



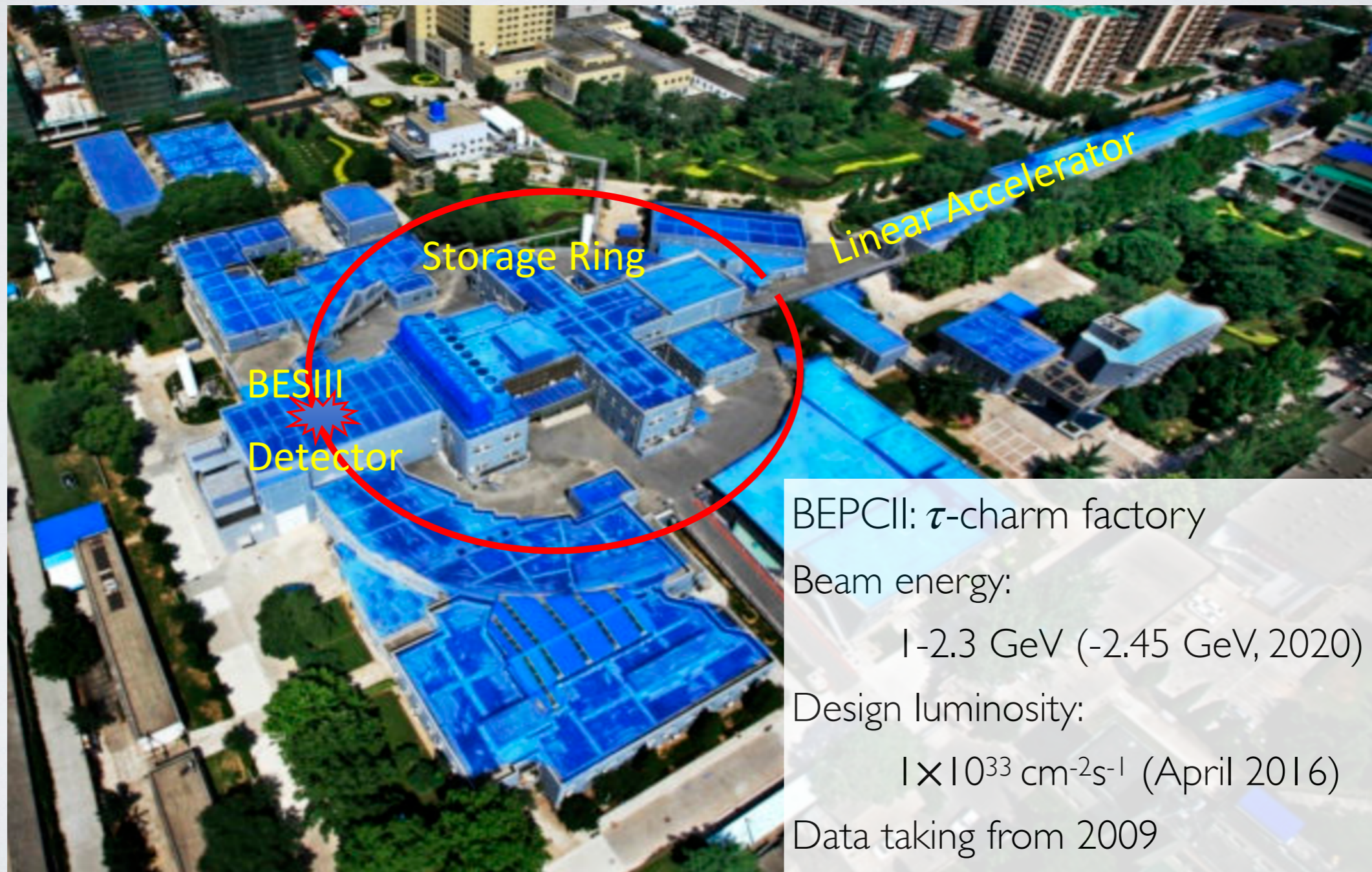
RECENT RESULTS AT BESIII

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上海市物理学会-粒子物理与核物理专业委员会
上海市核学会-核物理专业委员会
2019年联合学术交流会
暨 粒子物理与核物理上海研讨会

Beijing Electron Positron Collider II



BESIII Detector

MUC: 9/8 layers RPC, $\sigma_{R\Phi}$: 2cm

Magnet yoke

SC Magnet: 1Tesla

TOF: (σ_T)
68 ps / 60 ps

Beam pipe

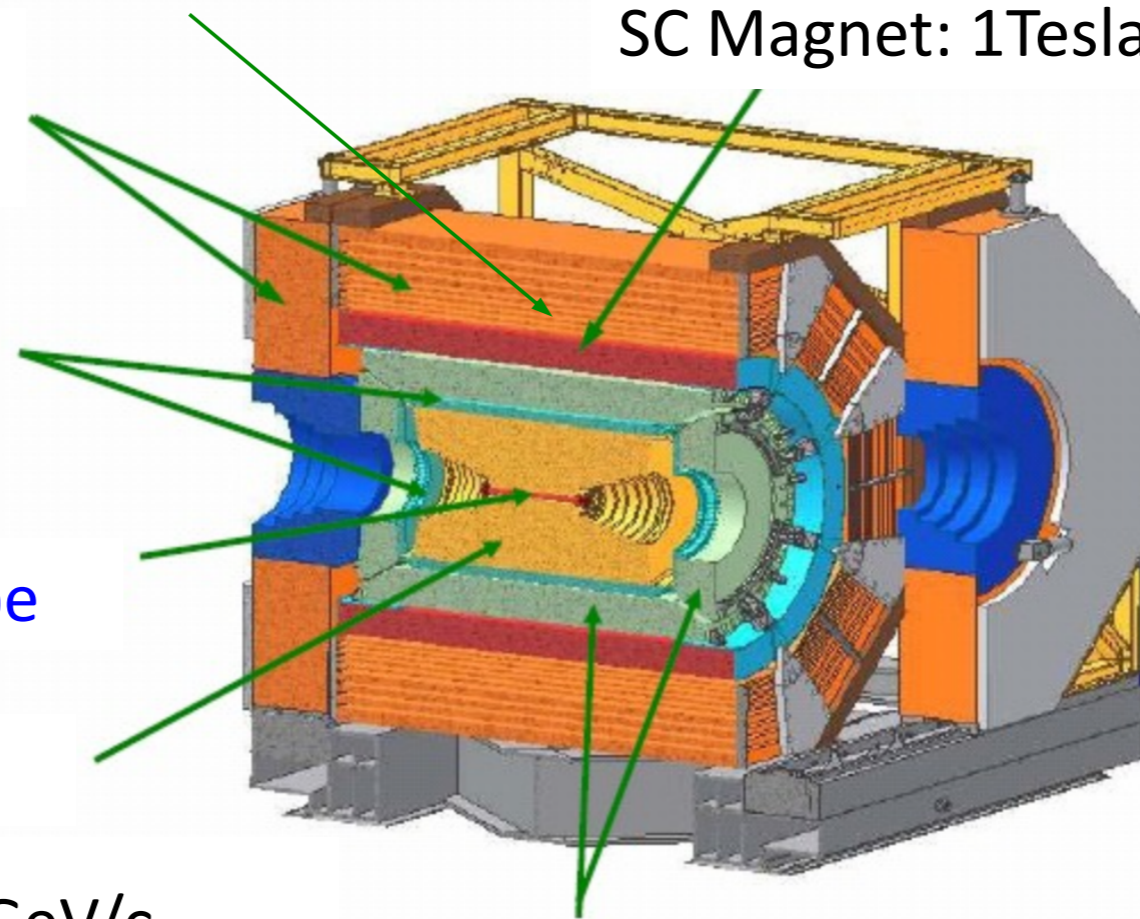
MDC:

σ_p/p : 0.5% at 1GeV/c

dE/dx: 6%

CsI calorimeter:

$\Delta E/E$: 2.5% / 5.0% at 1 GeV; σ_z : 0.6 cm/ \sqrt{E}

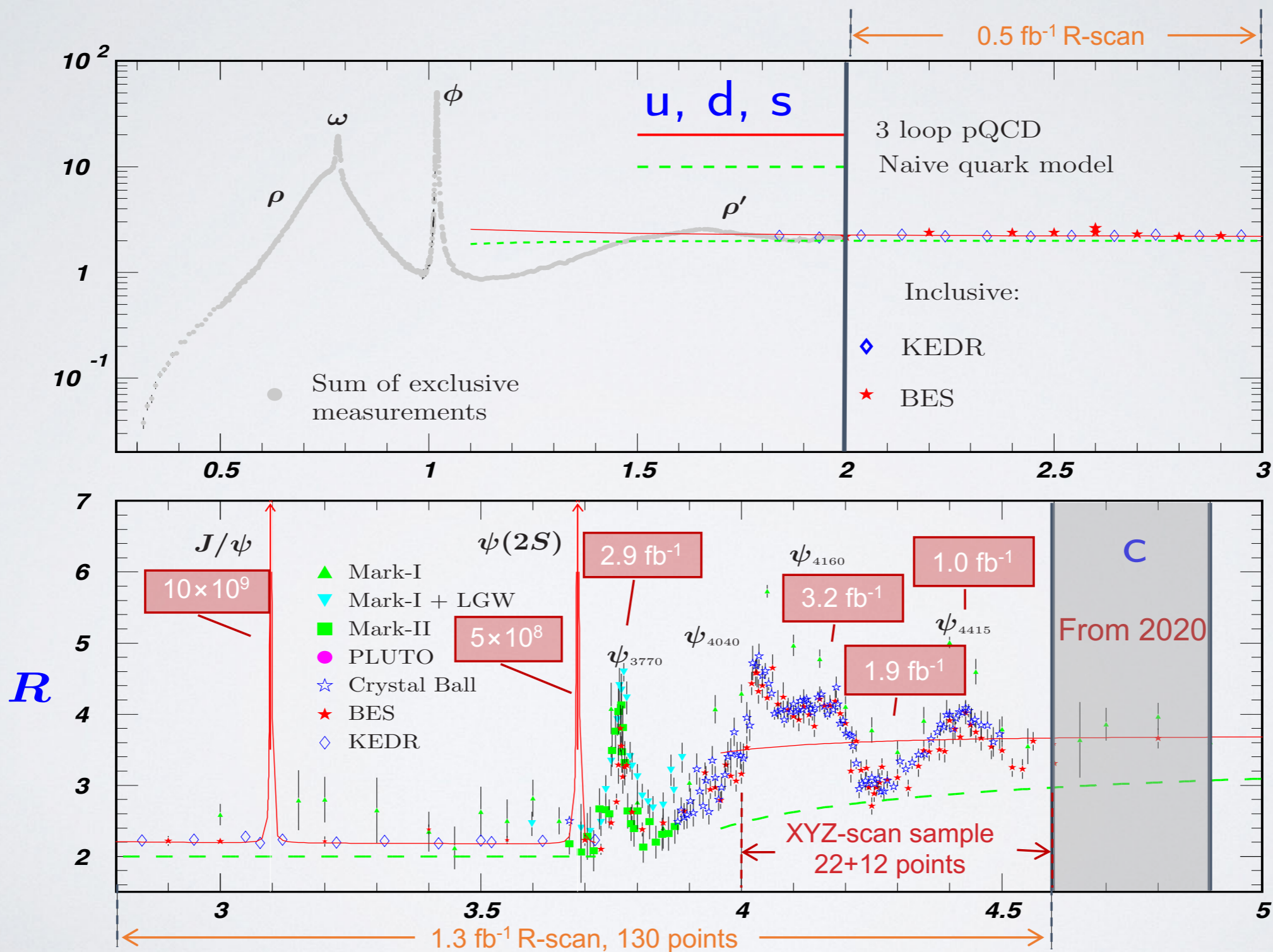




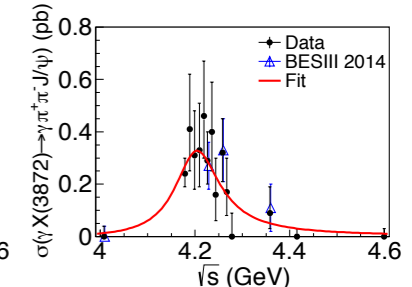
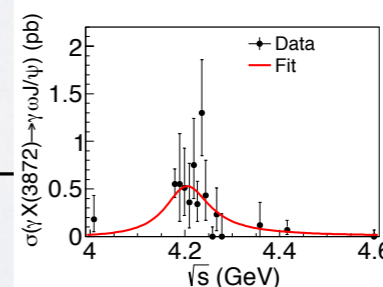
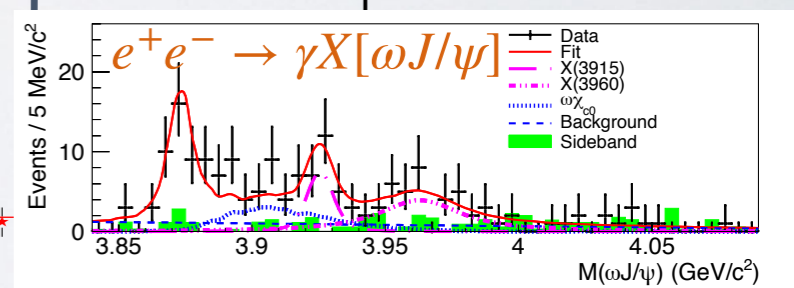
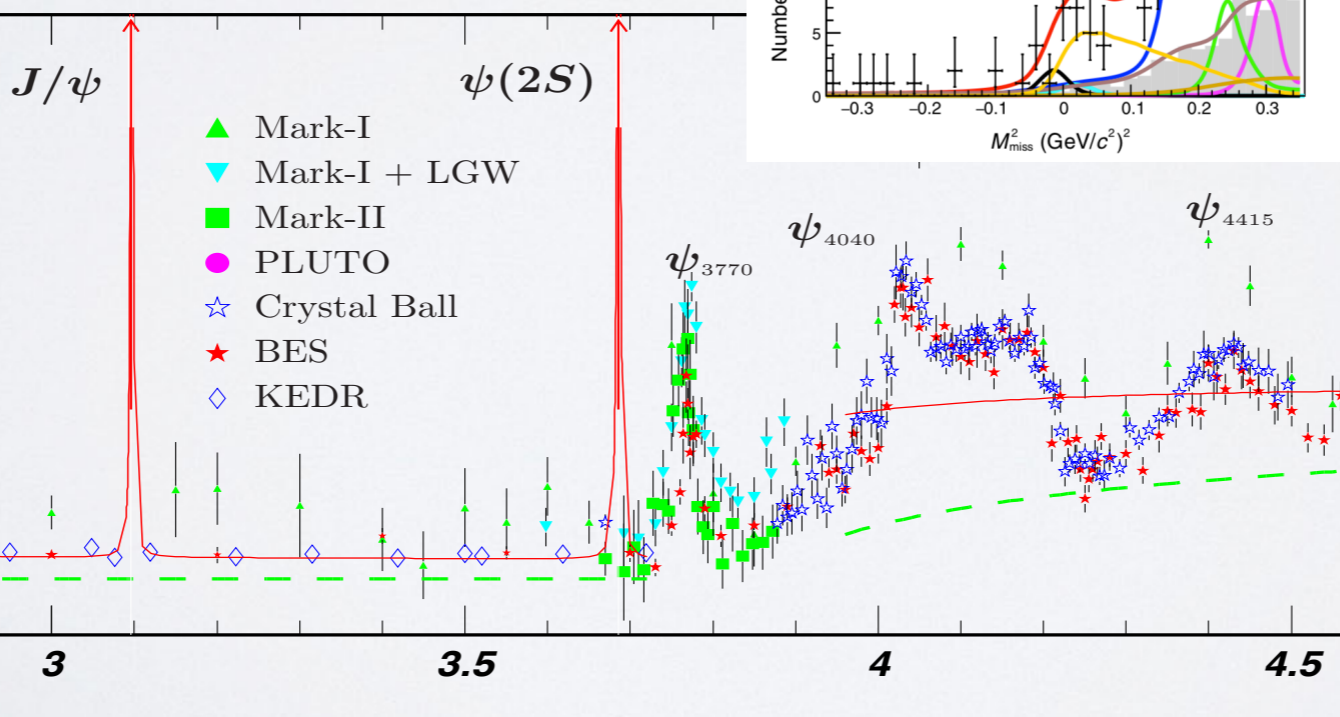
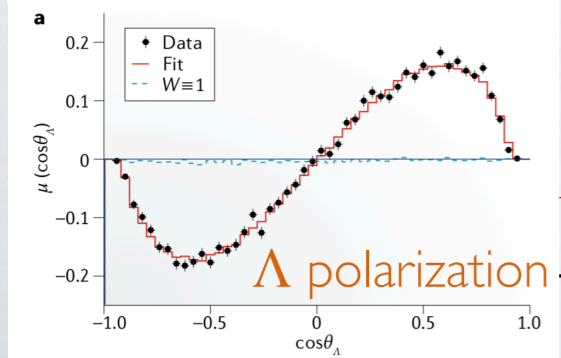
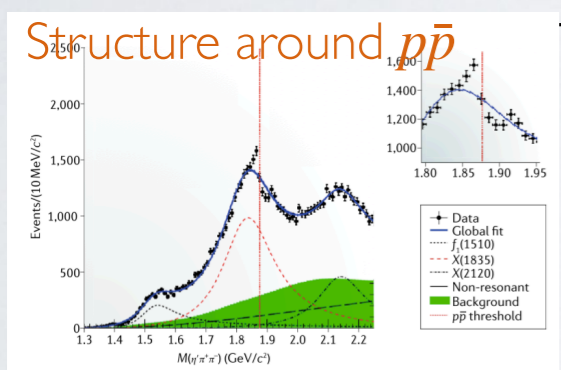
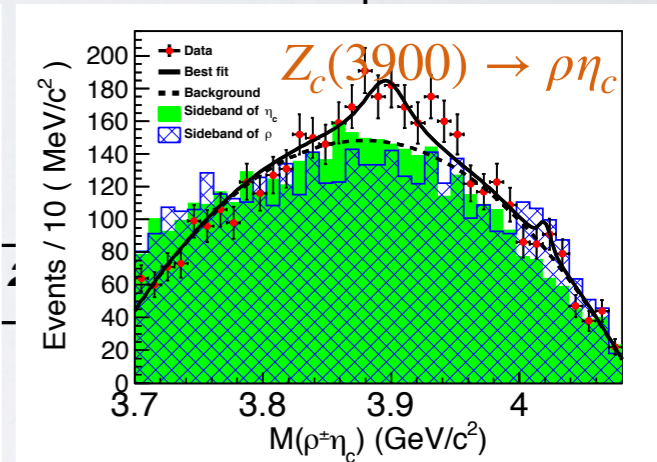
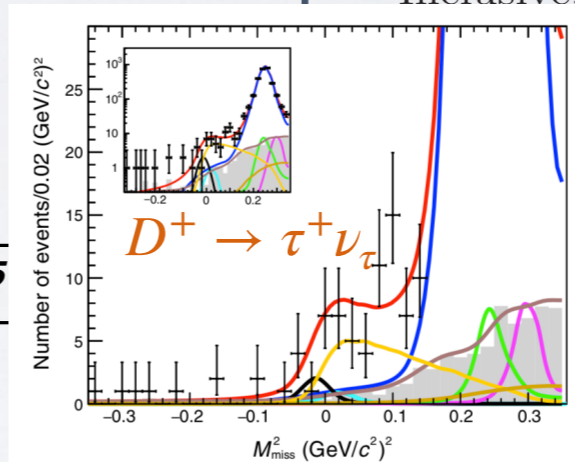
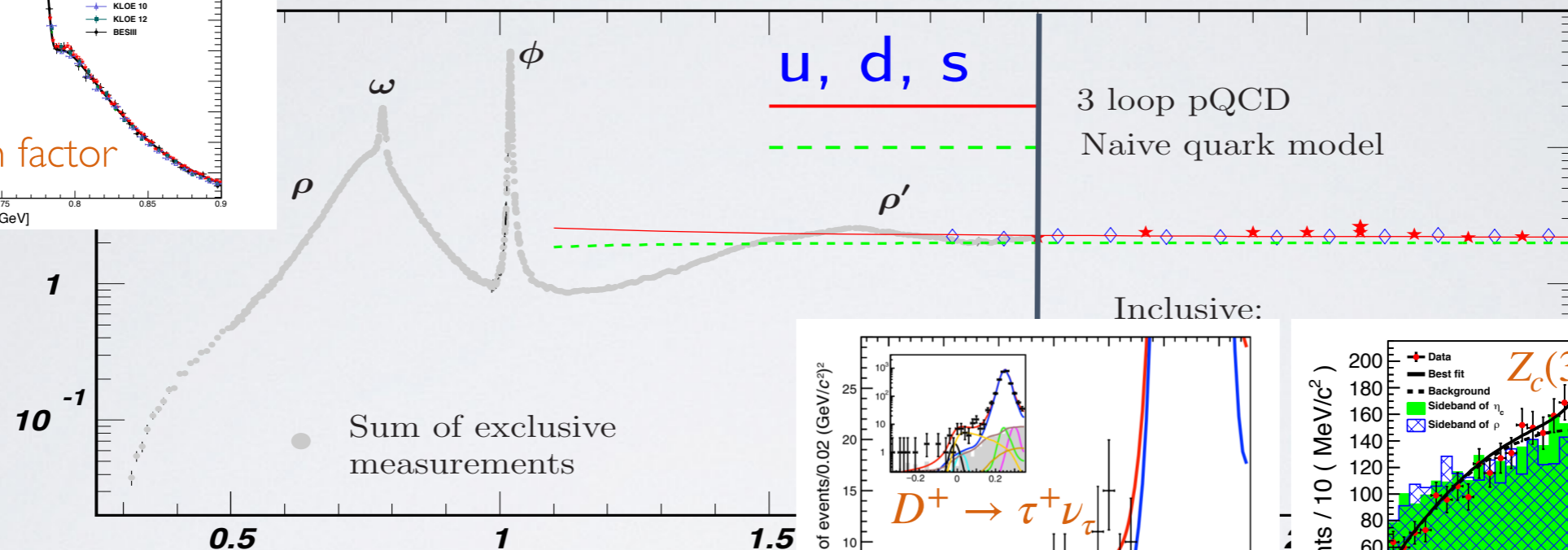
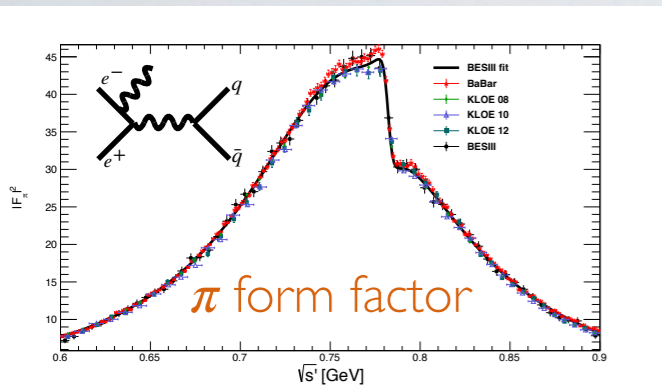
Physics at BESIII

- Light hadron physics
- Charmonium physics
- Charm physics
- R value, QCD and τ physics
- New physics
- Spectroscopy and transition
- Exotic hadron
- Hyperon polarization (Λ, Σ, \dots)
- CKM matrix, $D\bar{D}$ mixing
- Charmed-baryon (Λ_c, Σ_c)
- R value, τ mass
- Hadronic cross section, hadron form factors
- Rare and forbidden decay
- Dark matter

BESIII Data Samples



BESIII Data Samples





Fudan BESIII Group

沈成平●、 罗涛●、 王小龙●、 严亮●、 郭玉萍●

IB Chair

Shift Committee
Member

Charmonium Group
co-convenor

- Spectroscopy and transition ●●●●●
- Exotic hadron ●●●●
- Hyperon polarization (Λ, Σ, \dots) ●

➔ Decay parameters, CP-test

- CKM matrix, $D\bar{D}$ mixing ●
- Charmed-baryon (Λ_c, Σ_c)

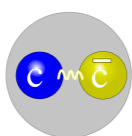
- R value, τ mass ●
- Hadronic cross section, hadron form factors ●

➔ Experiment input for
SM calculation of $(g - 2)_\mu$

- Rare and forbidden decay ● SM test, physics beyond
- Dark matter

Charmonium Spectroscopy

Conventional

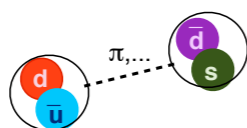


Exotic

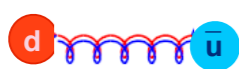
Tetraquark



Molecule



Hybrid

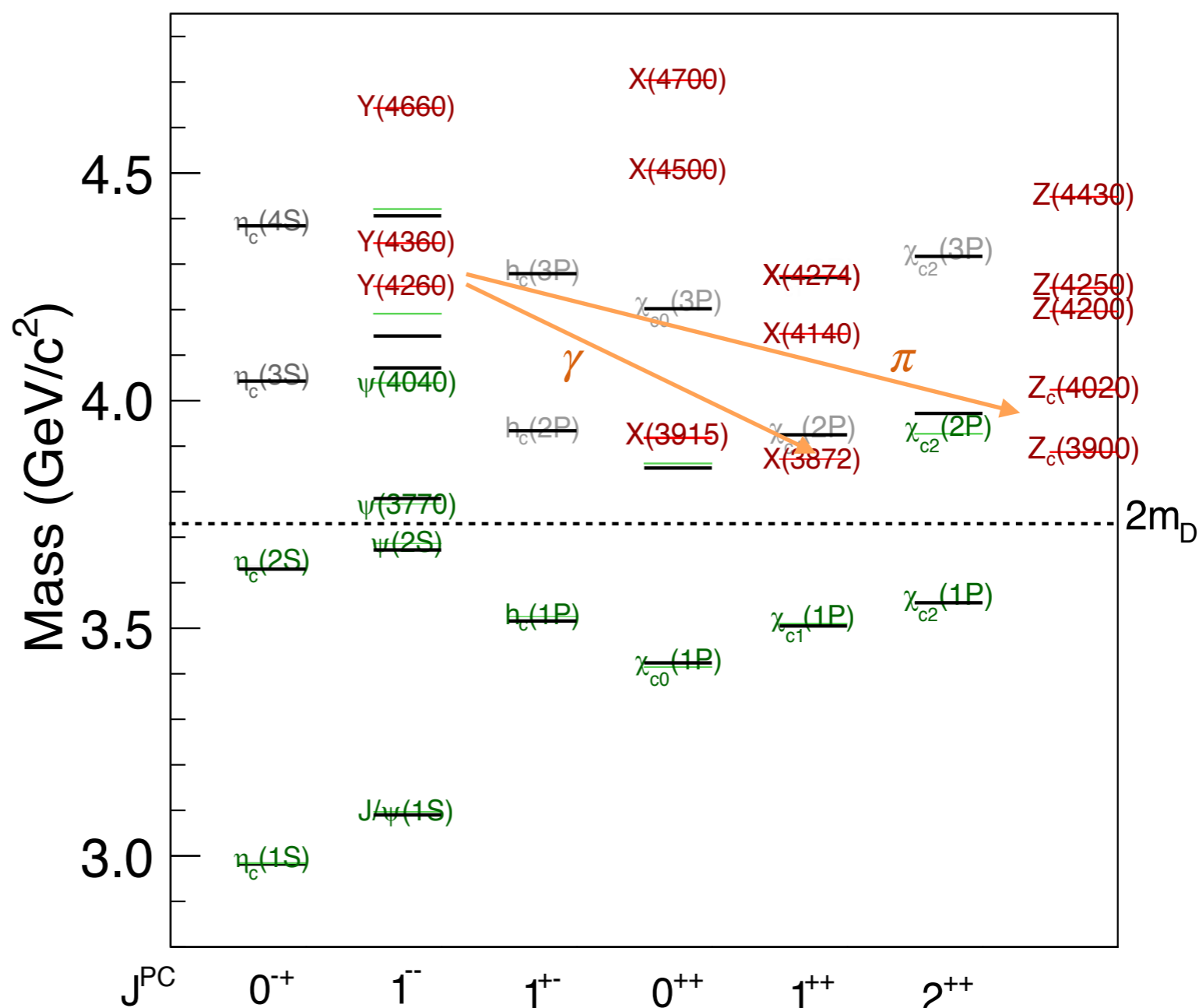


Glueball



+ ...

?





Publications

- Search for heavy Majorana neutrino in lepton number violating decays of $D \rightarrow K\pi e^+ e^-$, Phys. Rev. D99,112002 (2019)
- First observation of the decay $\chi_{cJ} \rightarrow \Sigma^+ \bar{p} K_S^0 + c.c. (J = 0,1,2)$, Phys. Rev. D100,092006 (2019)
- Observation of the decays $\chi_{cJ} \rightarrow \phi\phi\eta$, arXiv:1911.02988
- Measurement of $J/\psi \rightarrow \Xi(1530)^- \bar{\Xi}^+$ and evidence for the radiative decay $\Xi(1530)^- \rightarrow \gamma \bar{\Xi}^-$, arXiv:1911.06669



Summary

- Rich physics program at BESIII experiment
- High statistics, clean environment, good detector performance
- ➔ Great opportunity
 - Spectroscopy & exotics
 - Hadron form factor & two-photon fusion
 - SM test and physics beyond

Thank you! 谢谢!