

MEIGHEN-BERGER, STEPHAN A.: PUBLICATION LIST

This list contains the 24 works to which I contributed directly, and my PhD thesis. Most of my 84 published papers and 89 conference papers on **INSPIRE** are collaboration papers of IceCube and P-ONE. These appear here only where I contributed to the analysis or supervised the student who led it. The full record is on INSPIRE.

Journal articles

- [1] R. Li, C. Spannfellner, K. Holzappel, S. Loipolder, C. Lagunas Gualda, M. Böhmer, M. Danninger, F. C. De Leo, C. Fruck, A. Gärtner, R. Gernhäuser, D. Grant, C. Haack, F. Henningsen, H. Johnson, C. Kopper, C. B. Krauss, K. Leismüller, **S. A. Meighen-Berger**, L. Papp, B. Pirenne, I. C. Rea, E. Resconi, L. Schumacher, and J. Stacho, “Polychromatic Population of Bioluminescent Organisms in the Deep Pacific Ocean”, *J. Geophys. Res. Oceans*, vol. 131, no. 7, e2025JC023267, 2026.
Contribution: Mentored student
- [2] **S. A. Meighen-Berger**, P. S. B. Dev, and M. Hostert, “New multimessenger probe of dark matter-nucleon interactions from ultrahigh energy cosmic ray acceleration”, *Phys. Rev. D*, vol. 113, no. 10, p. 103 050, 2026. arXiv: [2512.18093 \[hep-ph\]](#).
Contribution: Co-wrote the paper, developed the idea
- [3] R. Ørsøe, **S. Meighen-Berger**, J. Lazar, J. Prado, I. Mozún-Mateo, A. Rosted, P. Weigel, and A. L. Anaya, “NuBench: An open benchmark for deep learning-based event reconstruction in neutrino telescopes”, *JINST*, vol. 21, no. 05, T05001, 2026. arXiv: [2511.13111 \[hep-ex\]](#).
Contribution: Wrote the simulation code and generated the public data sets
- [4] P. Bhattacharjee, S. Robles, **S. A. Meighen-Berger**, and F. Calore, “Can local white dwarfs constrain dark matter interactions?”, *JCAP*, vol. 10, p. 093, 2025. arXiv: [2505.13629 \[hep-ph\]](#).
Contribution: Worked on the neutrino calculations and predictions
- [5] **S. A. Meighen-Berger**, J. L. Newstead, and L. E. Strigari, “Measuring the Cosmic Ray Spectrum with Next Generation Neutrino Detectors”, *Phys. Rev. D*, May 2025, accepted. arXiv: [2505.09111 \[hep-ph\]](#).
Contribution: Co-wrote the paper, developed the idea
- [6] S. Robles and **S. A. Meighen-Berger**, “Extending the dark matter reach of water Cherenkov detectors using Jupiter”, *Phys. Rev. D*, vol. 112, p. L041301, 2025. arXiv: [2411.04435 \[hep-ph\]](#).
Contribution: Co-wrote the paper, developed the neutrino calculations and sensitivities
- [7] **S. A. Meighen-Berger**, J. L. Newstead, J. F. Beacom, N. F. Bell, and M. J. Dolan, “Enhancing DUNE’s Solar Neutrino Capabilities with Neutral-Current Detection”, *Phys. Rev. Lett.*, vol. 135, no. 1, p. 011 803, 2025. arXiv: [2410.00330 \[hep-ph\]](#).
Contribution: Co-wrote the paper, developed the idea
- [8] **S. A. Meighen-Berger**, J. F. Beacom, N. F. Bell, and M. J. Dolan, “New signal of atmospheric tau neutrino appearance: Sub-GeV neutral-current interactions in JUNO”, *Phys. Rev. D*, vol. 109, no. 9, p. 092 006, 2024. arXiv: [2311.01667 \[hep-ph\]](#).
Contribution: Co-wrote the paper, developed the idea
- [9] J. Lazar, **S. Meighen-Berger**, C. Haack, D. Kim, S. Giner, and C. A. Argüelles, “Prometheus: An open-source neutrino telescope simulation”, *Comput. Phys. Commun.*, vol. 304, p. 109 298, 2024. arXiv: [2304.14526 \[hep-ex\]](#).
Contribution: Co-wrote the paper, developed the water-based simulation, co-developed the framework
- [10] K. Desai, R. Li, and **S. Meighen-Berger**, “Searching for dark matter annihilation with IceCube and P-ONE”, *JCAP*, vol. 02, p. 049, 2024. arXiv: [2302.10542 \[hep-ph\]](#).
Contribution: Co-wrote the paper, developed the idea, mentored student
- [11] T. R. Pollmann, S. Schönert, J. Müller, J. Pollmann, E. Resconi, C. Wiesinger, C. Haack, L. Shtembari, A. Turcati, B. Neumair, **S. Meighen-Berger**, G. Zattera, M. Neumair, U. Apel, and A. Okolie, “The

impact of digital contact tracing on the SARS-CoV-2 pandemic—a comprehensive modelling study”, *EPJ Data Science*, vol. 10, no. 1, p. 37, 2021.

Contribution: Wrote one of the numerical models

- [12] **S. Meighen-Berger**, M. Agostini, A. Ibarra, K. Krings, H. Niederhausen, A. Rappel, E. Resconi, and A. Turcati, “New constraints on supersymmetry using neutrino telescopes”, *Phys. Lett. B*, vol. 811, p. 135 929, 2020. arXiv: [2005.07523 \[hep-ph\]](#).

Contribution: Co-wrote the paper, developed the idea

Submitted

- [13] **S. A. Meighen-Berger**, “Estimating High-Energy Neutrino Effective Areas from Muon Propagation”, Sep. 2026, submitted. arXiv: [2609.40188 \[hep-ph\]](#).

Contribution: Wrote the paper, developed the idea

- [14] C. A. Argüelles, P. S. B. Dev, B. Dutta, G. Herrera, N. Kamp, J. Kumar, **S. A. Meighen-Berger**, M. Rai, and I. M. Shoemaker, “Astrophysical Neutrino Sources as Colliders”, Jul. 2026, submitted. arXiv: [2607.19254 \[hep-ph\]](#).

Contribution: Developed the production of neutrinos from pp and $p\gamma$ interactions

- [15] **S. A. Meighen-Berger**, R. A. Gustafson, N. F. Bell, J. L. Newstead, S. Robles, and I. M. Shoemaker, “Dark matter energy exchange in stars orbiting supermassive black holes”, Jul. 2026, submitted. arXiv: [2607.00840 \[hep-ph\]](#).

Contribution: Co-wrote the paper, developed the idea

- [16] J. F. Beacom, N. F. Bell, M. J. Dolan, **S. A. Meighen-Berger**, and H. M. Yim, “Towards Measuring the CP-Violating Phase with Atmospheric Neutrinos”, May 2026, submitted. arXiv: [2605.16721 \[hep-ph\]](#).

Contribution: Co-wrote the paper, developed the idea, mentored student

Preprints

- [17] **S. Meighen-Berger** and M. Karl, “Dark Matter Hot Spots and Neutrino Telescopes”, Sep. 2021, preprint. arXiv: [2109.07885 \[hep-ph\]](#).

Contribution: Co-wrote the paper, developed the idea

- [18] **S. Meighen-Berger**, R. Li, and G. Wimmer, “Bioluminescence modeling for deep sea experiments”, 2021, preprint. arXiv: [2103.03816](#).

Contribution: Co-wrote the paper, developed the idea, mentored student

- [19] **S. Meighen-Berger**, A. Fedynitch, and M. Huber, “EmCa – Electromagnetic-Cascades Simulation Package”, Jul. 2019, preprint. arXiv: [1907.06924 \[astro-ph.HE\]](#).

Contribution: Co-wrote the paper, developed the idea

Conference proceedings

- [20] J. Lazar, A. L. Anaya, **S. Meighen-Berger**, I. Mozún-Mateo, R. Ørsøe, J. Prado, A. Rosted, and P. Weigel, “Open-source, Cross-detector Comparisons for Machine Learning Reconstructions in Neutrino Telescopes”, *PoS*, vol. ICRC2025, p. 1090, 2025.

Contribution: Co-wrote the paper, developed the training data set

- [21] **S. Meighen-Berger** and M. Li, “Atmospheric muons from electromagnetic cascades”, *PoS*, vol. ICRC2019, p. 961, 2020. arXiv: [1910.05984 \[astro-ph.HE\]](#).

Contribution: Co-wrote the paper, developed the idea, mentored student

Collaboration papers with a direct contribution

- [22] J.-H. Schmidt-Dencker, **S. Meighen-Berger**, and C. Haack, “Search for STaus in IceCube”, in *37th International Cosmic Ray Conference*, Jul. 2021. arXiv: [2107.10049 \[astro-ph.HE\]](#).
Contribution: Mentored student
- [23] M. Agostini et al., “The Pacific Ocean Neutrino Experiment”, *Nature Astron.*, vol. 4, no. 10, pp. 913–915, 2020. arXiv: [2005.09493 \[astro-ph.HE\]](#).
Contribution: Calculated neutrino veto and estimated stau sensitivity
- [24] M. Agostini et al., “Modulations of the Cosmic Muon Signal in Ten Years of Borexino Data”, *JCAP*, vol. 02, p. 046, 2019. arXiv: [1808.04207 \[hep-ex\]](#).
Contribution: Calculated the atmospheric flux variations

Thesis

- [25] **S. Meighen-Berger**, “Precision background modeling for neutrino telescopes”, Ph.D. dissertation, Technical University of Munich, 2021.