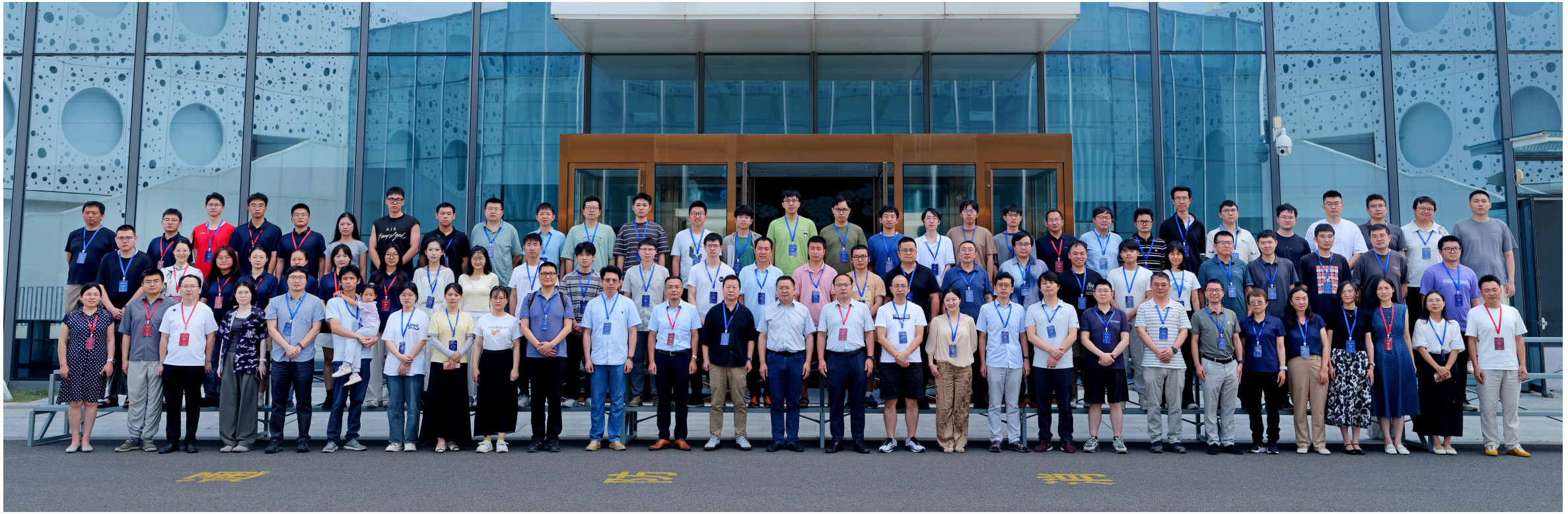
Closing Remarks

People

- ~100 participants from ~ 40 insititutes



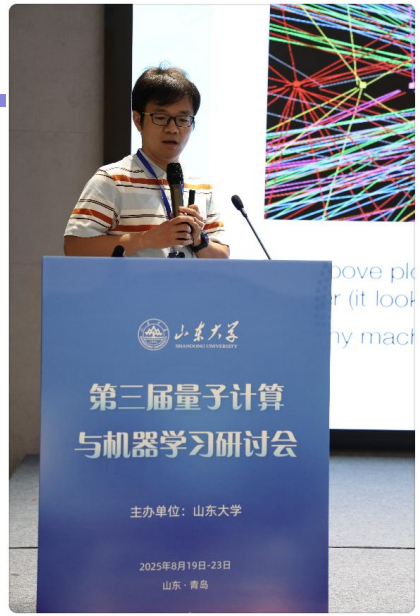
Talks

- 4 days, 12 sessions, 47 talks
- Very diverse topics
  - LLM (8)
  - Quantum AI, Quantum algorithm (3)
  - Quantum Computer (1)
  - Quantum Simulation (6)
  - AI for online (3)
  - AI for offline data processing (~20)
  - AI for theory (5)
  - And others...

Rich topics


欢迎致辞
AI for High Energy Theory
超导量子计算进展
Physics reach of the CEPC - in the scope of AI enhanced reco & analysis
Coffee break
机器学习FPGA加速在STCF触发系统预研中的初步应用
Machine Learning for real-time data processing at Belle II
Development of the neural network algorithm on Versal AI-engine
AI usage at ILC reconstruction
面向量子AI的算法研究和设计
分类与异常检测技术在ATLAS实验上的新进展
分类与异常检测技术在CMS实验上的新进展
Coffee break
智慧光源大脑2.0平台
粒子物理数据分析AI助手-赛博士
A New Intelligent LHAASO: Pushing the Limits of AI for High-Energy Astronomy
Neural Network Feild Theory
Anindita Maiti
09:00 - 09:30
AI for discovery: a preliminary glimpse
东山 见
09:30 - 09:50
ML for lattice gauge field simulations
Wei Wang
09:50 - 10:10
Coffee break
The Neural Networks with Tensor Weights and the Corresponding Fermionic Q
Machine Learning for Parton-Level Studies of Quantum Entanglement Using p
Vision / Language Calorimeter: deep-learning-based anti-neutron reconstructio
Yangu Li
AI-assisted Four Top Quark Reconstruction
开源ROCm GPGPU加速的中微子事例重建
Benda Xu
09:00 - 09:20
Reconstruction of Electromagnetic Shower Axis in the AMS-02 ECAL using Deep Learning Method
Yaozu Xiong
09:20 - 09:40
基于机器学习的eXTP卫星PFA载荷地面和在轨数光电子径迹重建
Dr 维春 姜
09:40 - 10:00
Towards a foundational jet model: Enhancing generalization with contrastive “gen-reco” pre-training
Zixun Kou
10:00 - 10:20
Coffee break
10:20 - 10:40
Pile-up events discrimination based on machine learning in JUNO
肇祥 吴
10:40 - 11:00
JUNO上基于深度学习的大气中微子和宇宙线缪子重建
晓晗 谭
11:00 - 11:20
Transformer-based Fermi/GBM Background Predictor
Mr 攀 鲁
11:20 - 11:40
Transfer learning empowers material Z classification with muon tomography
Mr 浩辰 王
11:40 - 12:00
Quantum & quantum-inspired optimization in high energy physics
正确地编写量子程序
Re-discovery of $Z_c(3900)$ at BESIII Based on Quantum Machine Learning
Quantum Simulations of Particle Scattering in Lattice Field Theories
Coffee break
Quantum simulation for real-time dynamics at colliders
Quantum simulations of quantum electrodynamics in Coulomb gauge
Computing n-time correlation functions without ancilla qubits
基于量子计算的SU(2)规范理论中的手性不平衡研究
Nuclear structure and dynamics calculations on quantum computers
Intern-S1: 科学多模态大模型
磐石科学大模型
AI赋能科学研究
BigBang：用于科学多任务学习的自回归大模型
Coffee break
White paper discussion
BESIII量能器快速模拟
1-1 correspondence reconstruction at electron-positron Higgs factories
Study of CNN Algorithms for PID System in STCF
Studying Hadronic Shower Development in HERD CALO with Machine Learni
Application of machine learning method for energy reconstruction on space b
UNKNOWN 廖川黎
Coffee break
15:40 - 16:00
White paper discussion
16:00 - 18:00

Rich topics



And a lot others...

Fruitful Discussions

第三届量子计算与机器学习研讨会

Discussion Sessions

Dates: 8.21 & 8.22, 2025

Moderators: Tianji Cai, Teng Li, Ke Li

Qingdao, Shandong, China

Current Paper Organization

CONTENTS

Mainly just placeholders. Contents to be modified.

May delete & distributed in each section

Purpose of the paper, its targeted audience, and what we want to achieve by writing this paper.

Major Concerns:

- Balance the Chinese specific discussions and the general physics discussions as part of the international community.
- What's novel about our paper that set us apart from other white papers already written?

Suggestions:

- To advance the high energy & AI ecosystem in China, while at the same time contributing to the international community.
- To survey on the many open questions of interest to the entire community and set a **flexible framework** both boosting targetted and structured research in key resource-intensive areas and leaving enough room for free explorations in yet unforeseeable domains.
- To demonstrate the community needs and serve as a reference when advocating for our community.

Scope of the paper, the general organization, principles for selecting physcis topics, writing style, and the desired paper length.

Major Concerns:

- The current physics scope does not cover all topics of interest to the entire community. Eg, non-collider HEP, instrumentation, etc.
- The current physics contents lack some unifying theme and feel a bit too loose.

Suggestions:

- We recognize that the field is at an early stage. Some problems might have matured enough for more orchestrated research, while others need more trials and errors. Both should be covered.
- The unifying "soul" may be "WHY" particle physics is unique in its AI challenges and contributions.
- **A list of topics of interest, loosely organized into four physics parts: instrumentation, experiments, phenomenology, theory.** Any topic brought by the community should at least be mentioned with a few sentences of general description. People who propose the topic should take charge of the writing of their topic, to be collected by the survey, then organized into the paper by the chief editors, and later confirmed by the original proposers.
- **Topics of main interests** should be given more attention & space in the paper as **Highlighted Topics**. E.g., foundation models, interpretability. Chosen based on the survey results.
- Shorten the paper <20 pages. Condense the general part and expand more on our Chinese specialty part.

Fruitful Discussions






我们初步达成的共识（高度总结）

- 需要通过书面材料（如路线图、白皮书等）来规范讨论并推动领域发展。
- 白皮书应当体现集体愿景并具有包容性。关键的第一步是设计高质量的调查问卷，并从整个社群中收集尽可能多的反馈。
- 长期来看，需要建立开放的社群平台（网站或其他形式）以支持路线图的持续迭代。调查与白皮书都应保持动态更新，从而更好地反映领域的快速演进，捕捉新进展与前沿议题。
- 官方支持至关重要，我们需要建立公平、包容且高效的组织机制来实现资源共享与协同合作，其根本目标是助力每个主体更好地实现科学目标。

Survey Structure (Tentative)

- Section 1: Basic Info
  - Physics subfields, AI experience level, Interested AI topics, etc --> mainly multi-choice
- Section 2: Physics & AI
  - Topic Description (sample): Physics problem statement, traditional method & bottlenecks, (if alraedy trid AI) AI methods, sucesses & challenges. --> mainly text
  - Abstract AI Problem: Extract the AI problem from the physics topic. --> mainly multi-choice & some text
  - General AI concerns (how important are they to your work): e.g. uncertainty, interpretability. -> rate on a scale from 1 to 5
  - Future Scientific Vision: What are some key questions? -> mainly text & some multi-choice
- Section 3: Community
  - How important are the following concerns to your research and teaching? --> Rate on a scale from 1 to 5.
  - What are your suggestions to address some of the above concerns? -> mainly text
  - What are some other concerns you encounter in your everyday work not addressed above? --> text.
  - What are some of the works you would be willing to volunteer? -> multi-choice

Contact

- Tianji Cai: tianjiresearch@gmail.com
- Ke Li: like@ihep.ac.cn
- Teng Li: tengli@sdu.edu.cn

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    伍思杨 于明玉 梁晓霞

Enjoy your stay at Qingdao

Have a safe and nice journey back

Please stay tuned...