

# Zhizheng Zhao

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## About

Hi, I am a third-year student at the School of Physics, Peking University, and I am interested in high-energy physics and artificial intelligence. I have previously collaborated with Dr. Renrui Zhang from the Chinese University of Hong Kong to study image generation based on thought chain reasoning and its related computational models. I am currently conducting research related to reinforcement learning under the guidance of Assistant Professor Minjia Zhang from the University of Illinois at Urbana-Champaign. In addition to my work in artificial intelligence, I am also passionate about physics, especially in areas related to theoretical and experimental research.

## EDUCATIONAL BACKGROUND

<b>Peking University</b>	Beijing, China	09/2022 – present
Grade: <b>83.4/100.0</b>		
• <b>Major in Physics:</b> (Consistent improvement from 82.1 in the first semester to 89.3 in the most recent semester; semester Grades: 82.1, 83.6, 79.1, 86.5, 89.3)		
• <b>Advanced Courses:</b>		
- Introduction to Earthquakes (98),		
- Introduction to Atmospheric Sciences (97),		
- Thermodynamics (90),		
- Data Structures and Algorithms(89),		
- Optics(89),		
- Fundamentals of Modern Electronic Circuits and Experiments(88),		
- Fluid Mechanics(85),		

## REASEARCH INTEREST

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

## REASEARCH EXPERIENCES

<b>Research on Chain-of-Thought Reasoning for Advanced Image Generation.</b>	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%.	
• <b>Progress:</b> Accepted by CVPR 2025.	
<b>Added time differentiation to GRPO's reward value</b>	03/2025–present
(Collaborator: Prof. Minjia Zhang, University of Illinois at Urbana-Champaign)	
• At present, the effect is improved by 10% compared with the GPRO method. The stability problem is still being solved, and the effect in the large parameter model is still being tested.	
• <b>Progress:</b> Under study.	
<b>Research on Muon-Based Dark Matter Detection in High-Energy Physics</b>	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.	
• <b>Progress:</b> 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

- <b>Shenzhen International Quantum Academy</b>	Visiting Student
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## **HOBBIES**

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