# Computing Center of IHEP

IHEP CAS Career Information Session

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Introduction to IHEP-CC

- Founded in 1974, the birthplace of Internet technology in China
  - **First email, first international link, first world wide web** server in China
- Missions
  - Providing large-scale scientific computing platform for HEP experiments
    - Facilities and computing, storage, network services
    - Scientific software and database application
  - Research on computing technologies related to HEP
    - AI, bigdata, quantum computing, etc.
  - Developing IT services for advanced information processing
- Strategic plan for the next 5-10 years
  - Becoming a leading national data center for HEP and synchrotron radiation in China
  - Establishing an Important International center for HEP computing
  - Developing world-class research programs, including scientific software, AI, quantum computing, etc.
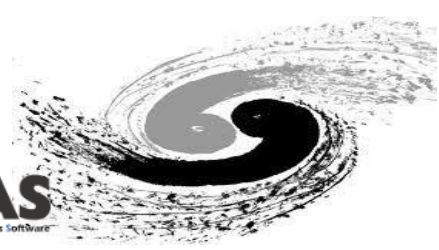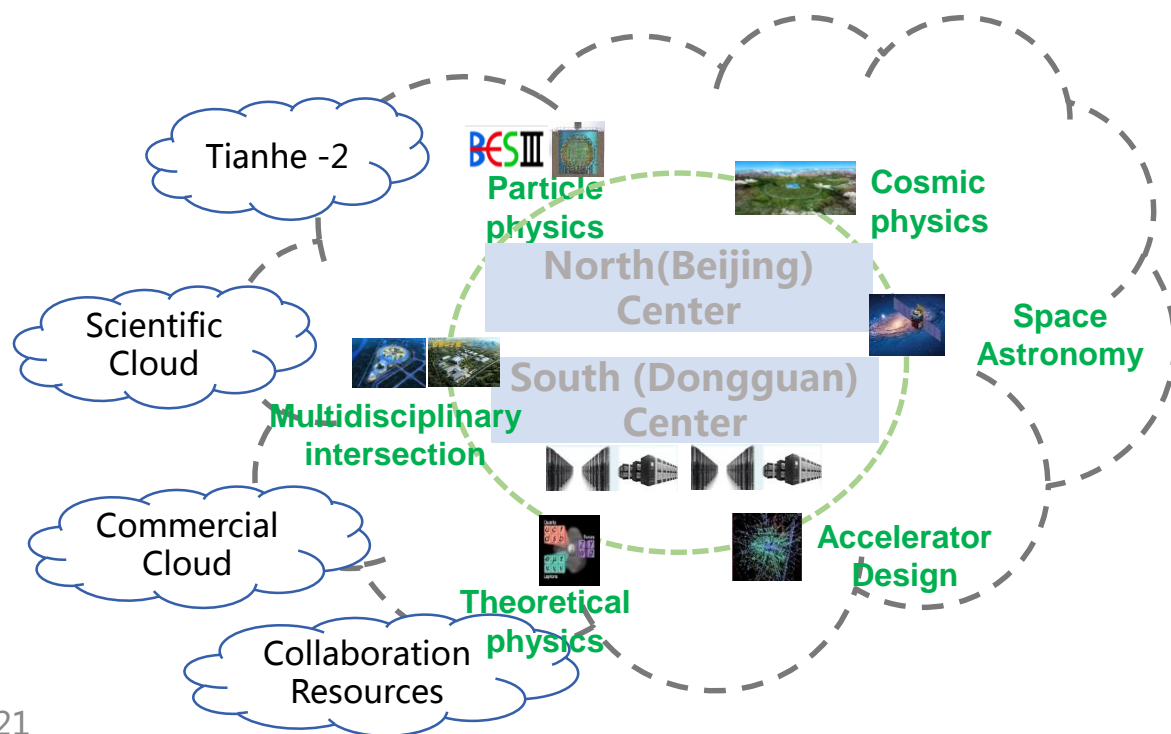
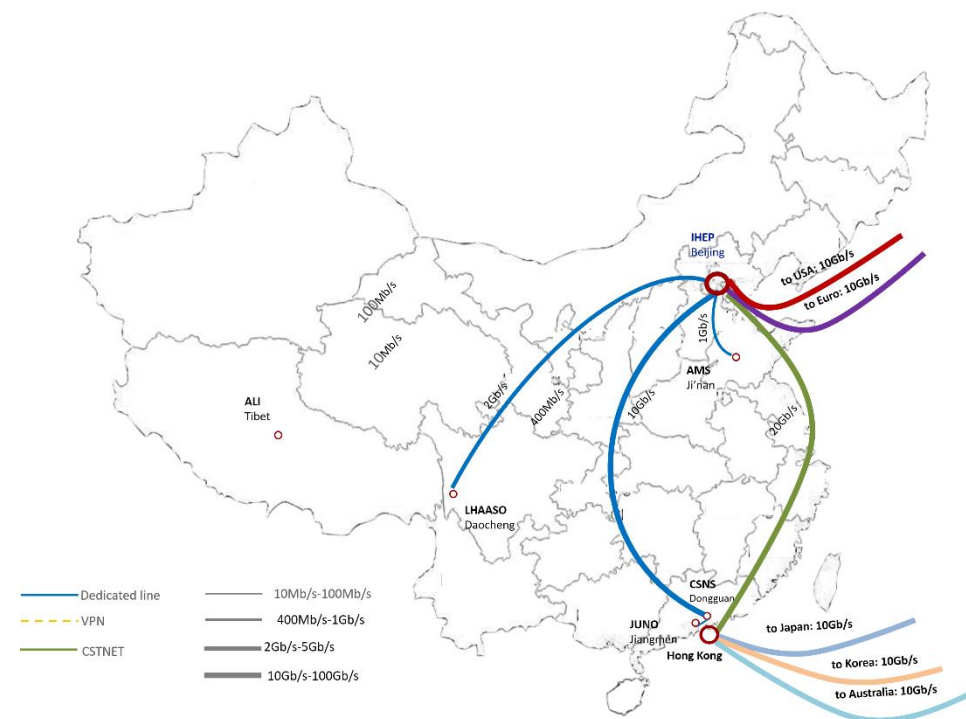# Introduction to Chinese HEP Computing Platform
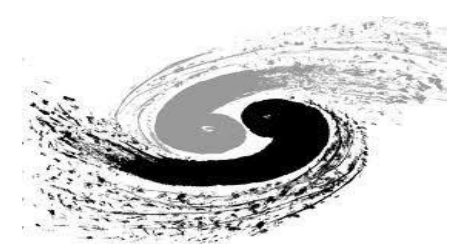
- Large-scale computing facilities
  - Computing: 100 k CPU cores, 400 GPU cards to for more than 20 experiments/applications
  - Storage: 102 PB disk storage, 50 PB tape storage
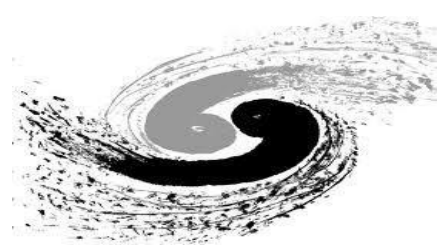   - Network: LHCONE member, WAN Bandwidth: 100Gbps

Chinese HEP Computing Platform

Network Connection of IHEP

# Introduction to Chinese HEP Computing Platform

- **Cross-center unified data processing platform**

  - North Center in Beijing :
    - Intel x86 CPU , Nvidia /DCU GPU cards
    - High Throughput Computing / High Performance Computing
    - Open source Distributed File System/ Tape Library
    - Grid Site: **LHCb Tier 1** and Atlas/CMS/Alice Tier2

  - South Center in Dongguan
    - Intel x86 CPU, Arm , Nvidia A100/V100 GPU cards
    - High Performance Computing
    - OceanStor9000 support by HUAWEI
    - Cloud Computing

North Center - Beijing

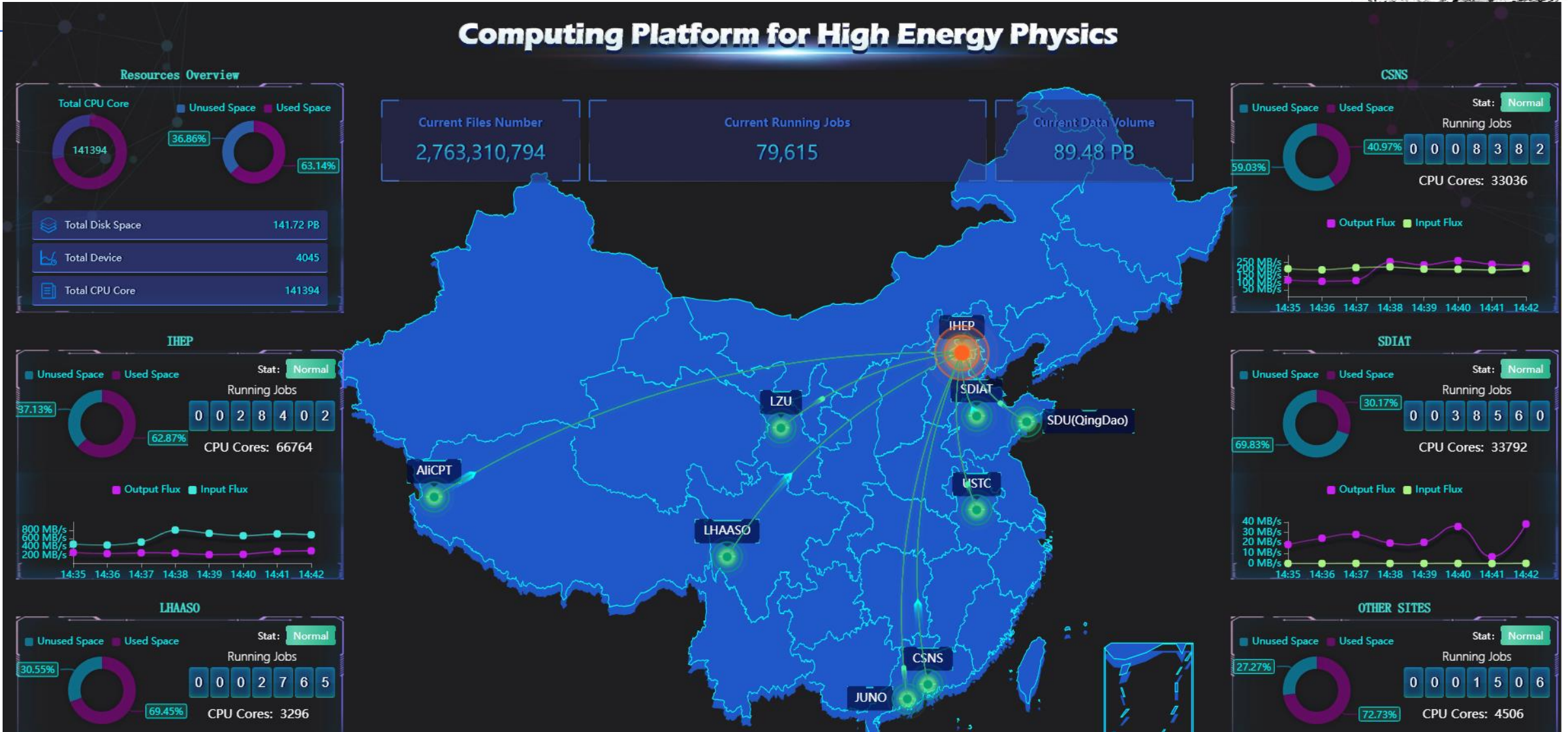South Center - Dongguan
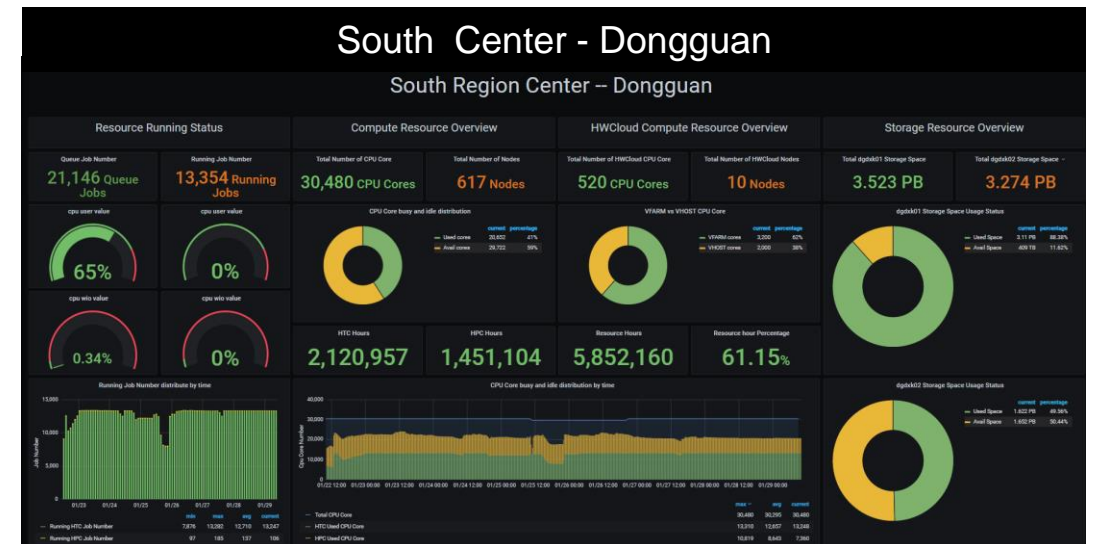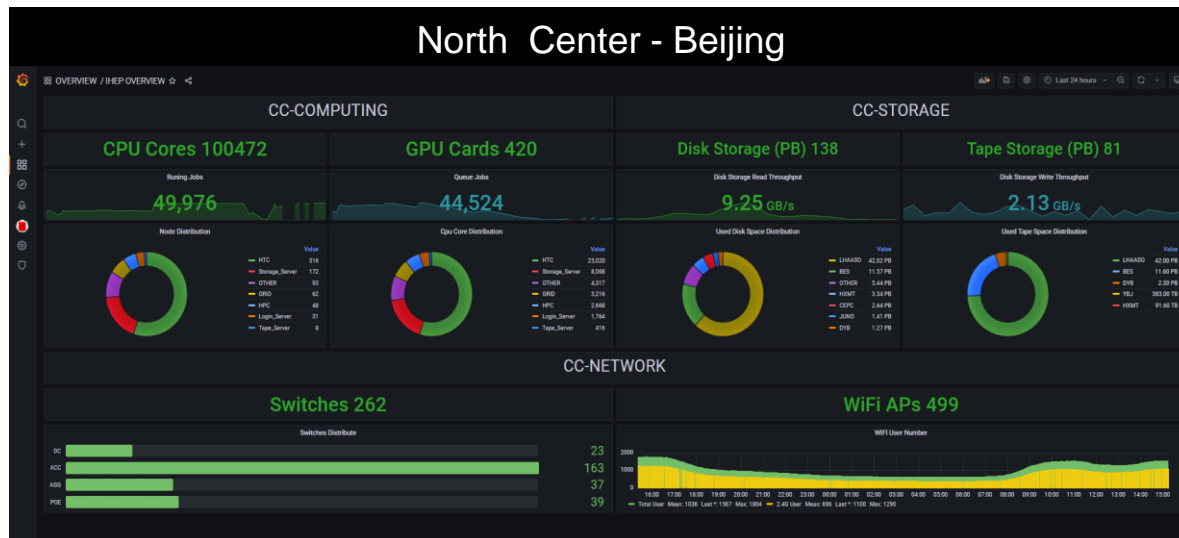
- **One platform, Multi centers** -- for HEP
  - Combining multiple computing sites and compatible with heterogeneous hardware
    - IT services deployed to the HEP Exp. facilities
    - Collaboration member IT resources
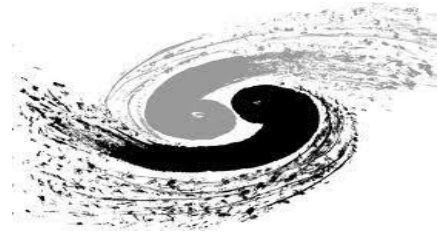   - Commercial clouds, super computing center

Global View on Chinese HEP Computing Platform

Research and Study Team

- Human resources of IHEP-CC (100+ member)
  - Currently 58 staff, 3 post doctors, 5 visiting members, 46 master and Ph.D. students
- Research fields

| Computing and Storage	Network and Cyber security	IT Services	Scientific Software	Innovation
• High Performance Computing • High Throughput Computing • Grid/Cloud computing • Distributed storage	• Datacenter and campus network • Dedicated link for remote experiments • International network collaboration	• Database technology and application • Conferencing Technology • Institutional management tool	• Open data and open science • Scientific data management • Scientific software framework	• AI for science • Quantum computing • Big data
shijy@ihep.ac.cn	zengshan@ihep.ac.cn	sunzh@ihep.ac.cn	hmzhang@ihep.ac.cn	zdzhang@ihep.ac.cn
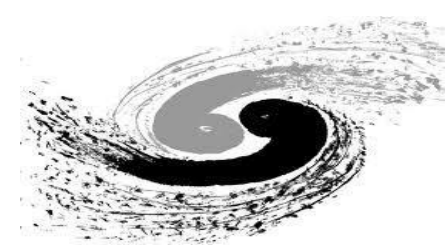
Position Description

IHEP-CC provides **faculty member** and **post doctor** positions

Staff – Deputy Director of NHEPSDC
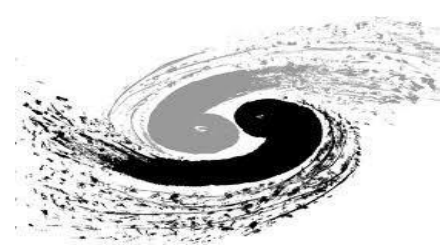
- NHEPSDC: The National High-Energy Physics Science Data Center
  - One of the first 20 national data centers certified by the Ministry of Science and Technology
  - Aiming to achieve data resource management, standard-setting, open sharing, and integrated analysis
- Responsibilities
  - Deputy Director of National HEP Data Center
  - To solve key technical issues and manage hybrid teams
  - Responsible for scientific data management and processing software, Artificial Intelligence and other related work
- Requirements
  - International perspective and excellent management skills
  - Experiences in the fields of HEP, AI, or their interdisciplinary fields
  - Preferred for experts who serving as a professor or equivalent position in well-known research institutions, universities

Contact with: Dr. Fazhi QI
qfz@ihep.ac.cn

Staff – HEP Artificial Intelligence Computing Platform

- Mission
  - Design and develop deep neural networks, large models and AI agents for HEP.
  - Build the High Energy Physics AI Platform (HepAI). For more information, visit: https://ai.ihep.ac.cn/
- Responsibilities
  - Develop AI agents for scientific research, with a focus on physical analysis. Train large language models (LLMs) for HEP. Contribute to current AI agents system Dr. Sai and LLM Xiwu.
  - Explore foundation model of HEP, including innovative pre-training techniques, unified particle data representations, and physical feedback reinforcement learning etc.
  - Utilize the powerful capabilities of AI to accelerate scientific discoveries in HEP.
  - Provide AI solutions to support research in particle physics, astrophysics, synchrotron radiation, and neutron science.
  - Develop HepAI software and system.
  - Design and implement DL/ML algorithms for HEP simulation, reconstruction, analysis, and real-time processing.
- Requirements
  - Extensive international academic influence or mastery of key core technologies in the fields of HEP, AI, or their interdisciplinary areas.
  - Doctoral degree in computer science, physics, mathematics or other related fields.
  - Ability to solve key technical problems.

2025/1/21

Contact with: Dr. Zhengde Zhang
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Postdoc – Quantum Computing
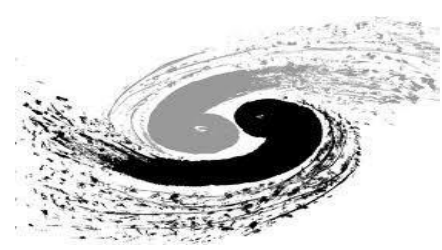
- Mission
    - Develop quantum computing platform for high energy physics research and explore the quantum machine learning and quantum simulation algorithms.
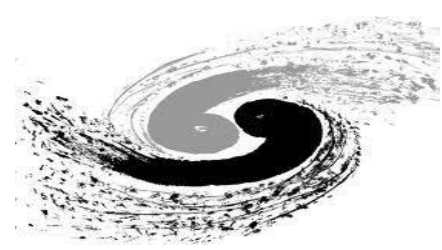- Responsibilities
    - Collaborate with colleagues to develop the quantum computing platform for HEP research
    - Collaborate with experimental and theoretical physicists on the application of NISQ era quantum machine learning and quantum simulation algorithms to HEP
    - Research on the state of art quantum information science and technologies from academia and industry, and seek for the potential application to high energy physics
    - Develop the software framework to interface the quantum algorithms and real world quantum computers with different architectures
    - Research of quantum algorithms on classical hardware
- Requirements
    - PhD or equivalent professional qualifications and experience in theoretical physics / mathematics / theoretical computer science / computational science or a related field

Contact with: Dr. Wei Sun
sunwei@ihep.ac.cn

Postdoc – Scientific Data Management

- Mission
  - Design and build a universal data management system for HEP and related disciplines
  - Research on the alignment and fusion of experiment data and simulation data, and building an AI-READY scientific data system
- Responsibilities
  - Develop applications for managing and integrating massive data supporting multiple experiments
  - Research knowledge graph technology based on high-energy physics data, develop knowledge graphs and knowledge mining applications
  - Design and develop a scientific data fusion system based on AI agent
- Requirements
  - Proficient in programming languages such as Java/Python or C++/C;
  - Preferred for those with the experience in scientific data management, AI-Ready data, knowledge graphs, and data mining

Contact with: Hao HU
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Postdoc– Computing Technology for HEP
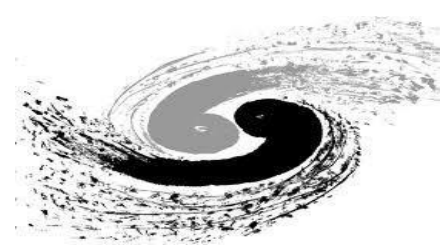
- Mission
  - Study the key technology of "high throughput computing" and the "high performance computing" for HEP and related disciplines
- Responsibilities
  - Research and develop scheduling algorithm on large scale of distributed computing system
  - Performance optimization on high performance computing for HEP applications
- requirements
  - Experience in software development, or HEP data analysis and have a good understanding of the Linux kernel and distributed computing
  - Majored in computer science, HEP experiments, or other related fields.

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Postdoc – Data Storage Technology for HEP
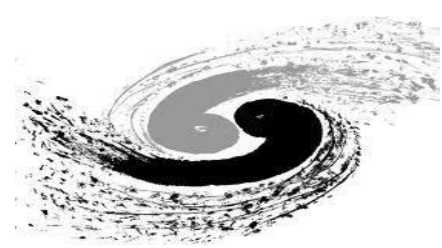
- Mission
  - Research and develop a large-scale distributed storage system with the capacity of hundreds of petabytes, supporting high concurrency and global data access across data centers
- Responsibilities
  - Study and develop the key technologies in distributed storage systems
  - Performance optimization of storage systems for HEP applications
  - Research on the application of integrated storage and computing technologies
- Requirements
  - Proficient in programming technologies such as C/C++, and have a good understanding of the Linux kernel and file system designs
  - Majored in computer science, HEP experiments, or other related fields.

Contact with: Dr Haibo Li
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Welcome

Join US!

Contact Now!

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