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# Zhiquan Lao

## Education

**Bachelor of Science, Physics (Honors) and Mathematics** **Aug 2022 - Dec 2024 (expected)**
*University of Michigan, Ann Arbor* *GPA:3.775*

Main courses: Quantum Field Theory, General Relativity, Computational Physics, Electrodynamics, Statistical mechanics

**Bachelor of Science, Physics (Transferred)** **Sep 2020 - May 2022**
*Hong Kong University of Science and Technology* *GPA:3.684*

Main courses: Classical Mechanics, Quantum Mechanics, Mathematical Methods for Physicists, Object-Oriented Programming and Data Structures (C++)

## Research Interest

My research centers on the intersection of quantum gravity and quantum information. Currently, my primary focus lies in exploring the quantum mechanical attributes of black holes, which may provide clues for quantum gravity. Specifically, I am intrigued by the black hole information paradox and delving into the properties of the Island within the black hole. Additionally, I am interested in using machine learning and artificial intelligence to analyze complex data patterns and phenomena.

## Research Experience

**Research in Department of Physics, University of Michigan** **May 2023-Ongoing**
*Professor Finn Larsen's Group*

- Explore about holographic entropy cone and the relationship between quantum information and holography.
- Study about the black hole information paradox. Do a comprehensive literature review on the split property of gravity and the relationship between massive gravitons and Island in black hole.
- Write a senior thesis on information paradox.
- Computation of BPS black hole thermodynamics

**Research in Department of Physics, University of Michigan** **Jan 2023-May 2023**
*Professor Junjie Zhu's Group*

- Testing the TDC (time-to-digital) ASIC (Application-specific integrated circuit) for the upgrade of the ATLAS Monitored Drift Tube detector.

**Research in Department of Physics, Hong Kong Univ of Sci and Tech** **Sep 2021 - Aug 2022**
*Professor Kwok Yee Wong Michael's Group*

- Analyze data collected from Electronic Toll Collection (ETC) system from the National Highway 1 of Taiwan
- Using XGBoost, a library that provide gradient boosting framework, to predict the travel latency
- Predicting multiple sub-segments at the same time to increase efficiency and achieve a higher accuracy.
- Extending the previous group members' result to the whole highway system
- Verifying the previous group members' clustering classification method and discover its ineffectiveness when working on the whole highway system
- Write a conference proceeding paper in 26th International Conference Hong Kong Society for Transportation Studies.

## Publication

[1] B. He, Z. Luo, M.F, Ho, **Z. Lao**, T.S. Choi, K.Y. Wong, "Large scale points-to-points highway latency prediction", Proceedings of the 26th International Conference of Hong Kong Society for Transportation Studies, 438-445 (2022)

## Award

- Dean's list (2020-2022)
- University Scholarship (2020-2021)
- Physics Entry Scholarship (2021)
- International Mathematical Olympiad Preliminary Selection Contest, Honorable Mention (2019)

## Skills

Python, Java, C++, Matlab, Mathematica, LaTex