Zhizheng Zhao

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About

Hi, I am a third-year student at the School of Physics, Peking University, with interests in both high-energy physics and artificial intelligence. I am currently collaborating with Dr. Renrui Zhang from The Chinese University of Hong Kong on research involving Chain-of-Thought reasoning for image generation and related computational models. In addition to my work in AI, I am passionate about physics, particularly in areas related to theoretical and experimental research. I aim to contribute to both academic and industry advancements through my research.

EDUCATIONAL BACKGROUND

Peking University   Beijing, China   09/2022 – present

- *Major in Physics***:**   GPA: **3.48**/4.30
  (Consistent improvement from 3.39 in the first semester to 3.78 in the most recent semester; semester GPAs: 3.39, 3.49, 3.18, 3.65, 3.78)
- **Advanced Courses:**
  - Thermodynamics (90),
  - Data Structures and Algorithms(89),
  - Optics(89),
  - Fundamentals of Modern Electronic Circuits and Experiments(88),
  - Fluid Mechanics(85),
  - Introduction to Atmospheric Sciences (97),
  - Introduction to Earthquakes (98)

REASEARCH INTEREST

- **Chain-of-Thought Reasoning for Enhancing AI Model Performance.**
- **Muon-Driven Dark Matter Detection in High-Energy Physics.**

REASEARCH EXPERIENCES

Research on Chain-of-Thought Reasoning for Advanced Image Generation.   09/2024–01/2025

(Collaborator: Dr. Renrui Zhang, The Chinese University of Hong Kong)

- Conducted research on applying Chain-of-Thought (CoT) reasoning to autoregressive image generation, focusing on test-time computation and Direct Preference Optimization (DPO).
- Proposed and implemented the Potential Assessment Reward Model (PARM), which adaptively evaluates each generation step by integrating existing reward models.
- Enhanced the Show-o model, achieving a +24% improvement on GenEval and surpassing Stable Diffusion 3 by +15%.
- **Progress:** Submitted research findings to CVPR 2025, currently under review.

Research on Muon-Based Dark Matter Detection in High-Energy Physics   05/2024–present

(Supervisor: Prof. Qite Li, Peking University)

- Conducted research on detecting dark matter using muons, leveraging their penetrating nature.
- Developed and optimized signal processing algorithms to enhance the accuracy and precision of detector data analysis.
- Proposed a novel method for improving the sensitivity of dark matter detection, focusing on signal extraction and noise reduction techniques.
- **Progress:** Currently preparing a manuscript for publication, with research findings under development.

PROFESSIONAL SKILLS

Programming and Software: Python / MATLAB / Mathematica / CERN ROOT / LATEX
Languages: Currently in preparation

EXPERIENCE

- **Shenzhen International Quantum Academy**   Visiting Student

HOBBIES

- **Anime**
- **Computer Games**