

The BESIII experiment

(and the need for PWA)

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IHEP, Beijing

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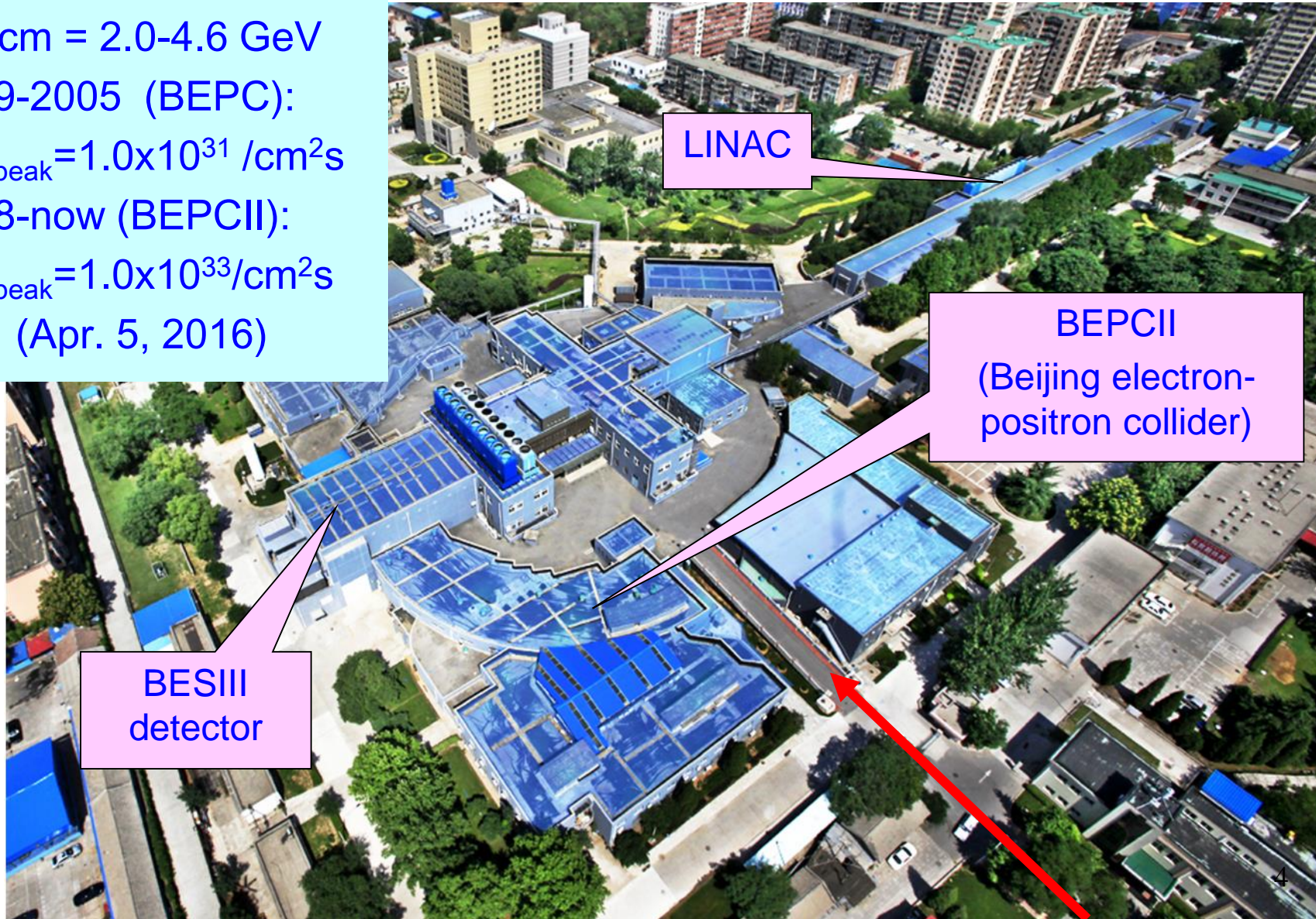
- Welcome to PWA10/ATHOS5

- Welcome to

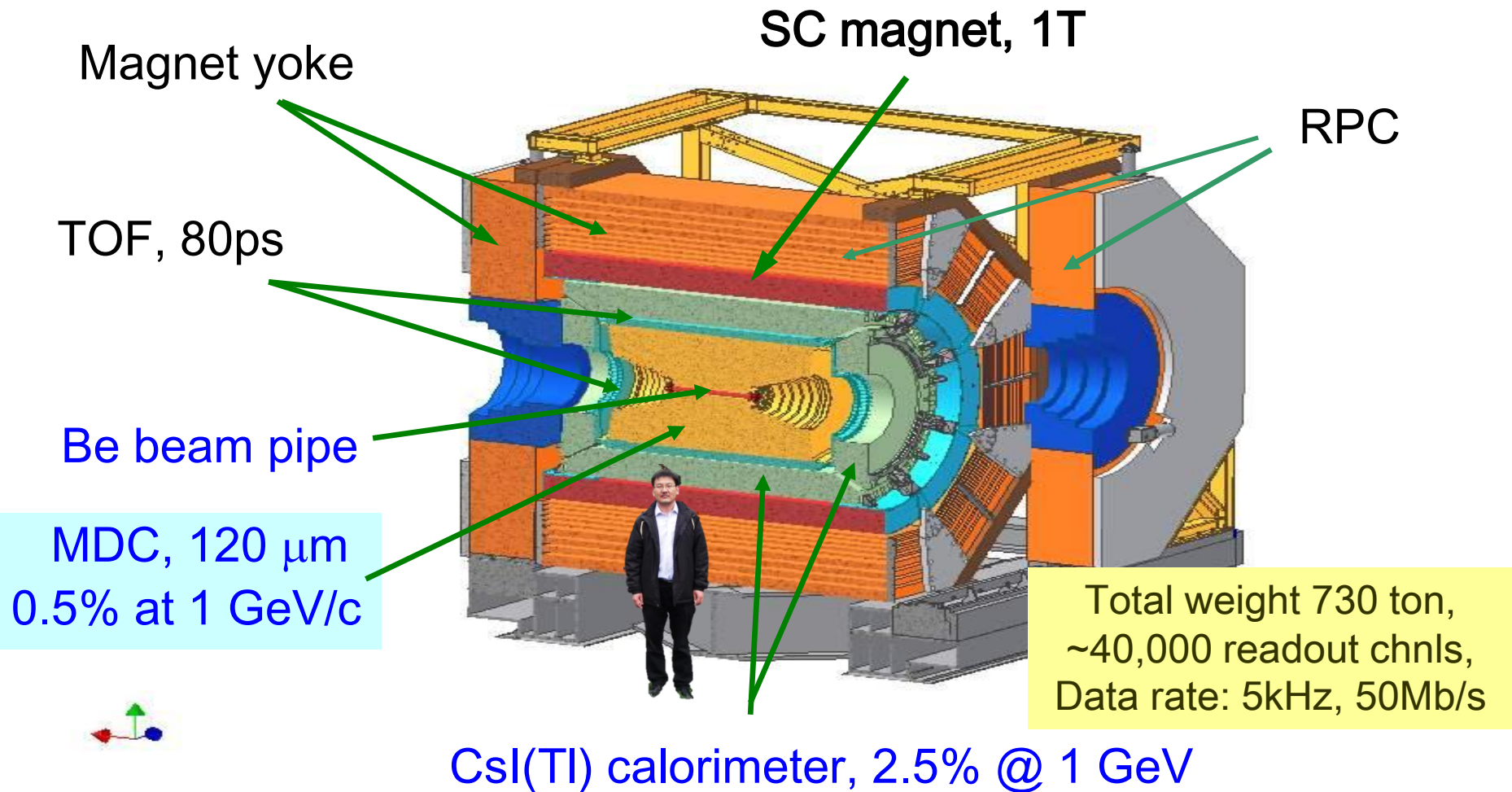
Institute of High Energy Physics (IHEP),
Chinese Academy of Sciences (CAS)

Beijing Electron Positron Collider (BEPC)

- Founded: 1984
 - $E_{cm} = 2.0\text{-}4.6 \text{ GeV}$
- 1989-2005 (BEPC):
 - $L_{peak} = 1.0 \times 10^{31} / \text{cm}^2 \text{s}$
- 2008-now (BEPCII):
 - $L_{peak} = 1.0 \times 10^{33} / \text{cm}^2 \text{s}$
 - (Apr. 5, 2016)

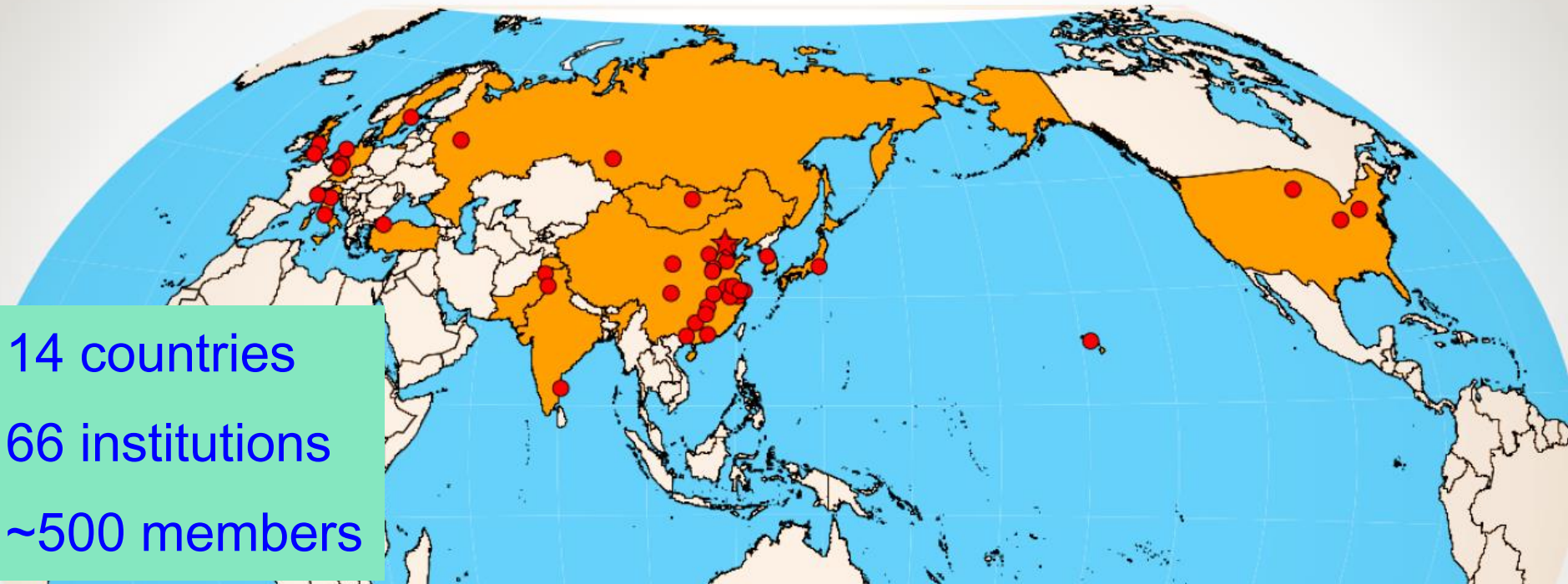


BESIII Detector

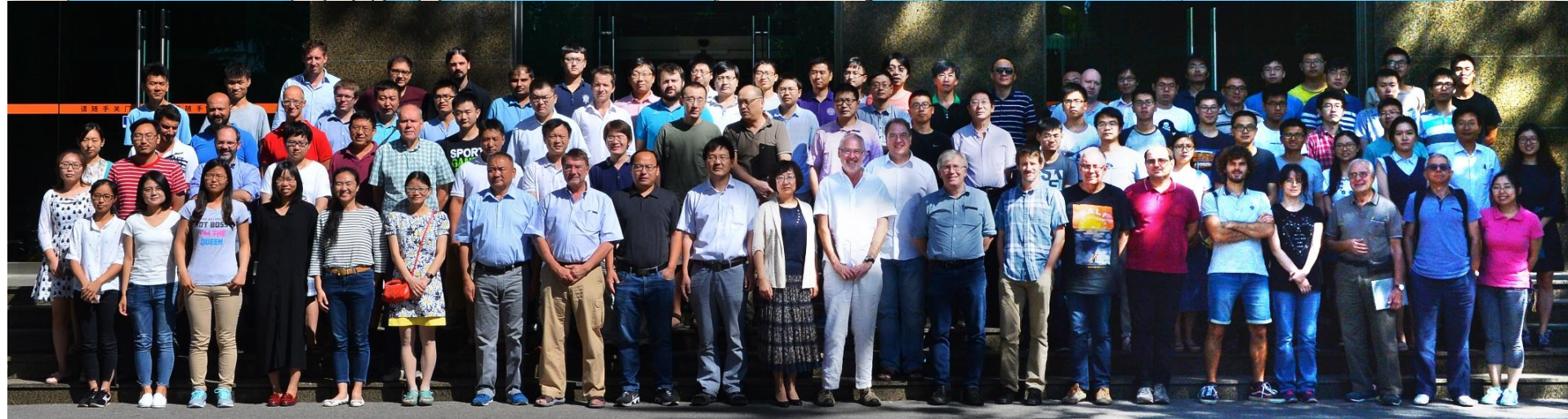


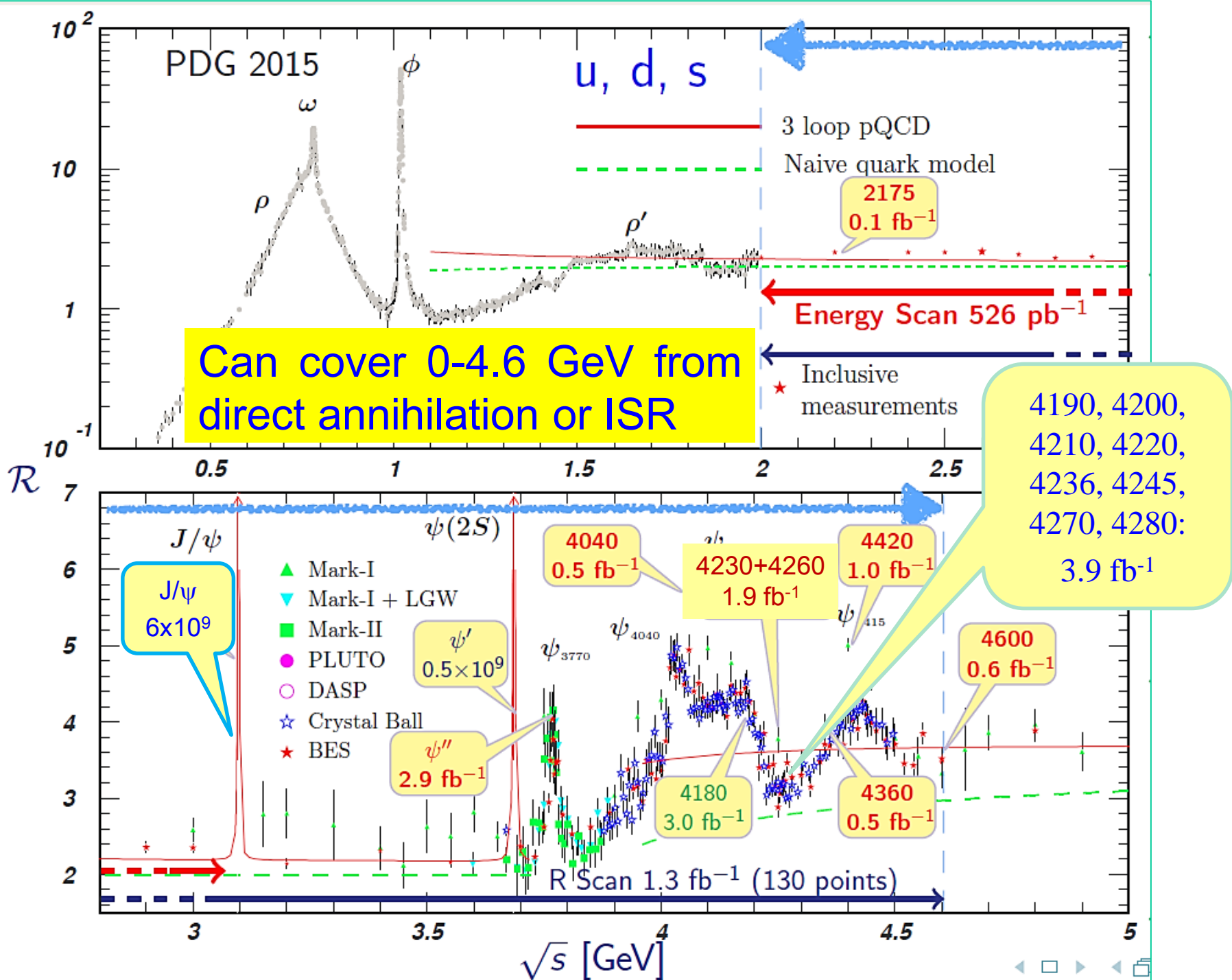
Has been in full operation since 2008,
all subdetectors are in very good status!

BESIII Collaboration



14 countries
66 institutions
~500 members



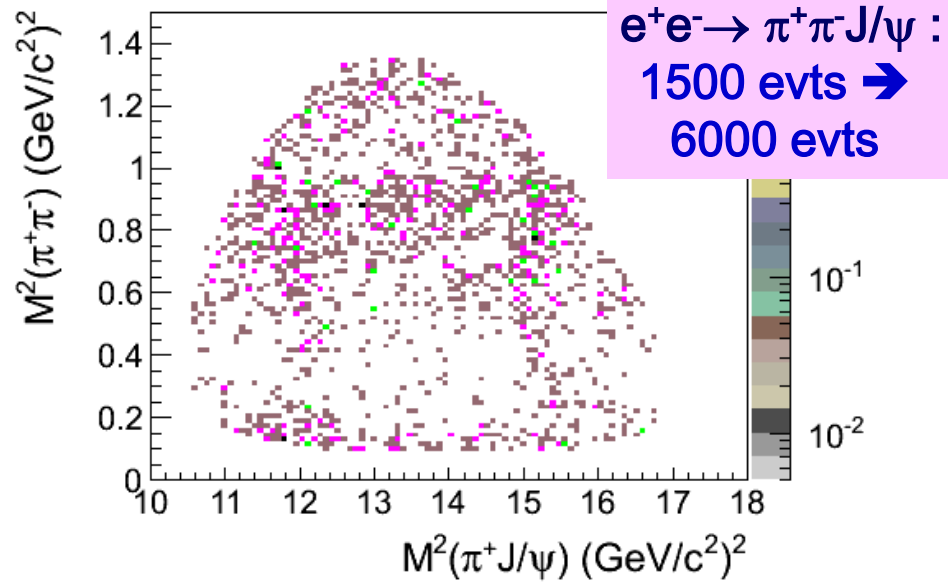
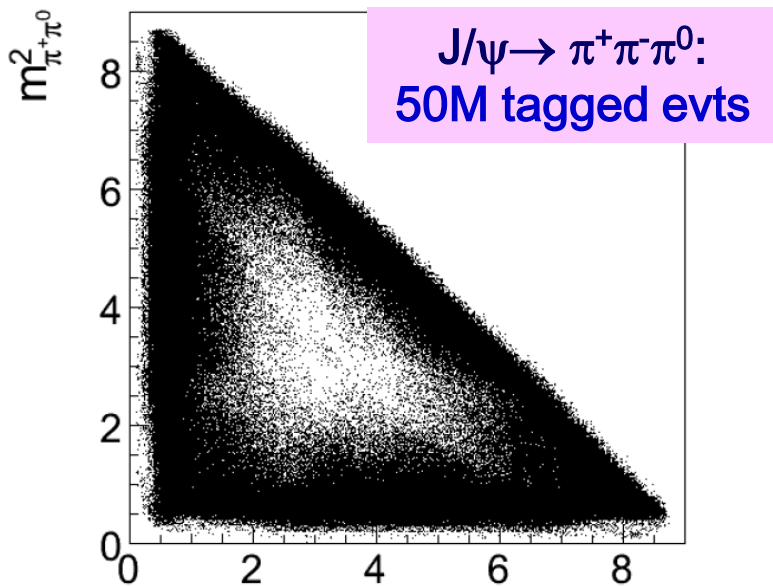


What physics interested us

- **Light hadrons** → QCD
 - Meson & Baryon Spectroscopy
 - Exotic hadrons: glueballs, hybrids, multiquark states, molecules ...
 - Decay dynamics
- **Charm physics** → QCD, EW & Beyond
 - CKM matrix elements and unitarity test
 - Decay constants & form factors
 - $\bar{D}D$ mixing and CPV
- **Charmonium & charmoniumlike states** → QCD
 - Spectroscopy and transitions
 - XYZ states: spectroscopy, production, and decay
 - Decay dynamics: “ $\rho\pi$ puzzle”, charmless decays of ψ ”
- **Tau, R values, EM FFs, two-photon physics** → SM
 - Precision measurement of the tau mass
 - HVP in $(g-2)_\mu$, $\alpha(s)$; HLBL in $(g-2)_\mu$
 - Meson & baryon structures
- **Search for rare and forbidden decays** → SM & Beyond

PWA is
needed for
almost all
the studies!

A few examples of the BESIII samples

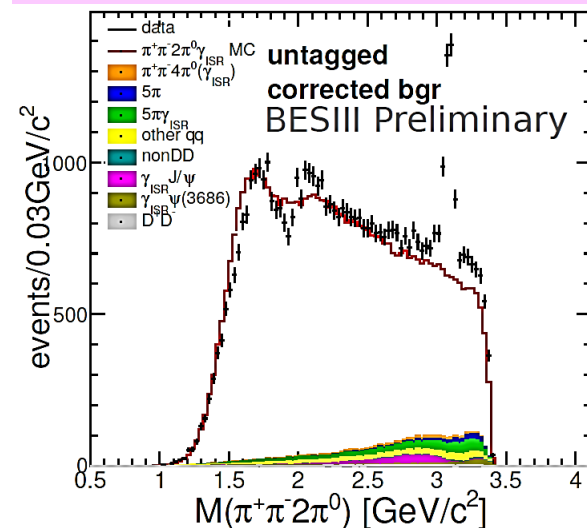
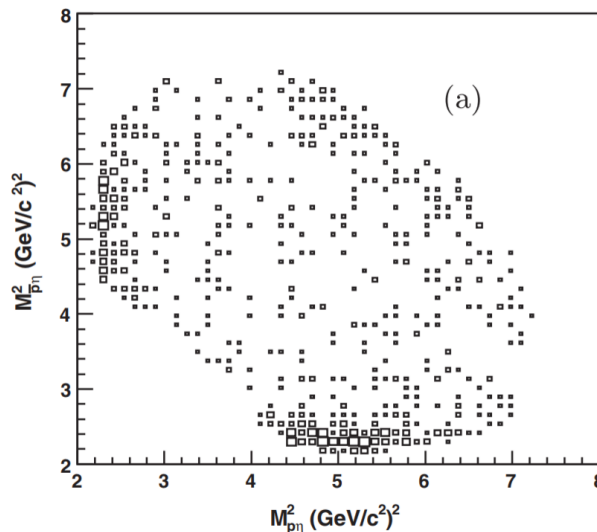
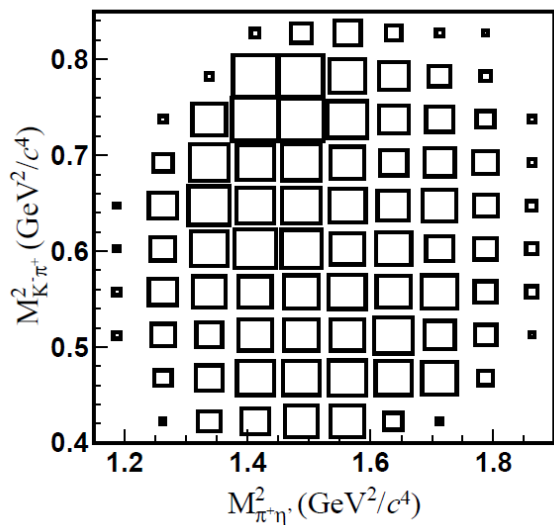


$D \rightarrow K\pi\eta'$: 2500
tagged evts

$m^2_{\pi^-\pi^0}$

$\psi' \rightarrow \bar{p}p\eta$: 745
evts in 106M ψ'

ISR $e^+e^- \rightarrow \pi^+\pi^-\pi^0\pi^0$:
lots of evts up to 3.4 GeV

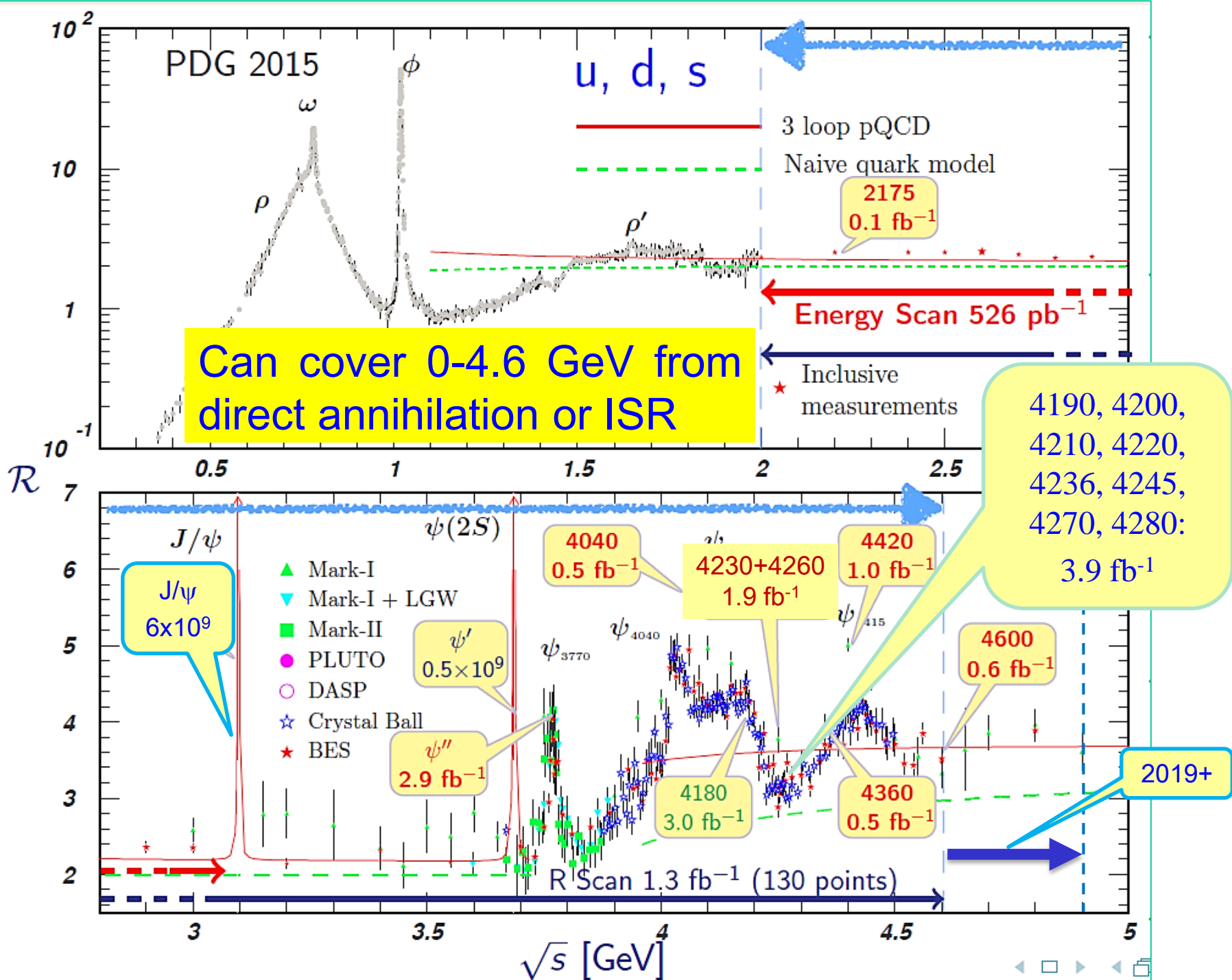


BEPCII Upgrade

- Increase of beam energy
 - $E_{\text{beam}} = 2.30 \rightarrow 2.35 \rightarrow 2.45$ GeV
 - Plan:
 - get to 2.35 GeV in 2019
 - Get to 2.45 GeV in 2020-21, change ISPB (Interaction region Septum Bending) magnet, big challenge
 - Funding approved
- Top-up injection
 - Data taking efficiency increases by 20~30%
 - Funding approved

BESIII Upgrade

- **CGEM inner tracker ongoing**
 - 3 layers construction completed
 - Will be shipped to IHEP this summer, Installation in summer 2019
- **Super Conducting Magnet**
 - New valve box of SC magnet: funding approved
- **Others**
 - Under discussion



Welcome!

- Welcome you again for coming to this workshop
- I wish the workshop every success and look forward to fruitful discussions and great achievements!
- I hope you have a pleasant stay in Beijing.
- I hope you explore and enjoy the beauty of Beijing.

Thanks a lot!