Brian McPeak

Born: November 17, 1992—Exton, Pennsylvania
Nationality: American
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Affiliation: Syracuse University
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Current Position

Postdoctoral Researcher, Syracuse University

Research Interests

Quantum field theory, quantum gravity, conformal field theory, effective field theory, machine learning

Education

2020 PhD in Physics, University of Michigan, Ann Arbor
Advisor: James T. Liu

2015 BS in Physics & Mathematics, University of Maryland, College Park
Undergraduate GPA: 3.77, Physics GPA: 3.83

2011 Downingtown East High School, Exton Pennsylvania
SAT scores: 800 math, 720 english, 790 writing

Past Positions

2024 Postdoctoral Fellow in Physics, Syracuse University, Syracuse, New York
Advisor: Alexander Maloney

2023 Postdoctoral Fellow in Physics, McGill University, Montreal, Canada
Advisor: Robert Brandenberger

2021 Postdoctoral Scholar in Physics, University of Pisa, Pisa, Italy
Advisor: Alessandro Vichi

Awards

2011 President's Scholarship, University of Maryland

Recent Journal articles

2024 S. Lawrence, B. McPeak, and D. Neill, *Bootstrapping time-evolution in quantum mechanics*. arxiv: 2412.08721 .

2024 S. Cremonini et al., *Causality bounds from charged shockwaves in 5d*. arxiv: 2412.06891 .

2024 F. Bertucci et al., *Positivity bounds on massive vectors*. JHEP 12 (2024) 051, arXiv: 2402.13327 .

2023 S. Cremonini, B. McPeak, and Y. Tang, *Electric shocks: bounding Einstein-Maxwell theory with time delays on boosted RN backgrounds*. JHEP 05 (2024) 192, arXiv: 2312.17328 .

2023 B. McPeak, M. Venuti, and A. Vichi, *Adding subtractions: comparing the impact of different Regge behaviors*. arXiv: 2310.06888 .

2022 J. Henriksson and B. McPeak, *Averaging over codes and an $SU(2)$ modular bootstrap*. Journal of High Energy Physics, 11 (2023) 035, arXiv: 2208.14457 .

2022 F. Bertucci, J. Henriksson, and B. McPeak, *Analytic bootstrap of mixed correlators in the $O(n)$ CFT*. Journal of High Energy Physics 10 (2022) 104, arXiv: 2205.09132 .

2022 J. Henriksson, A. Kakkar, and B. McPeak, *Narain CFTs and Quantum Codes at Higher Genus*. Journal of High Energy Physics 04 (2023) 011 arXiv: 2205.00025 .

2022 J. Henriksson, B. McPeak, F. Russo, and A. Vichi, *Bounding violations of the weak gravity conjecture*. Journal of High Energy Physics 08 (2022) 184, arXiv:2203.08164.

2021 J. Henriksson, A. Kakkar, and B. McPeak, *Classical codes and chiral CFTs at higher genus*. Journal of High Energy Physics 05 (2022) 159 , arXiv: .

2021 S. Cremonini, C. R. Jones, J. T. Liu, B. McPeak, and Y. Tang, *Repulsive black holes and higher-derivatives*. Journal of High Energy Physics 03 (2022) 013 , arXiv: : 2110.10178 .

2021 J. Henriksson, B. McPeak, F. Russo, and A. Vichi, *Rigorous bounds on light-by-light scattering*, (2019), arXiv:2107.13009.

2020 S. Cremonini, C. R. Jones, J. T. Liu, B. McPeak, and Y. Tang, *NUT charge weak gravity conjecture from dimensional reduction*. Physical Review D 103 (2021) 10, 106011, (2020), arXiv: 2011.06083 .

2019 S. Cremonini, C. R. Jones, J. T. Liu, and B. McPeak, *Higher-Derivative Corrections to Entropy and the Weak Gravity Conjecture in Anti-de Sitter Space*. Journal of High Energy Physics 09 (2020) 003, (2020), arXiv: 1912.11161 .

2019 C. R. T. Jones and B. McPeak, *The Black Hole Weak Gravity Conjecture with Multiple Charges*. Journal of High Energy Physics 06 (2020) 140, (2019), arXiv:1908.10452.

2019 J. T. Liu and B. McPeak, *Gauged Supergravity from the Lunin-Maldacena background*. Journal of High Energy Physics 01 (2020) 177, arXiv:1905.06861.

2018 J. T. Liu and B. McPeak, *The Weyl Anomaly from the 6D Superconformal Index*. arXiv:1804.04155.

2017 James T. Liu and Brian McPeak. *One-Loop Holographic Weyl Anomaly in Six Dimensions*. Journal of High Energy Physics 01 (2018) 149, arxiv: 1709.02819

Conferences

Presentations Given

2024 Invited Seminar, University of Pennsylvania, PA, September 8$^{\text{th}}$
Effective field theories and bootstrap

2024 Invited Seminar, Los Alamos National Lab NM, January 12$^{\text{th}}$
The S-matrix and the EFT bootstrap

2022 Invited Seminar, Scuola Normale Superiore di Pisa, Italy, October 20$^{\text{th}}$
Bounding light-by-light scattering with unitarity and causality

2022 Amplitudes meets the BSM, MITP, Mainz, Germany, May 31$^{\text{st}}$
Positivity bounds and photon scattering

2022 Possible and Impossible in Effective Field Theory, IAS, Princeton NJ, May 4$^{\text{th}}$
WGC from photon scattering

2022 Invited Talk, Lehigh University, April 14$^{\text{th}}$
Dispersion relations, photon scattering, and the weak gravity conjecture

2022 Bootstrap Seminar, January 26$^{\text{th}}$:
Error-correcting codes and chiral CFTs at higher genus

2018 ICTP Workshop on Supersymmetric Localization and Holography, Italy
Poster: *The 6D $\mathcal{N} = (1, 0)$ Weyl anomaly from the superconformal index*

2018 Great Lakes Strings, University of Chicago
Holographic Weyl anomaly from the superconformal index

2017 Midwest Relativity, University of Michigan
The holographic Weyl anomaly in AdS_7 / CFT_6

Other conferences attended

2022 Simons Center Summer Workshop, Stony Brook University

2022 Bootstrap 2022, Porto, Portugal

2019 Simons Center Summer Workshop, Stony Brook University

2019 TASI, University of Colorado, Boulder

2018 Simons Center Summer Workshop, Stony Brook University

2017 Great Lakes Strings, University of Cincinnati

Teaching

2020 Review course for graduate student qualifying exam
2019 Astronomy 201: Introduction to Astrophysics
2019 Physics 136: Everyday Physics
2018 Astronomy 201: Introduction to Astrophysics
2018 Astronomy 201: Introduction to Astrophysics
2017 Physics 360: Honors Physics III
2017 Astronomy 106: Aliens
2016 Astronomy 201: Introduction to Astrophysics
2016 Physics 141: Elementary Laboratory I
2015 Physics 141: Elementary Laboratory I