Lead: Neutrino Sources Working Group 2022 – 2023
IceCube Collaboration

Convener: Particle Physics Working Group
HAWC Collaboration

2019 – 2023

Research Collaborations

Member HAWC Collaboration	2015 – Present
Member IceCube Collaboration	2019 – Present
Member P-ONE Collaboration	2023 – Present
Member SWGO Collaboration	2024 – Present

Teaching

at MSU

- PHY 294H: Honors Physics 2 - Electromagnetism Spring 2026
- PHY 184: Physics for Scientists and Engineers 2 Spring 2025
- PHY 184: Physics for Scientists and Engineers 2 Fall 2024
- PHY 221: Studio Physics for Life Scientists 1 Spring 2024

at University of Rochester

- PHY 141: Newtonian Mechanics Summer 2014

Awards and Recognition

Gaurang Yodh Award 2025
Award for 10 years of services and scientific contributions to HAWC

Seminars, Colloquia and Conference Talks

23. 09/08/2026 CCAPP Seminar, Ohio State University "The Galactic Neutrino Puzzle"
22. 04/2/2026 NCfA Symposium, University of Nevada Las Vegas (Invited Talk) "The Pacific Ocean Neutrino Experiment: Towards Sharpening Our view of the Neutrino Sky"
21. 10/16/2025 Physics Colloquium, Oakland University "The Puzzle of Cosmic Neutrinos"
20. 09/16/2025 Laboratory for Particle Physics and Cosmology Seminar, Harvard University "Understanding Dark Matter with TeV Gamma rays and Neutrinos"

19. 03/17/2025 CIPANP 2025 (Invited Talk) "BSM Physics: Perspectives and Recent Results from IceCube"
18. 03/17/2025 APS Global Summit (Invited Talk) "New Physics in the Neutrino Sky"
17. 10/18/2024 High Energy Physics Seminar, Cornell University "Unveiling the TeV Sky in Neutrinos and Gamma rays"
16. 04/25/2024 Center for Relativistic Astrophysics Seminar, Georgia Tech "Unveiling the TeV Sky in Neutrinos and Gamma rays"
15. 10/22/2023 IceCube Collaboration Meeting Science Session (Invited Talk) "Particle Astrophysics with the Very-High-Energy Sun"
14. 03/26/2023 AAS HEAD Meeting 2023 (Invited Talk) "Neutrino Astronomy: Overview and Prospects"
13. 02/06/2023 Cosmic Physics Center Seminar, Fermi National Accelerator Laboratory "Particle Astrophysics of the Sun in TeV Gamma rays"
12. 11/29/2022 MAGIC Multi-wavelength and Multi-messenger Seminar "IceCube in the Era of Realtime Multi-messenger Astronomy"
11. 06/09/2022 NASA Goddard Space Flight Center Colloquium "The Search for Dark Matter in the Very-high-energy Sky"
10. 04/04/2022 Physics Seminar – National University of Science and Technology, Islamabad "The Search for Dark Matter in the Ultra-high-energy Sky"
9. 03/28/2022 University of Michigan Ann Arbor "Mapping the TeV Sky with HAWC"
8. 02/24/2022 University of Massachusetts Lowell Center for Space Science & Technology "Mapping the TeV Sky with HAWC"
7. 02/16/2022 University of Maryland "The TeV Sky in Neutrinos and Gamma rays"
6. 09/13/2021 HQL 2021 (Invited Talk) "Probing the Neutrino Sky for New Physics with IceCube"
5. 06/07/2021 AAS 2021 (Invited Talk) "The Sun as a Target for Very-High-Energy Gamma-Ray Observations"
4. 02/02/2021 COSPAR 2021 (Invited Talk) "Mapping the TeV Sky with HAWC in the era of CTA"
3. 10/1/2019 HEP Seminar – MSU "Constraining the Foregrounds for New Physics Searches in TeV Cosmic rays and Gamma rays"
2. 06/20/2019 Physics Research Seminar – LUMS "Observing the Very-High-Energy Sky for Particle Signatures of Dark Matter"
1. 09/18/2018 CCAPP Seminar – Ohio State University "Looking for New Physics with HAWC Observations of the Moon and the Sun"

Contributed Conference Talks

8. 08/08/2022 **TeVPA 2022** "HAWC Observations of Gamma Rays from the Quiescent Sun"
7. 10/29/2021 **TeVPA 2021** "A Time-independent Search for Neutrinos from Galaxy Clusters with IceCube"
6. 03/29/2021 **Winter Aspen Conference** "A Glimpse into the Dark Sector with TeV Gamma Rays and Cosmic Rays"
5. 07/31/2019 **ICRC 2019** "Probing the Anomalous Flux of Very-high-energy Gamma rays from the Sun with HAWC"
4. 04/14/2018 **APS April Meeting** "Searching for TeV signatures of cosmic-ray interaction and dark matter near the Sun with HAWC Observatory"
3. 08/07/2017 **TeVPA 2017** "Observations of the Moon and the Sun with the HAWC Observatory"
2. 07/13/2017 **ICRC 2017** "Probing Cosmic-ray Propagation with TeV gamma rays from the Sun using HAWC Observatory"
1. 01/31/2017 **APS April Meeting** "Observations of the Moon and the Sun using TeV gamma rays and cosmic rays"

Outreach and EDI Efforts

- 2024 **MSU Science Festival** Presenter and Organizer (particle astrophysics activities)
- 2022–Present **Supernova Foundation** Mentor for Women in Physics
- 2020–Present **Astronomy on Tap, Lansing - MI** Annual Public Talks on High Energy Astrophysics and Dark Matter
- 2024 **Skype a Scientist** Guest speaker (Aimed at Middle school students)
- 2021–2023 **IceCube Diversity Task Force** Member
- 2022 **Pakistan Alliance for Math and Science** STEM Ambassador (Aimed at High School Girls)
- 2019 **National Incubation Center, Lahore, Pakistan** Public Talk on Dark Matter
- 2017–2019 **IceCube MasterClass for High School Students** Tutor
- 2018 **IAU Astronomy Translation Network** Translator and Scientific Reviewer
- 2018 **University of Rochester Pre-College Summer Program** Tutor
- 2016–2017 **University of Rochester Upward Bound Program** Physics Demo Instructor
- 2017 **APS April Meeting Press Conference** on behalf of HAWC

Scientific Press and Media

- Kainaat Astronomy, [Dark Matter and Neutrino Astronomy](#) (April 2025)
- MSU News, [Spartans help make a surprising discovery about the sun](#) (Aug 2023)
- Physics World, [HAWC spots highest-energy photons from the Sun, deep colours keep their cool](#) (Aug 2023)
- IceCube News, [IceCube search for neutrino emission from extended sources in the galactic plane](#) (July 2023)
- IceCube News, [ICECAT-1, IceCube's first event catalog of neutrino "track" alerts](#) (April 2023)
- Quanta Magazine, [Strange Solar Gamma Rays Discovered at Even Higher Energies](#) (Feb 2023)
- IceCube News, [IceCube sets strongest limits on galaxy clusters as potential neutrino sources](#) (Sep 2022)
- IceCube News, [IceCube places the strictest constraints on WIMPs from the sun](#) (Nov 2021)
- University of Rochester News, [In the mystery of positrons, dark matter is leading suspect](#) (Nov 2017)

Professional Service

- **Graduate Admissions Committee** 2024–2025
Department of Physics and Astronomy, MSU
- **Graduate Student Guidance Committee Member** 2024–Present
Joseph Chung-Jung, Ian Herzog, Shane Watters
- **National Science Foundation**
Peer Review Panelist
- **Fermi Gamma-Ray Space Telescope Guest Investigator Program**
Peer Review Panelist
- **Journal Referee**
Physical Review Letters, Physical Review D, Astrophysical Journal
- **Conference Session Convener** 2025
Indirect Dark Matter Detection – TeVPA (TeV Particle Astrophysics)
- **Conference Session Chair** 2025
APS Global Summit
- **Workshop Co-organizer – Primordial Blackholes: Theory Meets Experiment** 2025
Amherst Center for Fundamental Interactions

Research Supervision and Mentorship

Postdoctoral Researchers (including co-advisees)*

- Rishi Babu (2024–Present)
- Dan Salazar* (2024–Present)
- Victoria Parrish* (2024–Present)
- Steve DeKirby* (2024–Present)

Graduate Students (including co-advisees)*

- Alejandra Granados (2024–Present)
- Brandon Henke (2024–Present)
- Joselyn Winda* (2025–Present)
- Phoebe Zyla* (2025–Present)
- Alina Kochocki* (2023–Present)
- Jean-Pierre Twagirayezu* (2024–Present)
- Maria Fernanda* (2025–Present)
- Dan Salazar* (2020–2024), now MSU postdoc
- Devyn Rysewyk* (2019–2021), now at Johns Hopkins University Applied Physics Laboratory
- Alison Peisker* (2019–2021), now at Fermilab

Undergraduate Students

- Sam Mungan (MSU) (2025–Present)
- Sean Furnas (MSU) (2025–Present)
- Palmer Wentworth (MSU) (2024–Present)
- Naga Dutta (MSU) (2024–2025)
- Dhiti Doddamreddy (MSU) (2023–2025), now at University of Padua
- Purvi Garg (2023–2024)
- Brandon Pries (2021–Present), now a graduate student at Georgia Tech University
- Ibrahim Osman (Howard University) (2024)

Publications

The full list of publications with complete author-lists can be found on [Google Scholar](#), [ADSABS](#) and [INSPIRE](#). The research is performed in large scientific collaborations with $\mathcal{O}(100)$ members who are listed in alphabetical order as authors on papers. In these collaborations, members are required to fulfill service tasks for the experiment, usually for a year, before they are eligible to become authors. Before scientific results can be shown publicly or published they go through an internal review process. Publications are assigned an editorial review board of 3 fellow collaborators whom have expertise relevant to the analysis being reviewed but were not part of the analysis. Once the review board is satisfied the publication is announced to the entire collaboration for a final review before being submitted to a journal. This scrutiny of the analysis/publication can take months, even years, to complete. The person or team (3–5 people) leading the analysis are responsible for correspondence with internal and external reviewers, and are acknowledged in the manuscripts either as the corresponding author or as having made leading contributions. Therefore, complete author lists (100–400 people) are not listed below. Selected publications with significant contributions are listed below, such as those with the candidate as the lead author, supervisor, internal reviewer, and/or those produced under the candidate’s oversight as a working group lead.

Publications during the reported period are indicated in boldface. Peer-reviewed publications are indicated with an *. Publications with MSU students and postdoctoral advisees are indicated with a †.

Publications with Significant Contributions

- [1] * R. Abbasi et al. **Probing the PeV region in the astrophysical neutrino spectrum using $\nu\mu$ from the Southern sky.** In: *Phys. Rev. D* 112.1 (2025), p. 012022. DOI: [10.1103/2hnq-1fsx](#). arXiv: [2502.19776](#) [astro-ph.HE].
- [2] * R. Abbasi et al. **Search for dark matter from the center of the Earth with 10 years of IceCube data.** In: *Eur. Phys. J. C* 85.5 (2025), p. 490. DOI: [10.1140/epjc/s10052-025-14144-7](#). arXiv: [2412.12972](#) [astro-ph.HE].
- [3] R. Abbasi et al. **Search for Heavy Neutral Leptons with IceCube DeepCore.** In: *Submitted to PRD* (Feb. 2025). arXiv: [2502.09454](#) [hep-ex].
- [4] † * S. Abdollahi et al. **Combined dark matter search towards dwarf spheroidal galaxies with Fermi-LAT, HAWC, H.E.S.S., MAGIC, and VERITAS.** In: *Accepted in JCAP* (Oct. 2025). DOI: [10.48550/arXiv.2508.20229](#).
- [5] P. Abreu et al. **Science Prospects for the Southern Wide-field Gamma-ray Observatory: SWGO.** In: *Submitted to Astroparticle Physics* (June 2025). arXiv: [2506.01786](#) [astro-ph.HE].
- [6] * A. Albert et al. **Extended TeV Halos May Commonly Exist around Middle-Aged Pulsars.** In: *Phys. Rev. Lett.* 134 (17 Apr. 2025), p. 171005. DOI: [10.1103/PhysRevLett.134.171005](#). URL: <https://link.aps.org/doi/10.1103/PhysRevLett.134.171005>.
- [7] R. Alfaro et al. **Search for Signatures of Dark Matter Annihilation in the Galactic Center with HAWC.** In: *Submitted to PRL* (Sept. 2025). arXiv: [2509.06210](#) [astro-ph.HE].
- [8] † Rishi Babu et al. **Improving Gamma-ray Source Search with Image Processing.** In: *39th International Cosmic Ray Conference*. July 2025. arXiv: [2507.10307](#) [astro-ph.HE].
- [9] † Alejandra Granados, Rishi Babu, and Mehr Un Nisa. **Search for Neutrinos from the Galactic 4FGL Sources with the Pion-bump Signature with IceCube.** In: *39th International Cosmic Ray Conference*. July 2025. arXiv: [2507.23040](#) [astro-ph.HE].

- [10] † Alina Kochocki et al. **A Search for Astrophysical Neutrinos from Flaring X-ray Binaries with IceCube.** In: *39th International Cosmic Ray Conference*. July 2025. arXiv: [2507.06807 \[astro-ph.HE\]](#).
- [11] * A. Albert et al. *Search for decaying dark matter in the Virgo cluster of galaxies with HAWC.* In: *Phys. Rev. D* 109.4 (2024), p. 043034. DOI: [10.1103/PhysRevD.109.043034](#). arXiv: [2309.03973 \[astro-ph.HE\]](#).
- [12] † * A. Albert et al. **TeV Analysis of a Source-rich Region with the HAWC Observatory: Is HESS J1809-193 a Potential Hadronic PeVatron?** In: *Astrophys. J.* 972.1 (2024), p. 21. DOI: [10.3847/1538-4357/ad59a6](#). arXiv: [2407.08849 \[astro-ph.HE\]](#).
- [13] * R. Alfaro et al. **Search for Joint Multimessenger Signals from Potential Galactic Cosmic-Ray Accelerators with HAWC and IceCube.** In: *Astrophys. J.* 976.1 (2024), p. 8. DOI: [10.3847/1538-4357/ad812f](#). arXiv: [2405.03817 \[astro-ph.HE\]](#).
- [14] * R. Abbasi et al. *IceCat-1: the IceCube Event Catalog of Alert Tracks.* In: *Astrophys. J. Suppl.* 269.1 (2023), p. 25. eprint: [2304.01174](#).
- [15] * R. Abbasi et al. *Search for Extended Sources of Neutrino Emission in the Galactic Plane with IceCube.* In: *Astrophys. J.* 956.1 (2023), p. 20. DOI: [10.3847/1538-4357/acf713](#). eprint: [2307.07576](#).
- [16] * R. Abbasi et al. **Searches for connections between dark matter and high-energy neutrinos with IceCube.** In: *JCAP* 10 (2023), p. 003. DOI: [10.1088/1475-7516/2023/10/003](#). arXiv: [2205.12950 \[hep-ex\]](#).
- [17] * A. Albert et al. *Discovery of Gamma Rays from the Quiescent Sun with HAWC.* In: *Phys. Rev. Lett.* 131.5 (2023), p. 051201. DOI: [10.1103/PhysRevLett.131.051201](#). arXiv: [2212.00815 \[astro-ph.HE\]](#).
- [18] * R. Abbasi et al. *Search for GeV-scale Dark Matter Annihilation in the Sun with IceCube DeepCore.* In: *Phys. Rev. D* 105.6 (2022), p. 062004. DOI: [10.1103/PhysRevD.105.062004](#). eprint: [2111.09970](#).
- [19] * R. Abbasi et al. *Searching for High-Energy Neutrino Emission from Galaxy Clusters with IceCube.* In: *Astrophys. J. Lett.* 938 (June 2022), p. L11. DOI: [10.3847/2041-8213/ac966b](#). arXiv: [2206.02054](#).
- [20] * A. Albert et al. *3HWC: The Third HAWC Catalog of Very-high-energy Gamma-Ray Sources.* In: *The Astrophysical Journal* 905.1 (Dec. 2020), p. 76. DOI: [10.3847/1538-4357/abc2d8](#). URL: <https://doi.org/10.3847/1538-4357/abc2d8>.
- [21] * A. Albert et al. *Constraining the Local Burst Rate Density of Primordial Black Holes with HAWC.* In: *JCAP* 04 (2020), p. 026. DOI: [10.1088/1475-7516/2020/04/026](#). arXiv: [1911.04356 \[astro-ph.HE\]](#).
- [22] * A. Albert et al. **Constraints on Lorentz Invariance Violation from HAWC Observations of Gamma Rays above 100 TeV.** In: *Phys. Rev. Lett.* 124.13 (2020), p. 131101. DOI: [10.1103/PhysRevLett.124.131101](#). arXiv: [1911.08070 \[astro-ph.HE\]](#).
- [23] * D. Rysewyk et al. *Atmospheric Cherenkov Telescopes as a potential veto array for neutrino astronomy.* In: *Astroparticle Physics* 117 (2020), p. 102417. ISSN: 0927-6505. DOI: <https://doi.org/10.1016/j.astropartphys.2019.102417>. URL: <http://www.sciencedirect.com/science/article/pii/S0927650519302208>.

- [24] M. U. Nisa et al. *The Sun at GeV–TeV Energies: A New Laboratory for Astroparticle Physics*. In: Bulletin of the American Astronomical Society 51.194 (3 2019). *arXiv*: 1903.06349 [astro-ph.HE].
- [25] * A. U. Abeysekara et al. *Constraining the $\bar{p}/p$ ratio in TeV cosmic rays with observations of the Moon shadow by HAWC*. In: Phys. Rev. D 97.10 (2018), p. 102005. DOI: 10.1103/PhysRevD.97.102005. *arXiv*: 1802.08913 [astro-ph.HE].
- [26] * A. Albert et al. *Constraints on Spin-Dependent Dark Matter Scattering with Long-Lived Mediators from TeV Observations of the Sun with HAWC*. In: Phys. Rev. D (2018). [Phys. Rev. D 98, 123012 (2018)]. DOI: 10.1103/PhysRevD.98.123012. *arXiv*: 1808.05624 [hep-ph].
- [27] * A. Albert et al. *First HAWC Observations of the Sun Constrain Steady TeV Gamma-Ray Emission*. In: Phys. Rev. D 98.12 (2018), p. 123011. DOI: 10.1103/PhysRevD.98.123011. *arXiv*: 1808.05620 [astro-ph.HE].
- [28] * R. Lopez-Coto et al. *Effect of the diffusion parameters on the observed γ -ray spectrum of sources and their contribution to the local all-electron spectrum: The EDGE code*. In: Astropart. Phys. 102 (2018), pp. 1–11. DOI: 10.1016/j.astropartphys.2018.04.003. *arXiv*: 1709.07653 [astro-ph.HE].
- [29] * A. U. Abeysekara et al. *Extended gamma-ray sources around pulsars constrain the origin of the positron flux at Earth*. In: Science 358.6365 (2017), pp. 911–914. DOI: 10.1126/science.aan4880. *arXiv*: 1711.06223 [astro-ph.HE].
- [30] * R. Lopez-Coto et al. *EDGE: a code to calculate diffusion of cosmic-ray electrons and their gamma-ray emission*. In: Proceedings, 35th International Cosmic Ray Conference (ICRC 2017): Bexco, Busan, Korea, July 12–20, 2017. 2017. *arXiv*: 1708.03139 [astro-ph.HE]. URL: <http://inspirehep.net/record/1615446/files/arXiv:1708.03139.pdf>.
- [31] Mehr Un Nisa. *Probing Cosmic-ray Propagation with TeV Gamma Rays from the Sun Using the HAWC Observatory*. In: Proceedings, 35th International Cosmic Ray Conference (ICRC 2017): Bexco, Busan, Korea, July 12–20, 2017. 2017. *arXiv*: 1708.03732 [astro-ph.HE]. URL: <http://inspirehep.net/record/1615828/files/arXiv:1708.03732.pdf>.
- [32] Segev BenZvi et al. *Towards a Measurement of the e^+e^- Flux above 1 TeV with HAWC*. In: PoS ICRC2015 (2016), p. 248. *arXiv*: 1508.03466 [astro-ph.HE].

As a Member of HAWC Collaboration

- [1] A. U. Abeysekara et al. *Absence of TeV halos around millisecond pulsars*. In: Phys. Rev. D 111.4 (2025), p. 043014. DOI: 10.1103/PhysRevD.111.043014. *arXiv*: 2505.00184 [astro-ph.HE].
- [2] R. Alfaro et al. *Orbital Modulation of Gamma Rays up to 100 TeV from LS 5039*. In: Astrophys. J. Lett. 987.2 (2025), p. L42. DOI: 10.3847/2041-8213/ade760. *arXiv*: 2503.20947 [astro-ph.HE].
- [3] R. Alfaro et al. *Study of Long-term Spectral Evolution and X-Ray and γ -Ray Correlation of Blazars Seen by HAWC*. In: Astrophys. J. 980.1 (2025), p. 88. DOI: 10.3847/1538-4357/ad9d3d. *arXiv*: 2501.15041 [astro-ph.HE].
- [4] R. Alfaro et al. *Study of the IC 443 region with the HAWC observatory*. In: (Jan. 2025). *arXiv*: 2501.12613 [astro-ph.HE].

- [5] A. Albert et al. Observation of the Galactic Center PeVatron beyond 100 TeV with HAWC. In: *Astrophys. J. Lett.* 973.1 (2024), p. L34. DOI: [10.3847/2041-8213/ad772e](https://doi.org/10.3847/2041-8213/ad772e). arXiv: [2407.03682](https://arxiv.org/abs/2407.03682) [astro-ph.HE].
- [6] A. . Albert et al. Performance of the HAWC Observatory and TeV Gamma-Ray Measurements of the Crab Nebula with Improved Extensive Air Shower Reconstruction Algorithms. In: *Astrophys. J.* 972.2 (2024), p. 144. DOI: [10.3847/1538-4357/ad5f2d](https://doi.org/10.3847/1538-4357/ad5f2d). arXiv: [2405.06050](https://arxiv.org/abs/2405.06050) [astro-ph.HE].
- [7] R. Alfaro et al. Analysis of the Emission and Morphology of the Pulsar Wind Nebula Candidate HAWC J2031+415. In: *Astrophys. J.* 975 (2024), p. 198. DOI: [10.3847/1538-4357/ad782a](https://doi.org/10.3847/1538-4357/ad782a). arXiv: [2407.02879](https://arxiv.org/abs/2407.02879) [astro-ph.HE].
- [8] R. Alfaro et al. Spectral Study of Very-high-energy Gamma Rays from SS 433 with HAWC. In: *Astrophys. J.* 976.1 (2024), p. 30. DOI: [10.3847/1538-4357/ad7e1b](https://doi.org/10.3847/1538-4357/ad7e1b). arXiv: [2410.21796](https://arxiv.org/abs/2410.21796) [astro-ph.HE].
- [9] A. U. Abeysekara et al. The High-Altitude Water Cherenkov (HAWC) observatory in México: The primary detector. In: *Nucl. Instrum. Meth. A* 1052 (2023), p. 168253. DOI: [10.1016/j.nima.2023.168253](https://doi.org/10.1016/j.nima.2023.168253). arXiv: [2304.00730](https://arxiv.org/abs/2304.00730) [astro-ph.HE].
- [10] A. Albert et al. Detailed Analysis of the TeV γ -Ray Sources 3HWC J1928+178, 3HWC J1930+188, and the New Source HAWC J1932+192. In: *Astrophys. J.* 942.2 (2023), p. 96. DOI: [10.3847/1538-4357/ac8de3](https://doi.org/10.3847/1538-4357/ac8de3). arXiv: [2302.14137](https://arxiv.org/abs/2302.14137) [astro-ph.HE].
- [11] A. Albert et al. HAWC Detection of a TeV Halo Candidate Surrounding a Radio-quiet Pulsar. In: *Astrophys. J. Lett.* 944.2 (2023), p. L29. DOI: [10.3847/2041-8213/acb5ee](https://doi.org/10.3847/2041-8213/acb5ee). arXiv: [2301.04646](https://arxiv.org/abs/2301.04646) [astro-ph.HE].
- [12] Andrea Albert et al. A Preliminary Look at the Construction of the 4HWC Very High and Ultra High Energy Source Catalog Using the Multi Source Fit Method. In: *PoS ICRC2023* (2023), p. 759. DOI: [10.22323/1.444.0759](https://doi.org/10.22323/1.444.0759).
- [13] Andrea Albert et al. ALPs searches with galactic sources using the HAWC Observatory. In: *PoS ICRC2023* (2023), p. 1422. DOI: [10.22323/1.444.1422](https://doi.org/10.22323/1.444.1422).
- [14] Andrea Albert et al. Constraining the TeV halo population in M31. In: *PoS ICRC2023* (2023), p. 768. DOI: [10.22323/1.444.0768](https://doi.org/10.22323/1.444.0768).
- [15] Andrea Albert et al. HAWC observations of microquasars as powerful particle accelerators. In: *PoS ICRC2023* (2023), p. 797. DOI: [10.22323/1.444.0797](https://doi.org/10.22323/1.444.0797).
- [16] Andrea Albert et al. High energy gamma ray emission from HESSJ1809-193: Morphological and Spectral studies with HAWC. In: *PoS ICRC2023* (2023), p. 789. DOI: [10.22323/1.444.0789](https://doi.org/10.22323/1.444.0789).
- [17] Andrea Albert et al. Recent Results From Hawc. In: *PoS ICRC2023* (2023), p. 756. DOI: [10.22323/1.444.0756](https://doi.org/10.22323/1.444.0756).
- [18] Andrea Albert et al. Revealing Ultra-High-Energy Gamma-Ray Emission from the eHWC J1825-134 Region with HAWC. In: *PoS ICRC2023* (2023), p. 796. DOI: [10.22323/1.444.0796](https://doi.org/10.22323/1.444.0796).
- [19] Andrea Albert et al. Spectral Study of the West Jet Lobe of SS 433 with HAWC. In: *PoS ICRC2023* (2023), p. 769. DOI: [10.22323/1.444.0769](https://doi.org/10.22323/1.444.0769).
- [20] Andrea Albert et al. Study of the HAWC counterpart of LHAASO J1849-0003 and its surroundings at TeV energies. In: *PoS ICRC2023* (2023), p. 581. DOI: [10.22323/1.444.0581](https://doi.org/10.22323/1.444.0581).
- [21] Andrea Albert et al. TeV Halo Study of Geminga and Monogem with HAWC. In: *PoS ICRC2023* (2023), p. 710. DOI: [10.22323/1.444.0710](https://doi.org/10.22323/1.444.0710).

- [22] Andrea Albert et al. The Boomerang PWN and its SNR G106.3+2.7 Viewed in the Very-High-Energy Gamma-Ray Regime by the HAWC Observatory. In: *PoS ICRC2023* (2023), p. 693. DOI: [10.22323/1.444.0693](https://doi.org/10.22323/1.444.0693).
- [23] H. A. Ayala Solares et al. Search for Gamma-Ray and Neutrino Coincidences Using HAWC and ANTARES Data. In: *Astrophys. J.* 944.2 (2023), p. 166. DOI: [10.3847/1538-4357/acafdd](https://doi.org/10.3847/1538-4357/acafdd). arXiv: [2209.13462](https://arxiv.org/abs/2209.13462) [[astro-ph.HE](#)].
- [24] Jose Andres Garcia Gonzalez et al. Comparing HAWC blazars light curves with different data reconstruction versions. In: *PoS ICRC2023* (2023), p. 889. DOI: [10.22323/1.444.0889](https://doi.org/10.22323/1.444.0889). arXiv: [2312.06536](https://arxiv.org/abs/2312.06536) [[astro-ph.HE](#)].
- [25] J. Patrick Harding et al. Beyond the Standard Model with HAWC. In: *PoS ICRC2023* (2023), p. 1400. DOI: [10.22323/1.444.1400](https://doi.org/10.22323/1.444.1400).
- [26] Pat Harding et al. The HAWC ultra-high-energy gamma-ray map with more than 5 years of data. In: *PoS ICRC2023* (2023), p. 698. DOI: [10.22323/1.444.0698](https://doi.org/10.22323/1.444.0698). arXiv: [2311.00861](https://arxiv.org/abs/2311.00861) [[astro-ph.HE](#)].
- [27] Fernando Josue Urena Mena et al. An updated survey of Active Galaxies with the HAWC gamma-ray observatory. In: *PoS ICRC2023* (2023), p. 805. DOI: [10.22323/1.444.0805](https://doi.org/10.22323/1.444.0805). arXiv: [2310.02484](https://arxiv.org/abs/2310.02484) [[astro-ph.HE](#)].
- [28] Fernando Josue Urena Mena et al. Study of the long-term Very High Energy emission of the blazars 1ES 1215+3031 and VER J0521+211 with the HAWC gamma-ray observatory. In: *PoS ICRC2023* (2023), p. 807. DOI: [10.22323/1.444.0807](https://doi.org/10.22323/1.444.0807). arXiv: [2310.02468](https://arxiv.org/abs/2310.02468) [[astro-ph.HE](#)].
- [29] Ian Watson et al. Deep Learning for the HAWC Observatory. In: *PoS ICRC2023* (2023), p. 927. DOI: [10.22323/1.444.0927](https://doi.org/10.22323/1.444.0927).
- [30] Sohyoun L. Yun-Carcamo et al. Observation of the Crab Nebula and Galactic Center with the improved HAWC reconstruction algorithm. In: *PoS ICRC2023* (2023), p. 697. DOI: [10.22323/1.444.0697](https://doi.org/10.22323/1.444.0697).
- [31] A. Albert et al. HAWC Study of the Ultra-high-energy Spectrum of MGRO J1908+06. In: *Astrophys. J.* 928.2 (2022), p. 116. DOI: [10.3847/1538-4357/ac56e5](https://doi.org/10.3847/1538-4357/ac56e5). arXiv: [2112.00674](https://arxiv.org/abs/2112.00674) [[astro-ph.HE](#)].
- [32] A. Albert et al. Probing the extragalactic mid-infrared background with HAWC. In: *Astrophys. J.* 933.2 (2022), p. 223. DOI: [10.3847/1538-4357/ac7714](https://doi.org/10.3847/1538-4357/ac7714). arXiv: [2204.12166](https://arxiv.org/abs/2204.12166) [[astro-ph.HE](#)].
- [33] A. Albert et al. Validation of standardized data formats and tools for ground-level particle-based gamma-ray observatories. In: *Astron. Astrophys.* 667 (2022), A36. DOI: [10.1051/0004-6361/202243527](https://doi.org/10.1051/0004-6361/202243527). arXiv: [2203.05937](https://arxiv.org/abs/2203.05937) [[astro-ph.IM](#)].
- [34] R. Alfaro et al. Gamma/hadron separation with the HAWC observatory. In: *Nucl. Instrum. Meth. A* 1039 (2022), p. 166984. DOI: [10.1016/j.nima.2022.166984](https://doi.org/10.1016/j.nima.2022.166984). arXiv: [2205.12188](https://arxiv.org/abs/2205.12188) [[astro-ph.HE](#)].
- [35] Pat Harding et al. An Optimized Search for Dark Matter in the Galactic Halo with HAWC. In: *PoS ICRC2021* (2022), p. 531. DOI: [10.22323/1.395.0531](https://doi.org/10.22323/1.395.0531).
- [36] H. Abdalla et al. TeV Emission of Galactic Plane Sources with HAWC and H.E.S.S. In: *Astrophys. J.* 917.1 (2021), p. 6. DOI: [10.3847/1538-4357/abf64b](https://doi.org/10.3847/1538-4357/abf64b). arXiv: [2107.01425](https://arxiv.org/abs/2107.01425) [[astro-ph.IM](#)].
- [37] Hassan Abdalla et al. Combined dark matter searches towards dwarf spheroidal galaxies with Fermi-LAT, HAWC, H.E.S.S., MAGIC, and VERITAS. In: *PoS ICRC2021* (2021), p. 528. DOI: [10.22323/1.395.0528](https://doi.org/10.22323/1.395.0528). arXiv: [2108.13646](https://arxiv.org/abs/2108.13646) [[hep-ex](#)].

- [38] A. U. Abeysekara et al. HAWC observations of the acceleration of very-high-energy cosmic rays in the Cygnus Cocoon. In: *Nature Astron.* 5.5 (2021). [Erratum: *Nature Astron.* 5, 724–724 (2021)], pp. 465–471. DOI: [10.1038/s41550-021-01361-9](https://doi.org/10.1038/s41550-021-01361-9). arXiv: [2103.06820](https://arxiv.org/abs/2103.06820) [astro-ph.HE].
- [39] Anushka Udara Abeysekara et al. HAWC measurements of the energy spectra of cosmic ray protons, helium and heavy nuclei in the TeV range. In: *PoS ICRC2021* (2021), p. 374. DOI: [10.22323/1.395.0374](https://doi.org/10.22323/1.395.0374). arXiv: [2108.03208](https://arxiv.org/abs/2108.03208) [astro-ph.HE].
- [40] Anushka Udara Abeysekara et al. Horizontal muon track identification with neural networks in HAWC. In: *PoS ICRC2021* (2021), p. 1036. DOI: [10.22323/1.395.1036](https://doi.org/10.22323/1.395.1036). arXiv: [2107.14475](https://arxiv.org/abs/2107.14475) [physics.ins-det].
- [41] Anushka Udara Abeysekara et al. Particle Acceleration in the Cygnus Superbubble. In: *PoS ICRC2021* (2021), p. 831. DOI: [10.22323/1.395.0831](https://doi.org/10.22323/1.395.0831). arXiv: [2108.09348](https://arxiv.org/abs/2108.09348) [astro-ph.HE].
- [42] A. Albert et al. A Survey of Active Galaxies at TeV Photon Energies with the HAWC Gamma-Ray Observatory. In: *Astrophys. J.* 907.2 (2021), p. 67. DOI: [10.3847/1538-4357/abca9a](https://doi.org/10.3847/1538-4357/abca9a). arXiv: [2009.09039](https://arxiv.org/abs/2009.09039) [astro-ph.HE].
- [43] A. Albert et al. Evidence of 200 TeV photons from HAWC J1825-134. In: *Astrophys. J. Lett.* 907.2 (2021), p. L30. DOI: [10.3847/2041-8213/abd77b](https://doi.org/10.3847/2041-8213/abd77b). arXiv: [2012.15275](https://arxiv.org/abs/2012.15275) [astro-ph.HE].
- [44] A. Albert et al. Evidence that Ultra-high-energy Gamma Rays Are a Universal Feature near Powerful Pulsars. In: *Astrophys. J. Lett.* 911.2 (2021), p. L27. DOI: [10.3847/2041-8213/abf4dc](https://doi.org/10.3847/2041-8213/abf4dc). arXiv: [2101.07895](https://arxiv.org/abs/2101.07895) [astro-ph.HE].
- [45] A. Albert et al. HAWC Search for High-Mass Microquasars. In: *Astrophys. J. Lett.* 912.1 (2021), p. L4. DOI: [10.3847/2041-8213/abf35a](https://doi.org/10.3847/2041-8213/abf35a). arXiv: [2101.08945](https://arxiv.org/abs/2101.08945) [astro-ph.HE].
- [46] A. Albert et al. Probing the Sea of Cosmic Rays by Measuring Gamma-Ray Emission from Passive Giant Molecular Clouds with HAWC. In: *Astrophys. J.* 914.2 (2021), p. 106. DOI: [10.3847/1538-4357/abfc47](https://doi.org/10.3847/1538-4357/abfc47). arXiv: [2101.08748](https://arxiv.org/abs/2101.08748) [astro-ph.HE].
- [47] A. Albert et al. Spectrum and Morphology of the Very-high-energy Source HAWC J2019+368. In: *Astrophys. J.* 911.2 (2021), p. 143. DOI: [10.3847/1538-4357/abecda](https://doi.org/10.3847/1538-4357/abecda). arXiv: [2101.01649](https://arxiv.org/abs/2101.01649) [astro-ph.HE].
- [48] J. A. Morales-Soto et al. The all-particle cosmic ray energy spectrum measured with HAWC. In: *PoS ICRC2021* (2021), p. 330. DOI: [10.22323/1.395.0330](https://doi.org/10.22323/1.395.0330). arXiv: [2108.04748](https://arxiv.org/abs/2108.04748) [astro-ph.HE].
- [49] Mehr Nisa and Segev BenZvi. Probing the Anomalous Flux of Very-high-energy Gamma rays from the Sun with HAWC. In: *PoS ICRC2019* (2021), p. 369. DOI: [10.22323/1.358.0369](https://doi.org/10.22323/1.358.0369).
- [50] Laura Olivera-Nieto et al. Standardized formats for gamma-ray analysis applied to HAWC observatory data. In: *PoS ICRC2021* (2021), p. 727. DOI: [10.22323/1.395.0727](https://doi.org/10.22323/1.395.0727). arXiv: [2109.04097](https://arxiv.org/abs/2109.04097) [astro-ph.IM].
- [51] A. U. Abeysekara et al. Multiple Galactic Sources with Emission Above 56 TeV Detected by HAWC. In: *Phys. Rev. Lett.* 124.2 (2020), p. 021102. DOI: [10.1103/PhysRevLett.124.021102](https://doi.org/10.1103/PhysRevLett.124.021102). arXiv: [1909.08609](https://arxiv.org/abs/1909.08609) [astro-ph.HE].
- [52] A. Albert et al. 3HWC: The Third HAWC Catalog of Very-High-Energy Gamma-ray Sources. In: *Astrophys. J.* 905.1 (2020), p. 76. DOI: [10.3847/1538-4357/abc2d8](https://doi.org/10.3847/1538-4357/abc2d8). arXiv: [2007.08582](https://arxiv.org/abs/2007.08582) [astro-ph.HE].
- [53] A. Albert et al. HAWC and Fermi-LAT Detection of Extended Emission from the Unidentified Source 2HWC J2006+341. In: *Astrophys. J. Lett.* 903.1 (2020), p. L14. DOI: [10.3847/2041-8213/abbfae](https://doi.org/10.3847/2041-8213/abbfae). arXiv: [2010.06670](https://arxiv.org/abs/2010.06670) [astro-ph.HE].

- [54] A. Albert et al. HAWC J2227+610 and its association with G106.3+2.7, a new potential Galactic PeVatron. In: *Astrophys. J. Lett.* 896 (2020), p. L29. DOI: [10.3847/2041-8213/ab96cc](https://doi.org/10.3847/2041-8213/ab96cc). arXiv: [2005.13699](https://arxiv.org/abs/2005.13699) [astro-ph.HE].
- [55] A. Albert et al. Search for gamma-ray spectral lines from dark matter annihilation in dwarf galaxies with the High-Altitude Water Cherenkov observatory. In: *Phys. Rev. D* 101.10 (2020), p. 103001. DOI: [10.1103/PhysRevD.101.103001](https://doi.org/10.1103/PhysRevD.101.103001). arXiv: [1912.05632](https://arxiv.org/abs/1912.05632) [astro-ph.HE].
- [56] A. U. Abeysekara et al. Measurement of the Crab Nebula at the Highest Energies with HAWC. In: *Astrophys. J.* 881 (2019), p. 134. DOI: [10.3847/1538-4357/ab2f7d](https://doi.org/10.3847/1538-4357/ab2f7d). arXiv: [1905.12518](https://arxiv.org/abs/1905.12518) [astro-ph.HE].
- [57] A. U. Abeysekara et al. Searching for Dark Matter Sub-structure with HAWC. In: *JCAP* 07 (2019), p. 022. DOI: [10.1088/1475-7516/2019/07/022](https://doi.org/10.1088/1475-7516/2019/07/022). arXiv: [1811.11732](https://arxiv.org/abs/1811.11732) [astro-ph.HE].
- [58] M. L. Ahnen et al. MAGIC and Fermi-LAT gamma-ray results on unassociated HAWC sources. In: *Mon. Not. Roy. Astron. Soc.* 485.1 (2019), pp. 356–366. DOI: [10.1093/mnras/stz089](https://doi.org/10.1093/mnras/stz089). arXiv: [1901.03982](https://arxiv.org/abs/1901.03982) [astro-ph.HE].
- [59] A. U. Abeysekara et al. A Search for Dark Matter in the Galactic Halo with HAWC. In: *JCAP* 02 (2018), p. 049. DOI: [10.1088/1475-7516/2018/02/049](https://doi.org/10.1088/1475-7516/2018/02/049). arXiv: [1710.10288](https://arxiv.org/abs/1710.10288) [astro-ph.HE].
- [60] A. U. Abeysekara et al. Observation of Anisotropy of TeV Cosmic Rays with Two Years of HAWC. In: *Astrophys. J.* 865.1 (2018), p. 57. DOI: [10.3847/1538-4357/aad90c](https://doi.org/10.3847/1538-4357/aad90c). arXiv: [1805.01847](https://arxiv.org/abs/1805.01847) [astro-ph.HE].
- [61] A. U. Abeysekara et al. VERITAS and Fermi-LAT Observations of TeV Gamma-Ray Sources Discovered by HAWC in the 2HWC Catalog. In: *Astrophys. J.* 866.1 (2018), p. 24. DOI: [10.3847/1538-4357/aade4e](https://doi.org/10.3847/1538-4357/aade4e). arXiv: [1808.10423](https://arxiv.org/abs/1808.10423) [astro-ph.HE].
- [62] A. U. Abeysekara et al. Very high energy particle acceleration powered by the jets of the microquasar SS 433. In: *Nature* 562.7725 (2018). [Erratum: *Nature* 564, E38 (2018)], pp. 82–85. DOI: [10.1038/s41586-018-0565-5](https://doi.org/10.1038/s41586-018-0565-5). arXiv: [1810.01892](https://arxiv.org/abs/1810.01892) [astro-ph.HE].
- [63] A. Albert et al. Dark Matter Limits From Dwarf Spheroidal Galaxies with The HAWC Gamma-Ray Observatory. In: *Astrophys. J.* 853.2 (2018), p. 154. DOI: [10.3847/1538-4357/aaa6d8](https://doi.org/10.3847/1538-4357/aaa6d8). arXiv: [1706.01277](https://arxiv.org/abs/1706.01277) [astro-ph.HE].
- [64] A. Albert et al. Search for Dark Matter Gamma-ray Emission from the Andromeda Galaxy with the High-Altitude Water Cherenkov Observatory. In: *JCAP* 06 (2018). [Erratum: *JCAP* 04, E01 (2019)], p. 043. DOI: [10.1088/1475-7516/2018/06/043](https://doi.org/10.1088/1475-7516/2018/06/043). arXiv: [1804.00628](https://arxiv.org/abs/1804.00628) [astro-ph.HE].
- [65] A. U. Abeysekara et al. Daily monitoring of TeV gamma-ray emission from Mrk 421, Mrk 501, and the Crab Nebula with HAWC. In: *Astrophys. J.* 841.2 (2017), p. 100. DOI: [10.3847/1538-4357/aa729e](https://doi.org/10.3847/1538-4357/aa729e). arXiv: [1703.06968](https://arxiv.org/abs/1703.06968) [astro-ph.HE].
- [66] A. U. Abeysekara et al. Extended gamma-ray sources around pulsars constrain the origin of the positron flux at Earth. In: *Science* 358.6365 (2017), pp. 911–914. DOI: [10.1126/science.aan4880](https://doi.org/10.1126/science.aan4880). arXiv: [1711.06223](https://arxiv.org/abs/1711.06223) [astro-ph.HE].
- [67] A. U. Abeysekara et al. Observation of the Crab Nebula with the HAWC Gamma-Ray Observatory. In: *Astrophys. J.* 843.1 (2017), p. 39. DOI: [10.3847/1538-4357/aa7555](https://doi.org/10.3847/1538-4357/aa7555). arXiv: [1701.01778](https://arxiv.org/abs/1701.01778) [astro-ph.HE].
- [68] A. U. Abeysekara et al. Search for Very High-energy Gamma Rays from the Northern Fermi Bubble Region with HAWC. In: *Astrophys. J.* 842.2 (2017), p. 85. DOI: [10.3847/1538-4357/aa751a](https://doi.org/10.3847/1538-4357/aa751a). arXiv: [1703.01344](https://arxiv.org/abs/1703.01344) [astro-ph.HE].

- [69] A. U. Abeysekara et al. The 2HWC HAWC Observatory Gamma Ray Catalog. In: *Astrophys. J.* 843.1 (2017), p. 40. DOI: [10.3847/1538-4357/aa7556](https://doi.org/10.3847/1538-4357/aa7556). arXiv: [1702.02992](https://arxiv.org/abs/1702.02992) [[astro-ph.HE](#)].
- [70] A. U. Abeysekara et al. The HAWC real-time flare monitor for rapid detection of transient events. In: *Astrophys. J.* 843.2 (2017), p. 116. DOI: [10.3847/1538-4357/aa789f](https://doi.org/10.3847/1538-4357/aa789f). arXiv: [1704.07411](https://arxiv.org/abs/1704.07411) [[astro-ph.HE](#)].
- [71] R. Alfaro et al. All-particle cosmic ray energy spectrum measured by the HAWC experiment from 10 to 500 TeV. In: *Phys. Rev. D* 96.12 (2017), p. 122001. DOI: [10.1103/PhysRevD.96.122001](https://doi.org/10.1103/PhysRevD.96.122001). arXiv: [1710.00890](https://arxiv.org/abs/1710.00890) [[astro-ph.HE](#)].

As a Member of IceCube Collaboration

- [1] R. Abbasi et al. A Search for Millimeter-Bright Blazars as Astrophysical Neutrino Sources. In: (July 2025). arXiv: [2507.03989](https://arxiv.org/abs/2507.03989) [[astro-ph.HE](#)].
- [2] R. Abbasi et al. All-sky neutrino point-source search with IceCube combined track and cascade data. In: (July 2025). arXiv: [2507.07275](https://arxiv.org/abs/2507.07275) [[astro-ph.HE](#)].
- [3] R. Abbasi et al. Evidence for a Spectral Break or Curvature in the Spectrum of Astrophysical Neutrinos from 5 TeV–10 PeV. In: (July 2025). arXiv: [2507.22233](https://arxiv.org/abs/2507.22233) [[astro-ph.HE](#)].
- [4] R. Abbasi et al. Fast Low Energy Reconstruction using Convolutional Neural Networks. In: (May 2025). arXiv: [2505.16777](https://arxiv.org/abs/2505.16777) [[astro-ph.HE](#)].
- [5] R. Abbasi et al. GollumFit: An IceCube Open-Source Framework for Binned-Likelihood Neutrino Telescope Analyses. In: (June 2025). arXiv: [2506.04491](https://arxiv.org/abs/2506.04491) [[hep-ex](#)].
- [6] R. Abbasi et al. IceCube Search for Neutrino Emission from X-Ray Bright Seyfert Galaxies. In: *Astrophys. J.* 988.1 (2025), p. 141. DOI: [10.3847/1538-4357/addd05](https://doi.org/10.3847/1538-4357/addd05). arXiv: [2406.07601](https://arxiv.org/abs/2406.07601) [[astro-ph.HE](#)].
- [7] R. Abbasi et al. Identification and Denoising of Radio Signals from Cosmic-Ray Air Showers using Convolutional Neural Networks. In: (Aug. 2025). arXiv: [2508.14711](https://arxiv.org/abs/2508.14711) [[hep-ex](#)].
- [8] R. Abbasi et al. Improved measurements of the TeV–PeV extragalactic neutrino spectrum from joint analyses of IceCube tracks and cascades. In: (July 2025). arXiv: [2507.22234](https://arxiv.org/abs/2507.22234) [[astro-ph.HE](#)].
- [9] R. Abbasi et al. Measurement of Atmospheric Neutrino Oscillation Parameters Using Convolutional Neural Networks with 9.3 Years of Data in IceCube DeepCore. In: *Phys. Rev. Lett.* 134.9 (2025), p. 091801. DOI: [10.1103/PhysRevLett.134.091801](https://doi.org/10.1103/PhysRevLett.134.091801). arXiv: [2405.02163](https://arxiv.org/abs/2405.02163) [[hep-ex](#)].
- [10] R. Abbasi et al. Measurement of the inelasticity distribution of neutrino-nucleon interactions for $80 \text{ GeV} < E_\nu < 560 \text{ GeV}$ with IceCube DeepCore. In: *Phys. Rev. D* 111.11 (2025), p. 112001. DOI: [10.1103/PhysRevD.111.112001](https://doi.org/10.1103/PhysRevD.111.112001). arXiv: [2502.13299](https://arxiv.org/abs/2502.13299) [[hep-ex](#)].
- [11] R. Abbasi et al. Measurement of the mean number of muons with energies above 500 GeV in air showers detected with the IceCube Neutrino Observatory. In: (June 2025). arXiv: [2506.19241](https://arxiv.org/abs/2506.19241) [[hep-ex](#)].
- [12] R. Abbasi et al. Observation of Cosmic-Ray Anisotropy in the Southern Hemisphere with 12 yr of Data Collected by the IceCube Neutrino Observatory. In: *Astrophys. J.* 981.2 (2025), p. 182. DOI: [10.3847/1538-4357/adb1de](https://doi.org/10.3847/1538-4357/adb1de). arXiv: [2412.05046](https://arxiv.org/abs/2412.05046) [[astro-ph.HE](#)].
- [13] R. Abbasi et al. Physics potential of the IceCube Upgrade for atmospheric neutrino oscillations. In: (Sept. 2025). arXiv: [2509.13066](https://arxiv.org/abs/2509.13066) [[hep-ex](#)].

- [14] R. Abbasi et al. Search for Extremely-High-Energy Neutrinos and First Constraints on the Ultrahigh-Energy Cosmic-Ray Proton Fraction with IceCube. In: *Phys. Rev. Lett.* 135.3 (2025), p. 031001. DOI: [10.1103/PhysRevLett.135.031001](https://doi.org/10.1103/PhysRevLett.135.031001). arXiv: [2502.01963](https://arxiv.org/abs/2502.01963) [astro-ph.HE].
- [15] R. Abbasi et al. Search for High-Energy Neutrinos From the Sun Using Ten Years of IceCube Data. In: (July 2025). arXiv: [2507.08457](https://arxiv.org/abs/2507.08457) [hep-ex].
- [16] R. Abbasi et al. Search for Neutrino Doublets and Triplets Using 11.4 yr of IceCube Data. In: *Astrophys. J.* 981.2 (2025), p. 159. DOI: [10.3847/1538-4357/adb312](https://doi.org/10.3847/1538-4357/adb312). arXiv: [2501.09276](https://arxiv.org/abs/2501.09276) [astro-ph.HE].
- [17] R. Abbasi et al. Search for Neutrino Emission from Hard X-Ray AGN with IceCube. In: *Astrophys. J.* 981.2 (2025), p. 131. DOI: [10.3847/1538-4357/ada94b](https://doi.org/10.3847/1538-4357/ada94b). arXiv: [2406.06684](https://arxiv.org/abs/2406.06684) [astro-ph.HE].
- [18] R. Abbasi et al. Seasonal Variations of the Atmospheric Muon Neutrino Spectrum measured with IceCube. In: (Feb. 2025). arXiv: [2502.17890](https://arxiv.org/abs/2502.17890) [astro-ph.HE].
- [19] R. Abbasi et al. The LED calibration systems for the mDOM and D-Egg sensor modules of the IceCube Upgrade: Design, production, testing and use in module calibration. In: (Aug. 2025). arXiv: [2508.03822](https://arxiv.org/abs/2508.03822) [astro-ph.IM].
- [20] R. Abbasi et al. Time-Integrated Southern-Sky Neutrino Source Searches with 10 Years of IceCube Starting-Track Events at Energies Down to 1 TeV. In: (Jan. 2025). arXiv: [2501.16440](https://arxiv.org/abs/2501.16440) [astro-ph.HE].
- [21] Atreya Acharyya et al. VERITAS and Multiwavelength Observations of the Blazar B3 2247+381 in Response to an IceCube Neutrino Alert. In: *Astrophys. J.* 982.2 (2025), p. 80. DOI: [10.3847/1538-4357/adb30c](https://doi.org/10.3847/1538-4357/adb30c). arXiv: [2502.03853](https://arxiv.org/abs/2502.03853) [astro-ph.HE].
- [22] Zheyang Chen et al. Astrophysical neutrino flux measurement and search for tau neutrino induced cascades with 11 years of IceCube data. In: *39th International Cosmic Ray Conference*. July 2025. arXiv: [2507.08421](https://arxiv.org/abs/2507.08421) [astro-ph.HE].
- [23] R. Abbasi et al. Acceptance Tests of more than 10 000 Photomultiplier Tubes for the multi-PMT Digital Optical Modules of the IceCube Upgrade. In: *JINST* 19.07 (2024), P07038. DOI: [10.1088/1748-0221/19/07/P07038](https://doi.org/10.1088/1748-0221/19/07/P07038). arXiv: [2404.19589](https://arxiv.org/abs/2404.19589) [astro-ph.IM].
- [24] R. Abbasi et al. All-sky Search for Transient Astrophysical Neutrino Emission with 10 Years of IceCube Cascade Events. In: *Astrophys. J.* 967.1 (2024), p. 48. DOI: [10.3847/1538-4357/ad3730](https://doi.org/10.3847/1538-4357/ad3730). arXiv: [2312.05362](https://arxiv.org/abs/2312.05362) [astro-ph.HE].
- [25] R. Abbasi et al. Characterization of the astrophysical diffuse neutrino flux using starting track events in IceCube. In: *Phys. Rev. D* 110.2 (2024), p. 022001. DOI: [10.1103/PhysRevD.110.022001](https://doi.org/10.1103/PhysRevD.110.022001). arXiv: [2402.18026](https://arxiv.org/abs/2402.18026) [astro-ph.HE].
- [26] R. Abbasi et al. Citizen science for IceCube: Name that Neutrino. In: *Eur. Phys. J. Plus* 139.6 (2024), p. 533. DOI: [10.1140/epjp/s13360-024-05179-y](https://doi.org/10.1140/epjp/s13360-024-05179-y). arXiv: [2401.11994](https://arxiv.org/abs/2401.11994) [astro-ph.HE].
- [27] R. Abbasi et al. Exploration of mass splitting and muon/tau mixing parameters for an eV-scale sterile neutrino with IceCube. In: *Phys. Lett. B* 858 (2024), p. 139077. DOI: [10.1016/j.physletb.2024.139077](https://doi.org/10.1016/j.physletb.2024.139077). arXiv: [2406.00905](https://arxiv.org/abs/2406.00905) [hep-ex].
- [28] R. Abbasi et al. Improved modeling of in-ice particle showers for IceCube event reconstruction. In: *JINST* 19.06 (2024), P06026. DOI: [10.1088/1748-0221/19/06/P06026](https://doi.org/10.1088/1748-0221/19/06/P06026). arXiv: [2403.02470](https://arxiv.org/abs/2403.02470) [astro-ph.HE].

- [29] R. Abbasi et al. Methods and stability tests associated with the sterile neutrino search using improved high-energy $\nu\mu$ event reconstruction in IceCube. In: *Phys. Rev. D* 110.9 (2024), p. 092009. DOI: [10.1103/PhysRevD.110.092009](https://doi.org/10.1103/PhysRevD.110.092009). arXiv: [2405.08077](https://arxiv.org/abs/2405.08077) [hep-ex].
- [30] R. Abbasi et al. Observation of Seven Astrophysical Tau Neutrino Candidates with IceCube. In: *Phys. Rev. Lett.* 132.15 (2024), p. 151001. DOI: [10.1103/PhysRevLett.132.151001](https://doi.org/10.1103/PhysRevLett.132.151001). arXiv: [2403.02516](https://arxiv.org/abs/2403.02516) [astro-ph.HE].
- [31] R. Abbasi et al. Probing the Connection between IceCube Neutrinos and MOJAVE AGN. In: *Astrophys. J.* 973.2 (2024), p. 97. DOI: [10.3847/1538-4357/ad643d](https://doi.org/10.3847/1538-4357/ad643d). arXiv: [2407.01351](https://arxiv.org/abs/2407.01351) [astro-ph.HE].
- [32] R. Abbasi et al. Search for 10–1000 GeV Neutrinos from Gamma-Ray Bursts with IceCube. In: *Astrophys. J.* 964.2 (2024), p. 126. DOI: [10.3847/1538-4357/ad220b](https://doi.org/10.3847/1538-4357/ad220b). arXiv: [2312.11515](https://arxiv.org/abs/2312.11515) [astro-ph.HE].
- [33] R. Abbasi et al. Search for a light sterile neutrino with 7.5 years of IceCube DeepCore data. In: *Phys. Rev. D* 110.7 (2024), p. 072007. DOI: [10.1103/PhysRevD.110.072007](https://doi.org/10.1103/PhysRevD.110.072007). arXiv: [2407.01314](https://arxiv.org/abs/2407.01314) [hep-ex].
- [34] R. Abbasi et al. Search for an eV-Scale Sterile Neutrino Using Improved High-Energy $\nu\mu$ Event Reconstruction in IceCube. In: *Phys. Rev. Lett.* 133.20 (2024), p. 201804. DOI: [10.1103/PhysRevLett.133.201804](https://doi.org/10.1103/PhysRevLett.133.201804). arXiv: [2405.08070](https://arxiv.org/abs/2405.08070) [hep-ex].
- [35] R. Abbasi et al. Search for Continuous and Transient Neutrino Emission Associated with IceCube’s Highest-energy Tracks: An 11 yr Analysis. In: *Astrophys. J.* 964.1 (2024), p. 40. DOI: [10.3847/1538-4357/ad18d6](https://doi.org/10.3847/1538-4357/ad18d6). arXiv: [2309.12130](https://arxiv.org/abs/2309.12130) [astro-ph.HE].
- [36] R. Abbasi et al. Search for decoherence from quantum gravity with atmospheric neutrinos. In: *Nature Phys.* 20.6 (2024), pp. 913–920. DOI: [10.1038/s41567-024-02436-w](https://doi.org/10.1038/s41567-024-02436-w). arXiv: [2308.00105](https://arxiv.org/abs/2308.00105) [hep-ex].
- [37] R. Abbasi et al. Search for Galactic Core-collapse Supernovae in a Decade of Data Taken with the IceCube Neutrino Observatory. In: *Astrophys. J.* 961.1 (2024), p. 84. DOI: [10.3847/1538-4357/ad07d1](https://doi.org/10.3847/1538-4357/ad07d1). arXiv: [2308.01172](https://arxiv.org/abs/2308.01172) [astro-ph.HE].
- [38] Rasha Abbasi et al. Cosmic ray detection with the IceTop Enhancement. In: *PoS EPS-HEP2023* (2024), p. 081. DOI: [10.22323/1.449.0081](https://doi.org/10.22323/1.449.0081). arXiv: [2506.18566](https://arxiv.org/abs/2506.18566) [astro-ph.HE].
- [39] Rasha Abbasi et al. In situ estimation of ice crystal properties at the South Pole using LED calibration data from the IceCube Neutrino Observatory. In: *The Cryosphere* 18.1 (2024), pp. 75–102. DOI: [10.5194/tc-18-75-2024](https://doi.org/10.5194/tc-18-75-2024).
- [40] Rasha Abbasi et al. Towards the Composition of sub-PeV Cosmic Rays at IceCube. In: *PoS TAUP2023* (2024), p. 137. DOI: [10.22323/1.441.0137](https://doi.org/10.22323/1.441.0137).
- [41] Naoko Kurahashi Neilson et al. Highlights from the IceCube Neutrino Observatory. In: *PoS ICRC2023* (2024), p. 017. DOI: [10.22323/1.444.0017](https://doi.org/10.22323/1.444.0017). arXiv: [2310.12840](https://arxiv.org/abs/2310.12840) [astro-ph.HE].
- [42] R. Abbasi et al. A Search for Coincident Neutrino Emission from Fast Radio Bursts with Seven Years of IceCube Cascade Events. In: *Astrophys. J.* 946.2 (2023), p. 80. DOI: [10.3847/1538-4357/acbea0](https://doi.org/10.3847/1538-4357/acbea0). arXiv: [2212.06702](https://arxiv.org/abs/2212.06702) [astro-ph.HE].
- [43] R. Abbasi et al. A Search for IceCube Sub-TeV Neutrinos Correlated with Gravitational-wave Events Detected By LIGO/Virgo. In: *Astrophys. J.* 959.2 (2023). [Erratum: *Astrophys. J.* 971, 192 (2024)], p. 96. DOI: [10.3847/1538-4357/aceefc](https://doi.org/10.3847/1538-4357/aceefc). arXiv: [2303.15970](https://arxiv.org/abs/2303.15970) [astro-ph.HE].

- [44] R. Abbasi et al. Constraining High-energy Neutrino Emission from Supernovae with IceCube. In: *Astrophys. J. Lett.* 949.1 (2023), p. L12. DOI: [10.3847/2041-8213/acd2c9](https://doi.org/10.3847/2041-8213/acd2c9). arXiv: [2303.03316](https://arxiv.org/abs/2303.03316) [astro-ph.HE].
- [45] R. Abbasi et al. Constraints on Populations of Neutrino Sources from Searches in the Directions of IceCube Neutrino Alerts. In: *Astrophys. J.* 951.1 (2023), p. 45. DOI: [10.3847/1538-4357/acd2ca](https://doi.org/10.3847/1538-4357/acd2ca). arXiv: [2210.04930](https://arxiv.org/abs/2210.04930) [astro-ph.HE].
- [46] R. Abbasi et al. D-Egg: a dual PMT optical module for IceCube. In: *JINST* 18.04 (2023), P04014. DOI: [10.1088/1748-0221/18/04/P04014](https://doi.org/10.1088/1748-0221/18/04/P04014). arXiv: [2212.14526](https://arxiv.org/abs/2212.14526) [astro-ph.IM].
- [47] R. Abbasi et al. IceCube Search for Neutrinos Coincident with Gravitational Wave Events from LIGO/Virgo Run O3. In: *Astrophys. J.* 944.1 (2023), p. 80. DOI: [10.3847/1538-4357/aca5fc](https://doi.org/10.3847/1538-4357/aca5fc). arXiv: [2208.09532](https://arxiv.org/abs/2208.09532) [astro-ph.HE].
- [48] R. Abbasi et al. Limits on Neutrino Emission from GRB 221009A from MeV to PeV Using the IceCube Neutrino Observatory. In: *Astrophys. J. Lett.* 946.1 (2023). [Erratum: *Astrophys. J. Lett.* 970, L43 (2024), Erratum: *Astrophys. J.* 970, L43 (2024)], p. L26. DOI: [10.3847/2041-8213/acc077](https://doi.org/10.3847/2041-8213/acc077). arXiv: [2302.05459](https://arxiv.org/abs/2302.05459) [astro-ph.HE].
- [49] R. Abbasi et al. Measurement of atmospheric neutrino mixing with improved IceCube Deep-Core calibration and data processing. In: *Phys. Rev. D* 108.1 (2023), p. 012014. DOI: [10.1103/PhysRevD.108.012014](https://doi.org/10.1103/PhysRevD.108.012014). arXiv: [2304.12236](https://arxiv.org/abs/2304.12236) [hep-ex].
- [50] R. Abbasi et al. Observation of high-energy neutrinos from the Galactic plane. In: *Science* 380.6652 (2023), adc9818. DOI: [10.1126/science.adc9818](https://doi.org/10.1126/science.adc9818). arXiv: [2307.04427](https://arxiv.org/abs/2307.04427) [astro-ph.HE].
- [51] R. Abbasi et al. Observation of seasonal variations of the flux of high-energy atmospheric neutrinos with IceCube. In: *Eur. Phys. J. C* 83.9 (2023), p. 777. DOI: [10.1140/epjc/s10052-023-11679-5](https://doi.org/10.1140/epjc/s10052-023-11679-5). arXiv: [2303.04682](https://arxiv.org/abs/2303.04682) [astro-ph.HE].
- [52] R. Abbasi et al. Search for Correlations of High-energy Neutrinos Detected in IceCube with Radio-bright AGN and Gamma-Ray Emission from Blazars. In: *Astrophys. J.* 954.1 (2023), p. 75. DOI: [10.3847/1538-4357/acdfcb](https://doi.org/10.3847/1538-4357/acdfcb). arXiv: [2304.12675](https://arxiv.org/abs/2304.12675) [astro-ph.HE].
- [53] R. Abbasi et al. Search for neutrino lines from dark matter annihilation and decay with IceCube. In: *Phys. Rev. D* 108.10 (2023), p. 102004. DOI: [10.1103/PhysRevD.108.102004](https://doi.org/10.1103/PhysRevD.108.102004). arXiv: [2303.13663](https://arxiv.org/abs/2303.13663) [astro-ph.HE].
- [54] R. Abbasi et al. Search for sub-TeV Neutrino Emission from Novae with IceCube-DeepCore. In: *Astrophys. J.* 953.2 (2023). [Erratum: *Astrophys. J.* 971, (2024)], p. 160. DOI: [10.3847/1538-4357/acdc1b](https://doi.org/10.3847/1538-4357/acdc1b). arXiv: [2212.06810](https://arxiv.org/abs/2212.06810) [astro-ph.HE].
- [55] R. Abbasi et al. Searches for Neutrinos from Large High Altitude Air Shower Observatory Ultra-high-energy γ -Ray Sources Using the IceCube Neutrino Observatory. In: *Astrophys. J. Lett.* 945.1 (2023), p. L8. DOI: [10.3847/2041-8213/acb933](https://doi.org/10.3847/2041-8213/acb933). arXiv: [2211.14184](https://arxiv.org/abs/2211.14184) [astro-ph.HE].
- [56] Paras Koundal et al. Cosmic-Ray Composition analysis at IceCube using Graph Neural Networks. In: *PoS ECRS* (2023), p. 085. DOI: [10.22323/1.423.0085](https://doi.org/10.22323/1.423.0085). arXiv: [2211.17198](https://arxiv.org/abs/2211.17198) [astro-ph.HE].
- [57] Fabian Schüssler et al. Joint searches by FACT, H.E.S.S., MAGIC and VERITAS for VHE gamma-ray emission associated with neutrinos detected by IceCube. In: *PoS ICRC2023* (2023), p. 1501. DOI: [10.22323/1.444.1501](https://doi.org/10.22323/1.444.1501). arXiv: [2309.15469](https://arxiv.org/abs/2309.15469) [astro-ph.HE].
- [58] R. Abbasi et al. Density of GeV muons in air showers measured with IceTop. In: *Phys. Rev. D* 106.3 (2022), p. 032010. DOI: [10.1103/PhysRevD.106.032010](https://doi.org/10.1103/PhysRevD.106.032010). arXiv: [2201.12635](https://arxiv.org/abs/2201.12635) [hep-ex].

- [59] R. Abbasi et al. Detection of astrophysical tau neutrino candidates in IceCube. In: *Eur. Phys. J. C* 82.11 (2022), p. 1031. DOI: [10.1140/epjc/s10052-022-10795-y](https://doi.org/10.1140/epjc/s10052-022-10795-y). arXiv: [2011.03561](https://arxiv.org/abs/2011.03561) [hep-ex].
- [60] R. Abbasi et al. Evidence for neutrino emission from the nearby active galaxy NGC 1068. In: *Science* 378.6619 (2022), pp. 538–543. DOI: [10.1126/science.abg3395](https://doi.org/10.1126/science.abg3395). arXiv: [2211.09972](https://arxiv.org/abs/2211.09972) [astro-ph.HE].
- [61] R. Abbasi et al. First all-flavor search for transient neutrino emission using 3-years of IceCube DeepCore data. In: *JCAP* 01 (2022), p. 027. DOI: [10.1088/1475-7516/2022/01/027](https://doi.org/10.1088/1475-7516/2022/01/027). arXiv: [2011.05096](https://arxiv.org/abs/2011.05096) [astro-ph.HE].
- [62] R. Abbasi et al. Framework and tools for the simulation and analysis of the radio emission from air showers at IceCube. In: *JINST* 17.06 (2022), P06026. DOI: [10.1088/1748-0221/17/06/P06026](https://doi.org/10.1088/1748-0221/17/06/P06026). arXiv: [2205.02258](https://arxiv.org/abs/2205.02258) [astro-ph.HE].
- [63] R. Abbasi et al. Low energy event reconstruction in IceCube DeepCore. In: *Eur. Phys. J. C* 82.9 (2022), p. 807. DOI: [10.1140/epjc/s10052-022-10721-2](https://doi.org/10.1140/epjc/s10052-022-10721-2). arXiv: [2203.02303](https://arxiv.org/abs/2203.02303) [hep-ex].
- [64] R. Abbasi et al. Search for Astrophysical Neutrinos from 1FLE Blazars with IceCube. In: *Astrophys. J.* 938.1 (2022), p. 38. DOI: [10.3847/1538-4357/ac8de4](https://doi.org/10.3847/1538-4357/ac8de4). arXiv: [2207.04946](https://arxiv.org/abs/2207.04946) [astro-ph.HE].
- [65] R. Abbasi et al. Search for High-energy Neutrino Emission from Galactic X-Ray Binaries with IceCube. In: *Astrophys. J. Lett.* 930.2 (2022), p. L24. DOI: [10.3847/2041-8213/ac67d8](https://doi.org/10.3847/2041-8213/ac67d8). arXiv: [2202.11722](https://arxiv.org/abs/2202.11722) [astro-ph.HE].
- [66] R. Abbasi et al. Search for High-energy Neutrinos from Ultraluminous Infrared Galaxies with IceCube. In: *Astrophys. J.* 926.1 (2022), p. 59. DOI: [10.3847/1538-4357/ac3cb6](https://doi.org/10.3847/1538-4357/ac3cb6). arXiv: [2107.03149](https://arxiv.org/abs/2107.03149) [astro-ph.HE].
- [67] R. Abbasi et al. Search for neutrino emission from cores of active galactic nuclei. In: *Phys. Rev. D* 106.2 (2022), p. 022005. DOI: [10.1103/PhysRevD.106.022005](https://doi.org/10.1103/PhysRevD.106.022005). arXiv: [2111.10169](https://arxiv.org/abs/2111.10169) [astro-ph.HE].
- [68] R. Abbasi et al. Search for quantum gravity using astrophysical neutrino flavour with IceCube. In: *Nature Phys.* 18.11 (2022), pp. 1287–1292. DOI: [10.1038/s41567-022-01762-1](https://doi.org/10.1038/s41567-022-01762-1). arXiv: [2111.04654](https://arxiv.org/abs/2111.04654) [hep-ex].
- [69] R. Abbasi et al. Search for Relativistic Magnetic Monopoles with Eight Years of IceCube Data. In: *Phys. Rev. Lett.* 128.5 (2022), p. 051101. DOI: [10.1103/PhysRevLett.128.051101](https://doi.org/10.1103/PhysRevLett.128.051101). arXiv: [2109.13719](https://arxiv.org/abs/2109.13719) [astro-ph.HE].
- [70] R. Abbasi et al. Search for Unstable Sterile Neutrinos with the IceCube Neutrino Observatory. In: *Phys. Rev. Lett.* 129.15 (2022), p. 151801. DOI: [10.1103/PhysRevLett.129.151801](https://doi.org/10.1103/PhysRevLett.129.151801). arXiv: [2204.00612](https://arxiv.org/abs/2204.00612) [hep-ex].
- [71] R. Abbasi et al. Searches for Neutrinos from Gamma-Ray Bursts Using the IceCube Neutrino Observatory. In: *Astrophys. J.* 939.2 (2022), p. 116. DOI: [10.3847/1538-4357/ac9785](https://doi.org/10.3847/1538-4357/ac9785). arXiv: [2205.11410](https://arxiv.org/abs/2205.11410) [astro-ph.HE].
- [72] R. Abbasi et al. Strong Constraints on Neutrino Nonstandard Interactions from TeV-Scale ν_μ Disappearance at IceCube. In: *Phys. Rev. Lett.* 129.1 (2022), p. 011804. DOI: [10.1103/PhysRevLett.129.011804](https://doi.org/10.1103/PhysRevLett.129.011804). arXiv: [2201.03566](https://arxiv.org/abs/2201.03566) [hep-ex].
- [73] Rasha Abbasi et al. Searching for High-Energy Neutrinos from Ultra-Luminous Infrared Galaxies with IceCube. In: *PoS EPS-HEP2021* (2022), p. 092. DOI: [10.22323/1.398.0092](https://doi.org/10.22323/1.398.0092).

- [74] A. Albert et al. Search for Spatial Correlations of Neutrinos with Ultra-high-energy Cosmic Rays. In: *Astrophys. J.* 934.2 (2022), p. 164. DOI: [10.3847/1538-4357/ac6def](https://doi.org/10.3847/1538-4357/ac6def). arXiv: [2201.07313](https://arxiv.org/abs/2201.07313) [astro-ph.HE].
- [75] M. G. Aartsen et al. Detection of a particle shower at the Glashow resonance with IceCube. In: *Nature* 591.7849 (2021). [Erratum: *Nature* 592, E11 (2021)], pp. 220–224. DOI: [10.1038/s41586-021-03256-1](https://doi.org/10.1038/s41586-021-03256-1). arXiv: [2110.15051](https://arxiv.org/abs/2110.15051) [hep-ex].
- [76] M. G. Aartsen et al. IceCube-Gen2: the window to the extreme Universe. In: *J. Phys. G* 48.6 (2021), p. 060501. DOI: [10.1088/1361-6471/abbd48](https://doi.org/10.1088/1361-6471/abbd48). arXiv: [2008.04323](https://arxiv.org/abs/2008.04323) [astro-ph.HE].
- [77] M. G. Aartsen et al. Measurements of the time-dependent cosmic-ray Sun shadow with seven years of IceCube data: Comparison with the Solar cycle and magnetic field models. In: *Phys. Rev. D* 103.4 (2021), p. 042005. DOI: [10.1103/PhysRevD.103.042005](https://doi.org/10.1103/PhysRevD.103.042005). arXiv: [2006.16298](https://arxiv.org/abs/2006.16298) [astro-ph.HE].
- [78] R. Abbasi et al. A Convolutional Neural Network based Cascade Reconstruction for the IceCube Neutrino Observatory. In: *JINST* 16 (2021), P07041. DOI: [10.1088/1748-0221/16/07/P07041](https://doi.org/10.1088/1748-0221/16/07/P07041). arXiv: [2101.11589](https://arxiv.org/abs/2101.11589) [hep-ex].
- [79] R. Abbasi et al. A muon-track reconstruction exploiting stochastic losses for large-scale Cherenkov detectors. In: *JINST* 16.08 (2021), P08034. DOI: [10.1088/1748-0221/16/08/P08034](https://doi.org/10.1088/1748-0221/16/08/P08034). arXiv: [2103.16931](https://arxiv.org/abs/2103.16931) [hep-ex].
- [80] R. Abbasi et al. A Search for Time-dependent Astrophysical Neutrino Emission with IceCube Data from 2012 to 2017. In: *Astrophys. J.* 911.1 (2021), p. 67. DOI: [10.3847/1538-4357/abe7e6](https://doi.org/10.3847/1538-4357/abe7e6). arXiv: [2012.01079](https://arxiv.org/abs/2012.01079) [astro-ph.HE].
- [81] R. Abbasi et al. All-flavor constraints on nonstandard neutrino interactions and generalized matter potential with three years of IceCube DeepCore data. In: *Phys. Rev. D* 104.7 (2021), p. 072006. DOI: [10.1103/PhysRevD.104.072006](https://doi.org/10.1103/PhysRevD.104.072006). arXiv: [2106.07755](https://arxiv.org/abs/2106.07755) [hep-ex].
- [82] R. Abbasi et al. Follow-up of Astrophysical Transients in Real Time with the IceCube Neutrino Observatory. In: *Astrophys. J.* 910.1 (2021), p. 4. DOI: [10.3847/1538-4357/abe123](https://doi.org/10.3847/1538-4357/abe123). arXiv: [2012.04577](https://arxiv.org/abs/2012.04577) [astro-ph.HE].
- [83] R. Abbasi et al. IceCube Data for Neutrino Point-Source Searches Years 2008-2018. In: (Jan. 2021). DOI: [10.21234/CPKQ-K003](https://doi.org/10.21234/CPKQ-K003). arXiv: [2101.09836](https://arxiv.org/abs/2101.09836) [astro-ph.HE].
- [84] R. Abbasi et al. LeptonInjector and LeptonWeighter: A neutrino event generator and weighter for neutrino observatories. In: *Comput. Phys. Commun.* 266 (2021), p. 108018. DOI: [10.1016/j.cpc.2021.108018](https://doi.org/10.1016/j.cpc.2021.108018). arXiv: [2012.10449](https://arxiv.org/abs/2012.10449) [physics.comp-ph].
- [85] R. Abbasi et al. Probing neutrino emission at GeV energies from compact binary mergers with the IceCube Neutrino Observatory. In: (May 2021). arXiv: [2105.13160](https://arxiv.org/abs/2105.13160) [astro-ph.HE].
- [86] R. Abbasi et al. Search for GeV neutrino emission during intense gamma-ray solar flares with the IceCube Neutrino Observatory. In: *Phys. Rev. D* 103.10 (2021), p. 102001. DOI: [10.1103/PhysRevD.103.102001](https://doi.org/10.1103/PhysRevD.103.102001). arXiv: [2101.00610](https://arxiv.org/abs/2101.00610) [astro-ph.HE].
- [87] R. Abbasi et al. Search for Multi-flare Neutrino Emissions in 10 yr of IceCube Data from a Catalog of Sources. In: *Astrophys. J. Lett.* 920.2 (2021), p. L45. DOI: [10.3847/2041-8213/ac2c7b](https://doi.org/10.3847/2041-8213/ac2c7b). arXiv: [2109.05818](https://arxiv.org/abs/2109.05818) [astro-ph.HE].
- [88] R. Abbasi et al. The IceCube high-energy starting event sample: Description and flux characterization with 7.5 years of data. In: *Phys. Rev. D* 104 (2021), p. 022002. DOI: [10.1103/PhysRevD.104.022002](https://doi.org/10.1103/PhysRevD.104.022002). arXiv: [2011.03545](https://arxiv.org/abs/2011.03545) [astro-ph.HE].

- [89] H. A. Ayala Solares et al. Multimessenger Gamma-Ray and Neutrino Coincidence Alerts Using HAWC and IceCube Subthreshold Data. In: *Astrophys. J.* 906 (2021), p. 63. DOI: [10.3847/1538-4357/abcaa4](https://doi.org/10.3847/1538-4357/abcaa4). arXiv: [2008.10616](https://arxiv.org/abs/2008.10616) [astro-ph.HE].
- [90] M. G. Aartsen et al. A search for IceCube events in the direction of ANITA neutrino candidates. In: *Astrophys. J.* 892 (2020), p. 53. DOI: [10.3847/1538-4357/ab791d](https://doi.org/10.3847/1538-4357/ab791d). arXiv: [2001.01737](https://arxiv.org/abs/2001.01737) [astro-ph.HE].
- [91] M. G. Aartsen et al. Characteristics of the diffuse astrophysical electron and tau neutrino flux with six years of IceCube high energy cascade data. In: *Phys. Rev. Lett.* 125.12 (2020), p. 121104. DOI: [10.1103/PhysRevLett.125.121104](https://doi.org/10.1103/PhysRevLett.125.121104). arXiv: [2001.09520](https://arxiv.org/abs/2001.09520) [astro-ph.HE].
- [92] M. G. Aartsen et al. Combined sensitivity to the neutrino mass ordering with JUNO, the IceCube Upgrade, and PINGU. In: *Phys. Rev. D* 101.3 (2020), p. 032006. DOI: [10.1103/PhysRevD.101.032006](https://doi.org/10.1103/PhysRevD.101.032006). arXiv: [1911.06745](https://arxiv.org/abs/1911.06745) [hep-ex].
- [93] M. G. Aartsen et al. Constraints on neutrino emission from nearby galaxies using the 2MASS redshift survey and IceCube. In: *JCAP* 07 (2020), p. 042. DOI: [10.1088/1475-7516/2020/07/042](https://doi.org/10.1088/1475-7516/2020/07/042). arXiv: [1911.11809](https://arxiv.org/abs/1911.11809) [astro-ph.HE].
- [94] M. G. Aartsen et al. Cosmic ray spectrum from 250 TeV to 10 PeV using IceTop. In: *Phys. Rev. D* 102 (2020), p. 122001. DOI: [10.1103/PhysRevD.102.122001](https://doi.org/10.1103/PhysRevD.102.122001). arXiv: [2006.05215](https://arxiv.org/abs/2006.05215) [astro-ph.HE].
- [95] M. G. Aartsen et al. Design and Performance of the first IceAct Demonstrator at the South Pole. In: *JINST* 15.02 (2020), T02002. DOI: [10.1088/1748-0221/15/02/T02002](https://doi.org/10.1088/1748-0221/15/02/T02002). arXiv: [1910.06945](https://arxiv.org/abs/1910.06945) [astro-ph.IM].
- [96] M. G. Aartsen et al. eV-Scale Sterile Neutrino Search Using Eight Years of Atmospheric Muon Neutrino Data from the IceCube Neutrino Observatory. In: *Phys. Rev. Lett.* 125.14 (2020), p. 141801. DOI: [10.1103/PhysRevLett.125.141801](https://doi.org/10.1103/PhysRevLett.125.141801). arXiv: [2005.12942](https://arxiv.org/abs/2005.12942) [hep-ex].
- [97] M. G. Aartsen et al. IceCube Search for High-Energy Neutrino Emission from TeV Pulsar Wind Nebulae. In: *Astrophys. J.* 898.2 (2020), p. 117. DOI: [10.3847/1538-4357/ab9fa0](https://doi.org/10.3847/1538-4357/ab9fa0). arXiv: [2003.12071](https://arxiv.org/abs/2003.12071) [astro-ph.HE].
- [98] M. G. Aartsen et al. IceCube Search for Neutrinos Coincident with Compact Binary Mergers from LIGO-Virgo's First Gravitational-wave Transient Catalog. In: *Astrophys. J. Lett.* 898.1 (2020), p. L10. DOI: [10.3847/2041-8213/ab9d24](https://doi.org/10.3847/2041-8213/ab9d24). arXiv: [2004.02910](https://arxiv.org/abs/2004.02910) [astro-ph.HE].
- [99] M. G. Aartsen et al. In-situ calibration of the single-photoelectron charge response of the IceCube photomultiplier tubes. In: *JINST* 15.06 (2020), P06032. DOI: [10.1088/1748-0221/15/06/P06032](https://doi.org/10.1088/1748-0221/15/06/P06032). arXiv: [2002.00997](https://arxiv.org/abs/2002.00997) [physics.ins-det].
- [100] M. G. Aartsen et al. Searching for eV-scale sterile neutrinos with eight years of atmospheric neutrinos at the IceCube Neutrino Telescope. In: *Phys. Rev. D* 102.5 (2020), p. 052009. DOI: [10.1103/PhysRevD.102.052009](https://doi.org/10.1103/PhysRevD.102.052009). arXiv: [2005.12943](https://arxiv.org/abs/2005.12943) [hep-ex].
- [101] M. G. Aartsen et al. Time-Integrated Neutrino Source Searches with 10 Years of IceCube Data. In: *Phys. Rev. Lett.* 124.5 (2020), p. 051103. DOI: [10.1103/PhysRevLett.124.051103](https://doi.org/10.1103/PhysRevLett.124.051103). arXiv: [1910.08488](https://arxiv.org/abs/1910.08488) [astro-ph.HE].
- [102] R. Abbasi et al. Measurement of the high-energy all-flavor neutrino-nucleon cross section with IceCube. In: (Nov. 2020). DOI: [10.1103/PhysRevD.104.022001](https://doi.org/10.1103/PhysRevD.104.022001). arXiv: [2011.03560](https://arxiv.org/abs/2011.03560) [hep-ex].
- [103] A. Albert et al. ANTARES and IceCube Combined Search for Neutrino Point-like and Extended Sources in the Southern Sky. In: *Astrophys. J.* 892 (2020), p. 92. DOI: [10.3847/1538-4357/ab7afb](https://doi.org/10.3847/1538-4357/ab7afb). arXiv: [2001.04412](https://arxiv.org/abs/2001.04412) [astro-ph.HE].

- [104] A. Albert et al. Combined search for neutrinos from dark matter self-annihilation in the Galactic Center with ANTARES and IceCube. In: *Phys. Rev. D* 102.8 (2020), p. 082002. DOI: [10.1103/PhysRevD.102.082002](https://doi.org/10.1103/PhysRevD.102.082002). arXiv: [2003.06614](https://arxiv.org/abs/2003.06614) [[astro-ph.HE](#)].
- [105] M. G. Aartsen et al. Efficient propagation of systematic uncertainties from calibration to analysis with the SnowStorm method in IceCube. In: *JCAP* 10 (2019), p. 048. DOI: [10.1088/1475-7516/2019/10/048](https://doi.org/10.1088/1475-7516/2019/10/048). arXiv: [1909.01530](https://arxiv.org/abs/1909.01530) [[hep-ex](#)].
- [106] A. U. Abeysekara et al. All-Sky Measurement of the Anisotropy of Cosmic Rays at 10 TeV and Mapping of the Local Interstellar Magnetic Field. In: *Astrophys. J.* 871.1 (2019), p. 96. DOI: [10.3847/1538-4357/aaf5cc](https://doi.org/10.3847/1538-4357/aaf5cc). arXiv: [1812.05682](https://arxiv.org/abs/1812.05682) [[astro-ph.HE](#)].
- [107] M. G. Aartsen et al. Multimessenger observations of a flaring blazar coincident with high-energy neutrino IceCube-170922A. In: *Science* 361.6398 (2018), eaat1378. DOI: [10.1126/science.aat1378](https://doi.org/10.1126/science.aat1378). arXiv: [1807.08816](https://arxiv.org/abs/1807.08816) [[astro-ph.HE](#)].
- [108] M. G. Aartsen et al. Multiwavelength follow-up of a rare IceCube neutrino multiplet. In: *Astron. Astrophys.* 607 (2017), A115. DOI: [10.1051/0004-6361/201730620](https://doi.org/10.1051/0004-6361/201730620). arXiv: [1702.06131](https://arxiv.org/abs/1702.06131) [[astro-ph.HE](#)].
- [109] B. P. Abbott et al. Multi-messenger Observations of a Binary Neutron Star Merger. In: *Astrophys. J. Lett.* 848.2 (2017), p. L12. DOI: [10.3847/2041-8213/aa91c9](https://doi.org/10.3847/2041-8213/aa91c9). arXiv: [1710.05833](https://arxiv.org/abs/1710.05833) [[astro-ph.HE](#)].

As a Member of P-One Collaboration

- [1] M. Agostini et al. Prototype acoustic positioning system for the Pacific Ocean Neutrino Experiment. In: (Apr. 2025). arXiv: [2504.13323](https://arxiv.org/abs/2504.13323) [[physics.ins-det](#)].
- [2] Jean Pierre Twagirayezu et al. Performance of the Pacific Ocean Neutrino Experiment (P-ONE). In: *PoS ICRC2023* (2023), p. 1175. DOI: [10.22323/1.444.1175](https://doi.org/10.22323/1.444.1175).