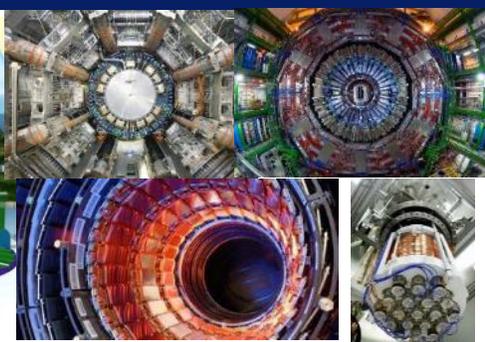
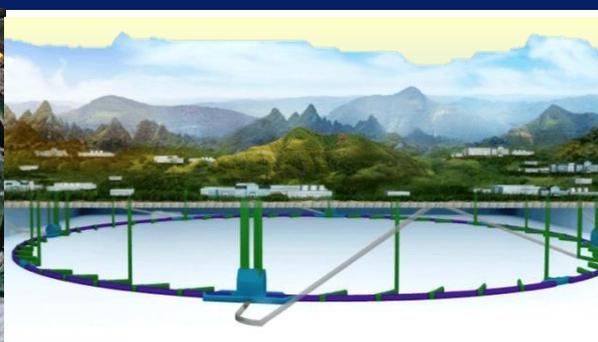


Introduction to Experimental Physics Division

Miao He

Institute of High Energy Physics, CAS

Feb. 2, 2026 @ CAREER INFORMATION SESSION OF IHEP CAS 2026

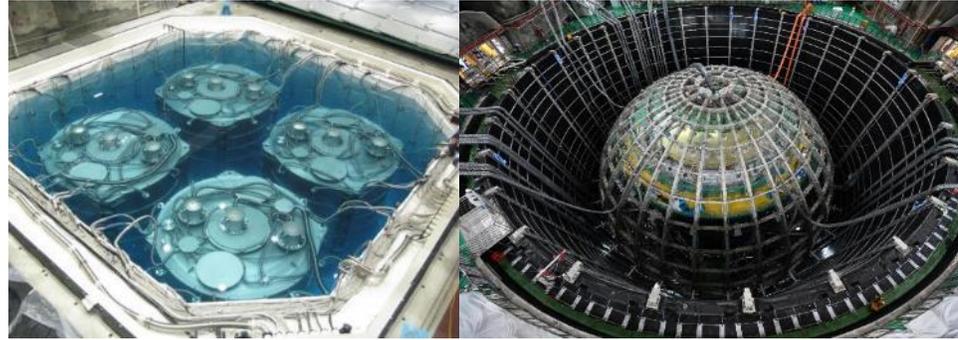


Experimental Physics Division (EPD)



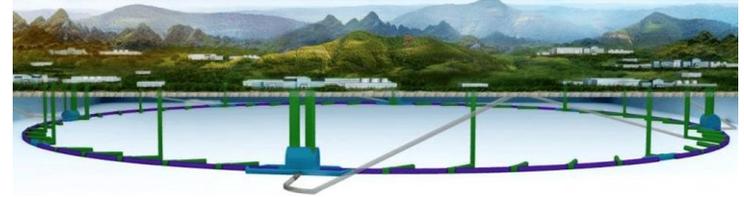
Charm Physics

BESIII, BelleII, PANDA, GlueX



Neutrino Physics

Daya Bay, JUNO, EXO, DarkSide, COMET



High Energy Frontier

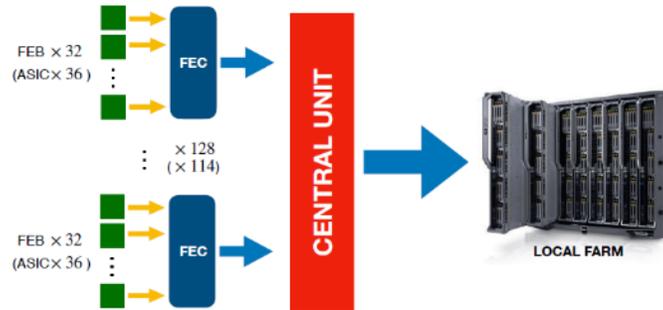
CEPC, LHC (ATLAS/CMS/LHCb)



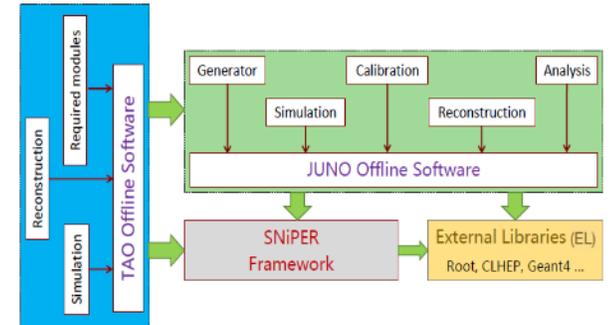
Detector



Electronics



Trigger, DAQ, DCS

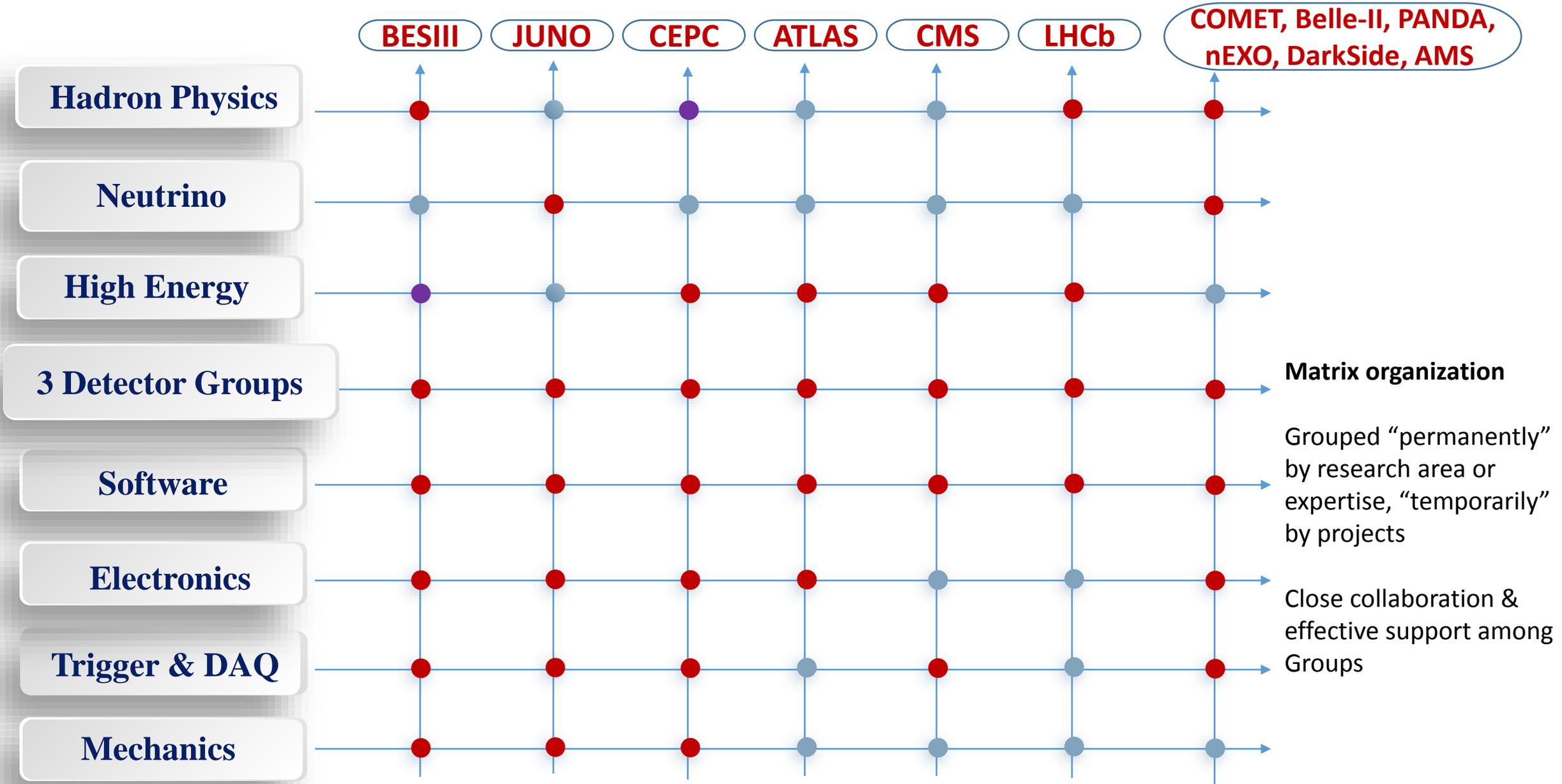


Software

Complete chain of design, construction, and operation of large-scale experiments, R&D of advanced technology
179 staff, 408 temporary (including postdoc, students), totaled 587 people (Dec. 2025)

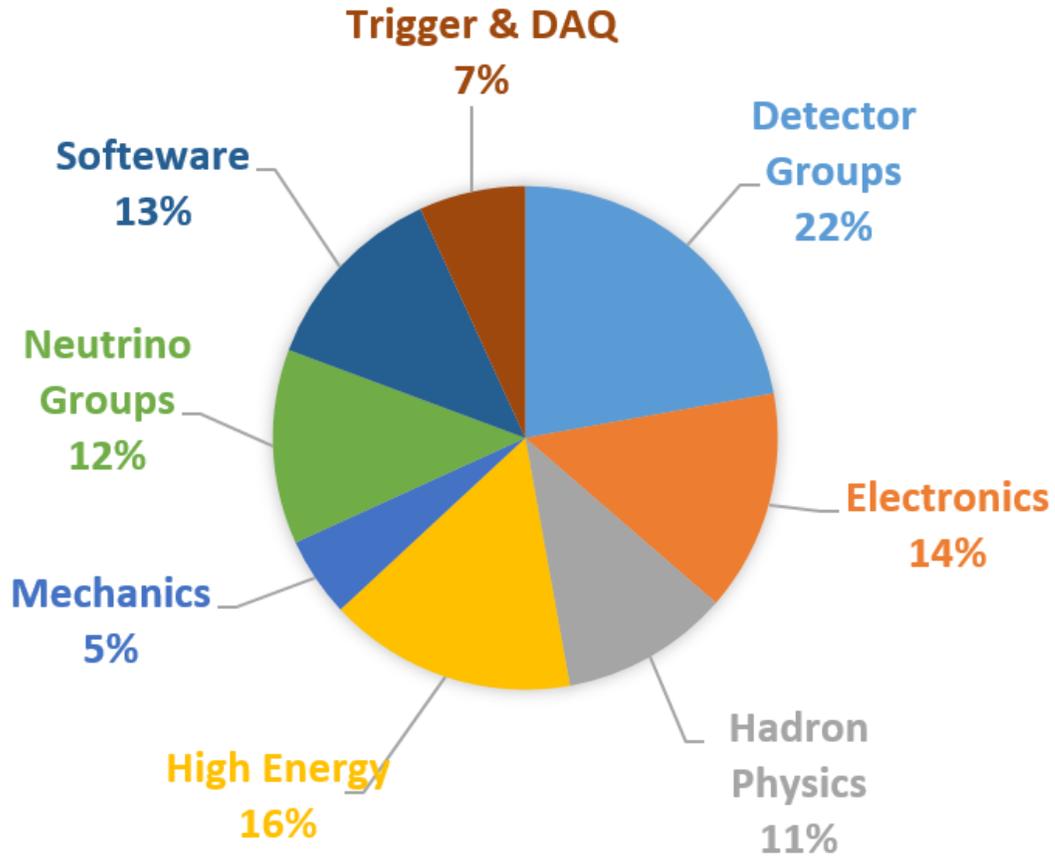


Research Groups in EPD





Members in EPD



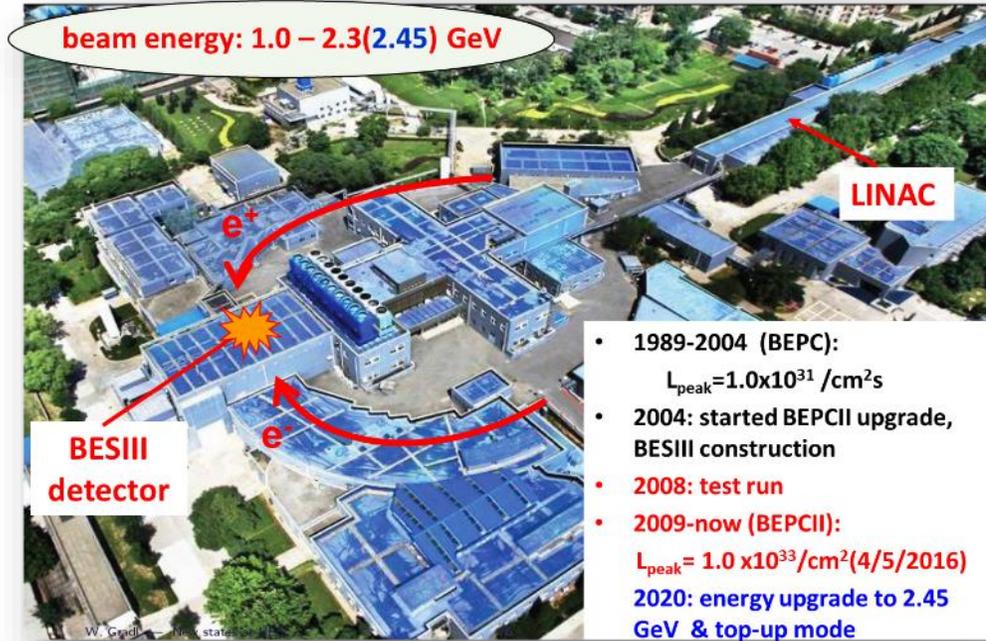
	Number
Faculty	~ 179 (9 international Prof.)
Postdoc	62 (9 international)
Student	~ 163
Visiting student	~ 146

Planned recruitment:

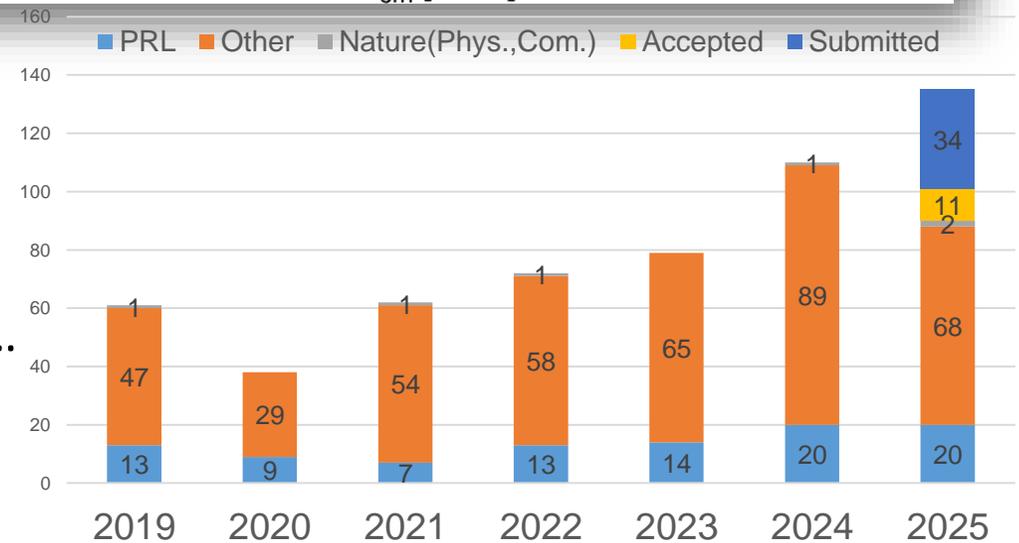
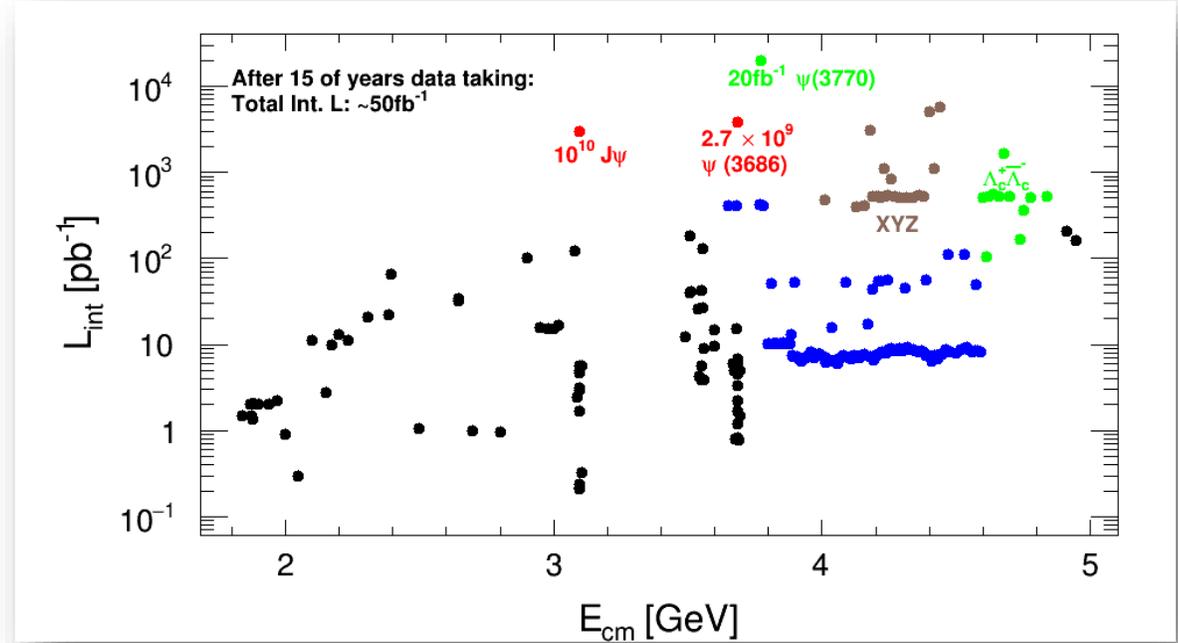
- Faculty: 5 - 10 /yr
- Postdoc: 50 – 60 /yr

Hadron Physics - BESIII

Beijing Electron Positron Collider (BEPCII)



World's largest τ – charm data sets in e^+e^- annihilation



~ 600 members (more than 130 from outside of China)
 from 84 institutions in 17 countries

Rich physics programs:

- Hadron spectroscopy, QCD exotics: **glueballs**, hybrids, XYZ's, ...
- **Charm flavor physics**: CKM matrix, decays constants, ...
- **Precision measurements**: R-values, time-like form factors, ...

BEPCII-U: 3x upgrade on luminosity; $E_{\text{cms}} \rightarrow 5.6 \text{ GeV}$ (2025)

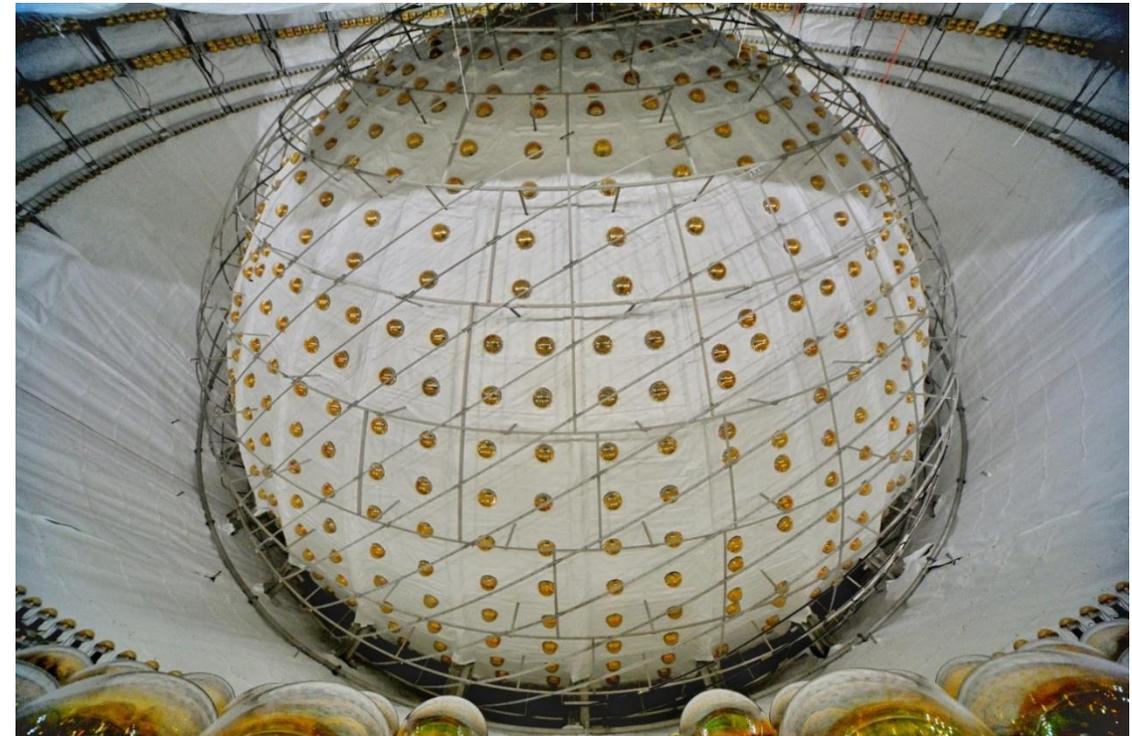
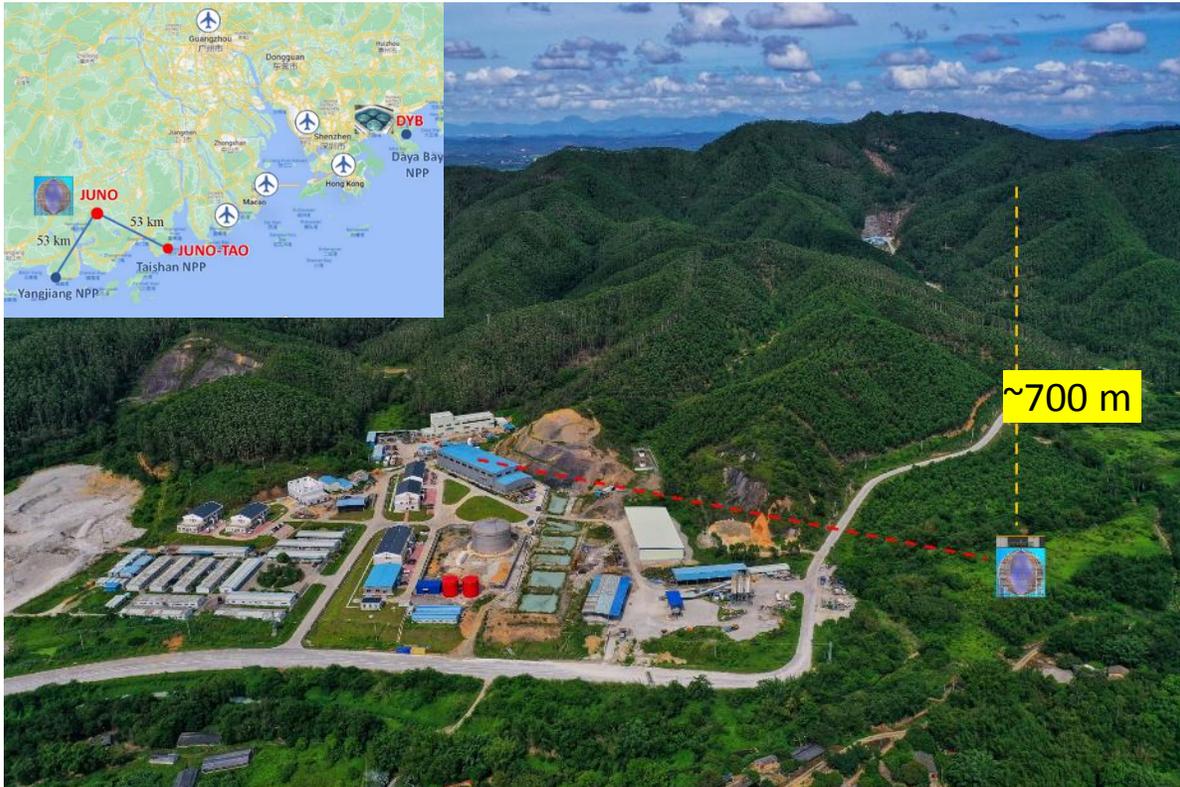
Neutrino Physics - JUNO

A multi-purpose neutrino observatory

- Determine **neutrino mass ordering** ($\sim 4\sigma$)
- **Precision measurement** ν -oscillation parameters ($\ll 1\%$)
- Other rich physics: **Supernova ν** , Geo- ν , Solar ν , Nucleon decay, Exotic searches, ...

- Experiment construction completed.
- Physics data taking on Aug. 26 2025.
- First physics result release on Nov. 19
- By 2030s, upgrade to search for $0\nu\beta\beta$

Exciting results will come in next a few years!



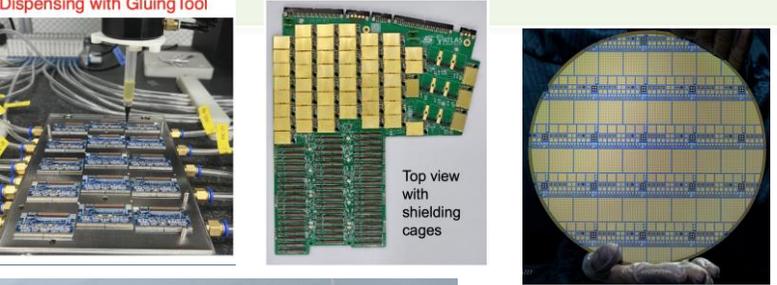
High Energy Frontier - ATLAS

- 14 Staff (4 international)
- 30 postdocs + Ph.D. students
- Topics :

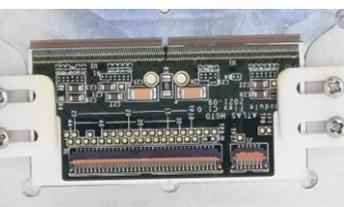
Joao Guimaraes Costa Group Leader	Xinchou Lou	Bruce Mellado	Xuai Zhuang	Yanping Huang	Zhijun Liang	Xin Shi
Zhaoru Zhang	Pielian Liu	Feng Lu	Lianyou Shan	Da Xu	Hideki Okawa	Yunyun Fan

- ✓ High granularity time detector (HGTD)
 - ✓ LGAD sensors chosen by CERN
 - ✓ IHEP played a leading role in HGTD
 - ✓ Project leaders, L2/L3 conveners
- ✓ Upgrade of Inner Track (ITK)
- ✓ Physics with rich directions:
 - SM: Higgs, Di-Higgs, W mass
 - New Physics: SUSY, Higgs-related BSM

HGTD detector : IHEP plays a leading role



IHEP LGAD silicon sensor



Physics highlights

HIGGS PHYSICS

Quarks: $\begin{pmatrix} u & c & t \\ d & s & b \end{pmatrix}$, Fortes: $\begin{pmatrix} Z & \gamma \\ W & \phi \end{pmatrix}$, Leptons: $\begin{pmatrix} e & \mu & \tau \\ \nu_e & \nu_\mu & \nu_\tau \end{pmatrix}$

PRD 98(2018) 052005: First observation of VBF Higgs production (6.5σ)

PRD 98(2018) 052003: Contribution to the First observation of $h \rightarrow b\bar{b}$ production

PRL 131,061802 (2023): Higgs CP measurement

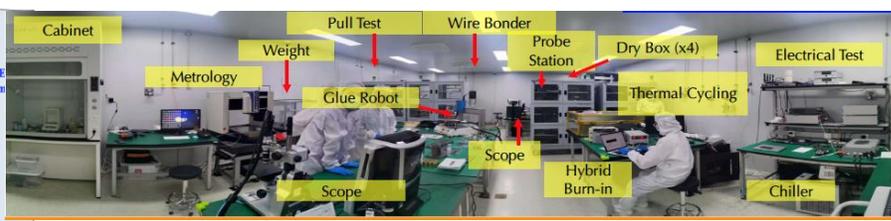
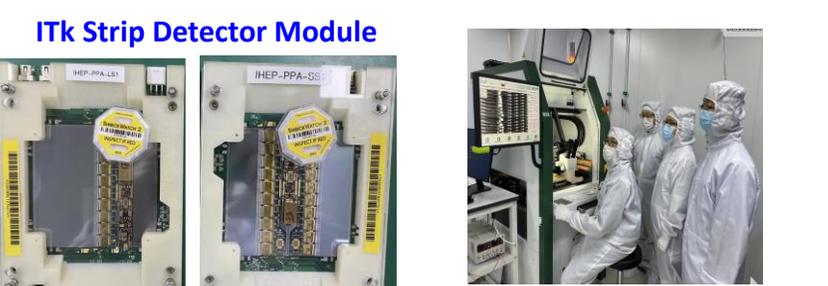
SUSY SEARCHES

Our World vs New World?

PRD 101(2020) 032009: First stau exclusion limit in ATLAS

EPCJ 79 (2019) 205: $\gamma/\tau/\mu e$ perform study

ITK: Responsible for 10% barrel strip module



High Energy Frontier - CMS

- **IHEP CMS group:** 10 staff, 30+ postdocs and PhD students
- **Strong involvement in a broad physics program**
 - Higgs, new physics searches, Top and EW precision measurements
 - Detector performance and physic object studies
- **Well-established labs and heavy commitment in the upgrade projects**
 - CMS **High Granularity Calorimeter** (HGCAL) module assembly center
 - CMS **iRPC/RPC endcap backend electronics** and trigger system R&D
 - Participation in HGCAL beam and system tests, CSC GIF++ at CERN



High Energy Frontier - LHCb

All faculty members joined IHEP in the past 6 years

Jianchun Wang

Yiming Li

Shanzhen Chen

Zijun Xu

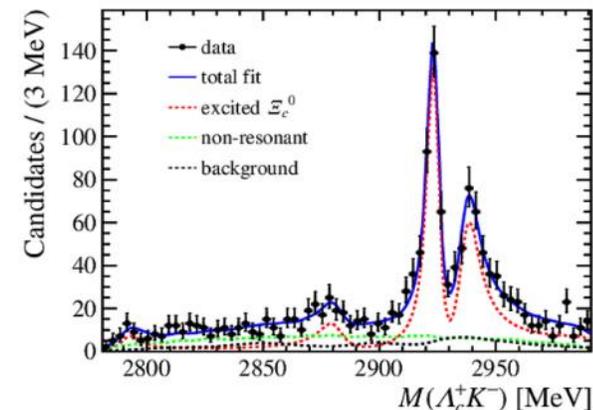
Xuhao Yuan



5 professors, 1 electronics engineer, 2 computing engineer, 2 visiting scientists
2 post-doctoral researchers, 14 post-graduate students

Heavy flavor physics

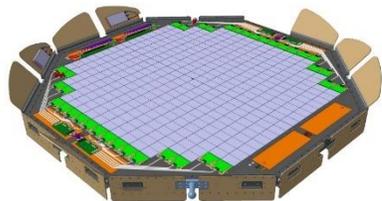
- Hadron spectroscopy and new particle searches
- CP violation and CKM parameter studies



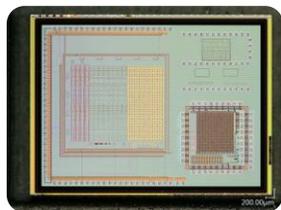
High-precision, radiation-hard silicon detector

- LHCb Upstream Tracker (UT) installation & operation
- Silicon pixel detector R&D for LHCb upgrade and CEPC
- Silicon detector module assembly for AMS projects

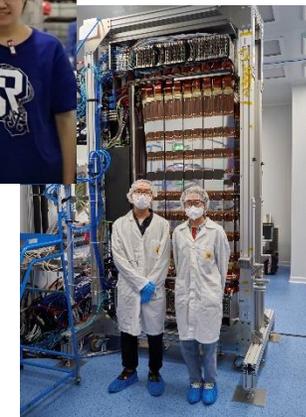
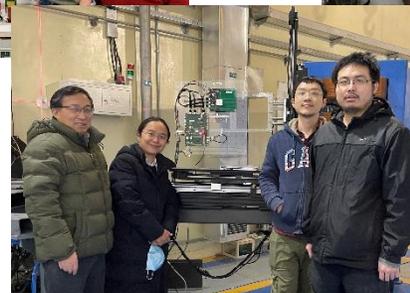
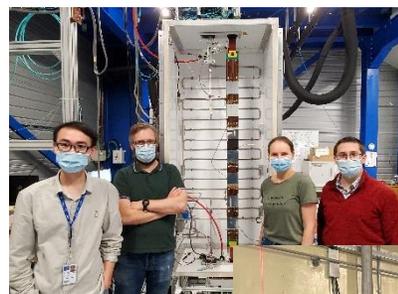
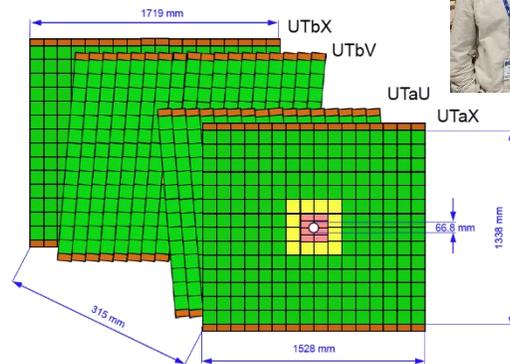
AMS LO



CEPC / LHCb



UT



High Energy Frontier - CEPC

10

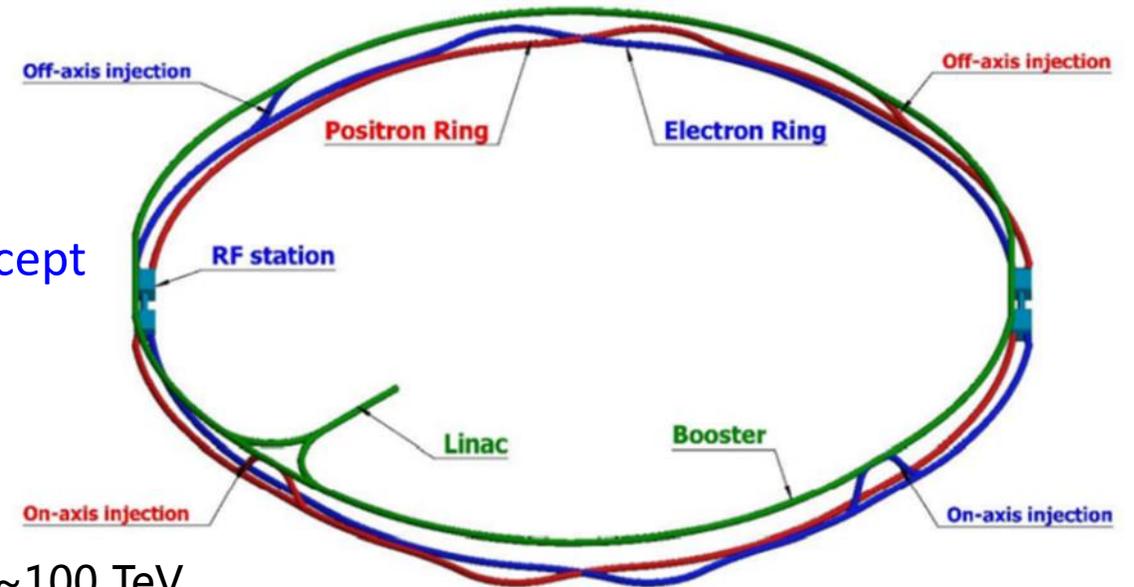
- CEPC: an e^+e^- Higgs factory producing H and W/ Z bosons and top quarks aims at discovering new physics beyond the Standard Model with energy scale of 10 TeV or even higher. Propose to commence construction in ~ 2027 and deliver data in 2030s
 - CEPC + SppC complex proposed in 2012 right after the Higgs discovery
 - Conceptual Design Report delivered in Nov. 2018, 1st for circular e^+e^- Higgs factory
 - Accelerator TDR released in Dec.2023, reference detector TDR released in Oct. 2025 high-impact innovations

- Focuses in near future:

- Accelerator Engineering Design Studies
- Physics studies, especially Physics White Papers
- Detector: further R&D based on TDR and new concept

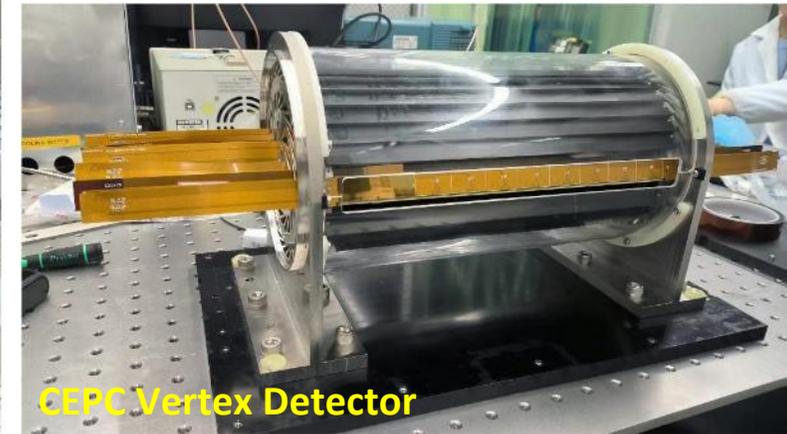
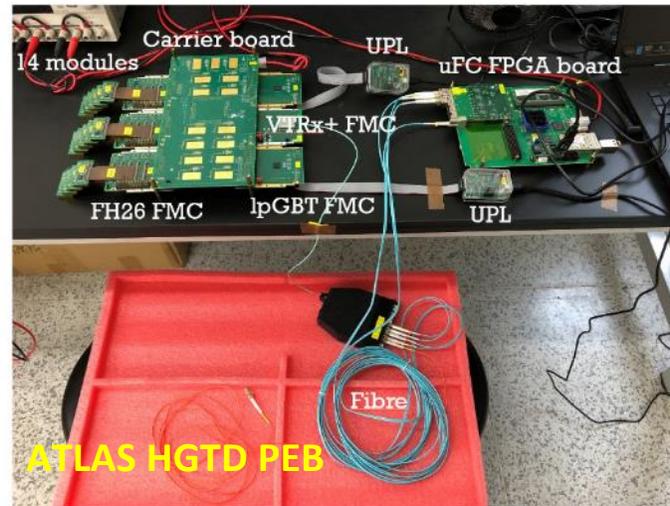
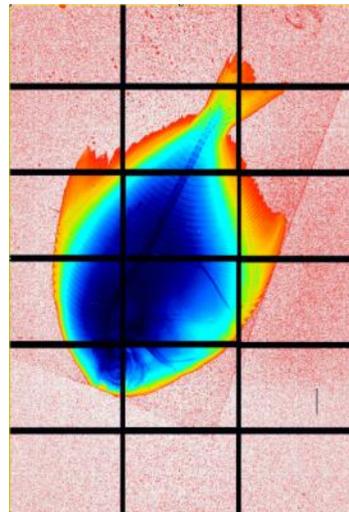
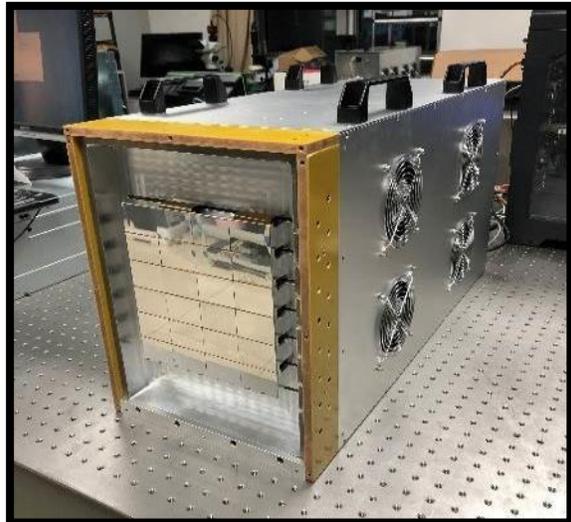
- **100 km circumference**

- Energy 90-240 GeV, can be upgraded to 360 GeV
- Updated to a Proton collider SppC in the same tunnel : ~ 100 TeV



Advanced Electronics development

- **EPD electronics group:** 23 staff, 15+ PhD students
- **Three major research directions**
 - Application Specific Integrated-Circuit (ASIC)
 - Advanced backend electronics system design
 - Advanced electronics technologies (packaging, cooling, communication...)
- **Long history and full chain of design capabilities for the electronics systems in large particle experiments**
 - BESIII, Dayabay, JUNO, LHAASO...
 - One of the largest electronics groups in the HEP field in China



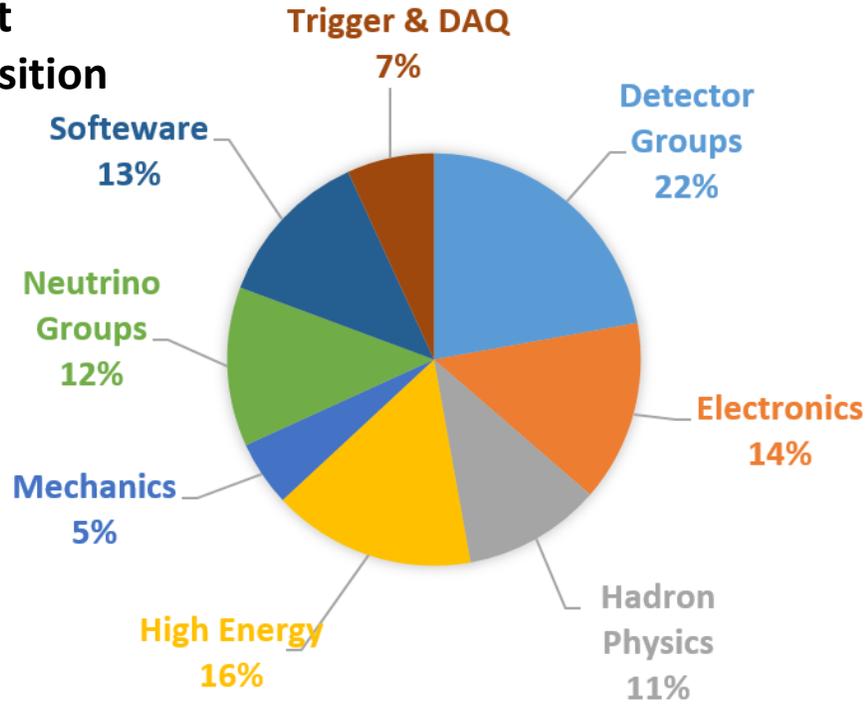
Frontier R&D for world-leading detectors

The first X-ray pixel detector in China for light sources

Deep involvement in wide int-col.

Recruitment opportunities

Current composition

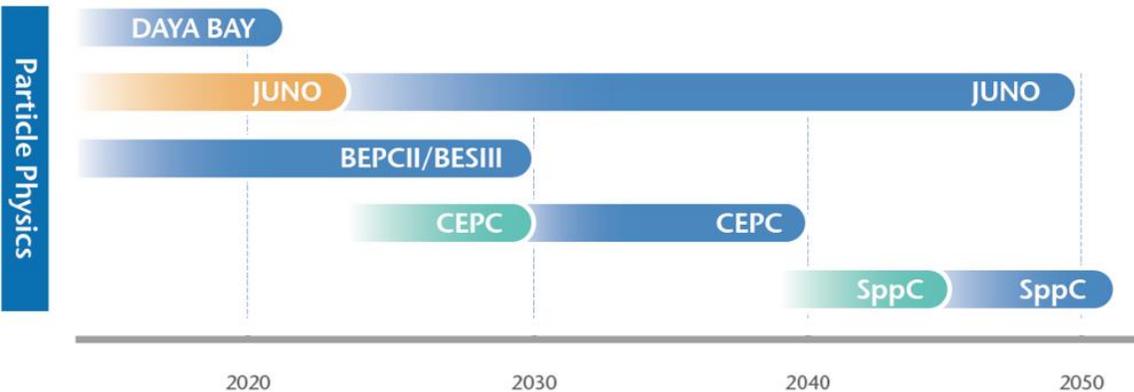


Planned recruitment:

- Faculty: 5 ~ 10 /yr
- Postdoc: 50 – 60 /yr

* Depending on project requirements, the LHC postdocs may need to station at CERN

Projects	Contacts
JUNO	Liangjian Wen (wenlj@ihep.ac.cn)
BESIII	Shuangshi Fang (fangss@ihep.ac.cn)
CEPC	Xinchou Lou (xinchou@ihep.ac.cn)
ATLAS	Joao Guimaraes Costa (guimaraes@ihep.ac.cn)
CMS	Mingshui Chen (chenms@ihep.ac.cn)
LHCb	Jianchun Wang (jwang@ihep.ac.cn)
Electronics	Wei Wei (weiw@ihep.ac.cn)
Detector	Miao He (hem@ihep.ac.cn)
Tech	Mingyi Dong (dongmy@ihep.ac.cn)





We offers :

- Sufficient start-up funding
- Competitive salary
 - support from Chinese Academy of Sciences
 - support from Local government
 - Dongguan city (CSNS), Kaiping city (JUNO), Jinan city
- Relocation expenses
- All standard benefits: insurance package, housing subsidy etc.
- Help in enrolling children in kindergarten and school