

Zheng Xiong, Ph.D. Student

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Education

2019 – now

■ **Ph.D. student, Institute of High Energy Physics** in Beijing, China.

I am a collaborator in the LHAASO (Large High Altitude Air Shower Observatory) Collaboration. I cooperated with my supervisor, Prof. Huihai He, to finish a research article on the Lorentz violation constraint using the LHAASO-KM2A early-stage observation in 2021. Now, my Ph.D. research revolves around cosmic-ray electron studies.

Main Work:

Measurement of cosmic-ray electron spectrum above 20 TeV with ground-based arrays is still challenging because of the difficulty of rejection of hadronic extensive air shower background.

In the feasibility research stage (2022), I found that the current hadron rejection power of the LHAASO-KM2A is insufficient to measure cosmic-ray electrons. I developed a new method to use WCDA to measure the muonic content in each shower. With the help of WCDA, the rejection power of LHAASO-KM2A has the potential to measure the cosmic-ray electron spectrum over 20 TeV. In the current research stage (2023), I am increasing the simulated statistics to get optimized discrimination cuts for KM2A. These results have already been reported at a recent conference, ICRC 2023. And I expect to see the early result of the cosmic-ray electron spectrum measured by LHAASO in 2024.

2015 – 2019

■ **Bachelor.Engineering. Material Science and Engineering, Wuhan University of Technology** in Wuhan, Hubei Province, China.

Thesis title: *The first principle calculation on the optical property on Barium-based complex perovskite (Ba(B'B'')O₃) ceramic.* Advisor: Prof. Wen Chen, co-advisor: Prof. Jie Shen
([Archived link](#))

Research Publications

Journal Articles





- 1 **Xiong, Zheng***, S. Wu, and H. H. He, “Method to measure muon content of extensive air showers with LHAASO KM2A-WCDA synergy,” (article submitted for) *Nuclear Instruments and Methods in Physics Research Section A*, 2023.
- 2 L. Chen, **Xiong, Zheng***, C. Li, S. Chen, and H. He, “Strong constraints on lorentz violation using new γ -ray observations around PeV,” *Chinese Physics C*, vol. 45, no. 10, p. 105105, 2021. [URL: https://iopscience.iop.org/article/10.1088/1674-1137/ac1166/meta](https://iopscience.iop.org/article/10.1088/1674-1137/ac1166/meta).

Conference Proceedings



- 1 H. H. He, **Xiong, Zheng**, and S. Wu, “Method to measure muon content of extensive air showers with LHAASO KM2A-WCDA synergy,” PoS(ICRC2023)314, vol. PCRI1-13, Nagoya, Japan, 2023. [URL: https://pos.sissa.it/444/314/pdf](https://pos.sissa.it/444/314/pdf).
- 2 **Xiong, Zheng***, S. Wu, and H. H. He, “Measurement of cosmic-ray electrons with LHAASO KM2A-WCDA synergy,” PoS(ICRC2023)315, vol. CRI7-03, Nagoya, Japan, 2023. [URL: https://pos.sissa.it/444/315/pdf](https://pos.sissa.it/444/315/pdf).

Popular Science Writing / Translation





Articles and Blogs

- 1 Z. Xiong and X. Q. Dong, “在校园捕捉来自宇宙的信息——2021年“国际宇宙日”活动概览(to capture the information from universe at campus - digest on 2021 cosmic day),” *Modern Physics*, vol. 34, no. 02, pp. 47–53, 2022, ISSN: 1001-0610.  DOI: 10.13405/j.cnki.xdwz.2022.02.017.
- 2 ParadoX, “超越费米悖论(Beyond Fermi Paradox),” in ser. Beyond Fermi Paradox 8/16, Mar. 2021.  URL: <https://mp.weixin.qq.com/s/9EqbGyC7wJtVuMysE7N1sA>.
- 3 ParadoX, “天文学家如愿以偿得到了想要的数据,却发现“哈勃常数危机”加剧了(Astronomers Get Their Wish, and a Cosmic Crisis Gets Worse),” in ser. IHEP Doctorial Scope 1/3, Dec. 2020.  URL: https://mp.weixin.qq.com/s/hPDKQVW60trVTOAw8Mrp_A.
- 4 ParadoX, “天文学家的备忘手册(Astronomer’s Toolbox),” in ser. Astronomer’s Toolbox, 2020.  URL: <https://mp.weixin.qq.com/s/10kYWIxJZn-FotJNb-BAA>.

Service



- 2020.09 – 2020.09  **Intern Technician.** Maintenance and verification of the KM2A-ED detectors, Shandong University.
- 2020.10 – 2020.11
- 2021.04 – 2022.05  **Intern Technician.** Installation and verification of the KM2A-MD detectors after 1/2 KM2A stage on-site service at the Large High Altitude Air Shower Observatory (LHAASO), Institute of High Energy Physics, CAS.

Skills



- Languages  Strong reading, writing, and speaking competencies in English, and Mandarin Chinese. Fluent in Japanese speaking and reading.
- Coding  C, C++, Python, cuda, \LaTeX , ...
- Software  CERN ROOT, CORSIKA, GEANT4, CASTEP
- Misc.  Academic research, teaching, training, consultation, \LaTeX typesetting and publishing.

Miscellaneous Experience

Awards and Achievements

- 2016 – 2019  **WHUT Prize for Outstanding Student Performance**, Wuhan University of Technology.
- 2021 – 2022  **Department Prize for Outstanding Student Performance**, Institute of High Energy Physics.

Certifications

- 2018  **Certified Advanced Students Training.** Awarded by XLAB Göttinger Experimentallabor in Georg-August-Universität Göttingen.
- 2022  **Certified Data Analysis Skill.** Awarded by LHAASO Collaboration 2022 Summer School.

References

Prof. Huihai He

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