小结

沈成平
北京航空航天大学

The 5th XYZ Meeting
Zhengzhou University, Oct. 20-23, 2018

来对了地方！


3:30
搜地点、查公交、找路线
火炬大厦
路况
图层
全景
上报
科学大道
美景菩提
正弘生活广场
玉兰街
紫薇小区
红枫里
金梭路
趣园路
光华体育会所
樱花街
帝苑别墅
木兰里
垂柳路
发现周边
路线
小度助手


=X+Y+Z


A：成功
X：艰苦的工作
Y：正确的方法
Z：少说废话
阿·爱因斯坦

成功=X+Y+Z

愉快的考察





丰富的报告内容

- 理论(10个报告) 实验(13个报告)
- 每个报告~50分钟 (讨论时间还是不够？)
- 报告的内容：

1.精彩的历史回顾

2.最近的实验/理论XYZ review

3.理论上对一些XYZ态的预言，实验的任务

4.理论和实验上重子、粲重子、双粲重子的讨论

5.未来和即将运行的实验

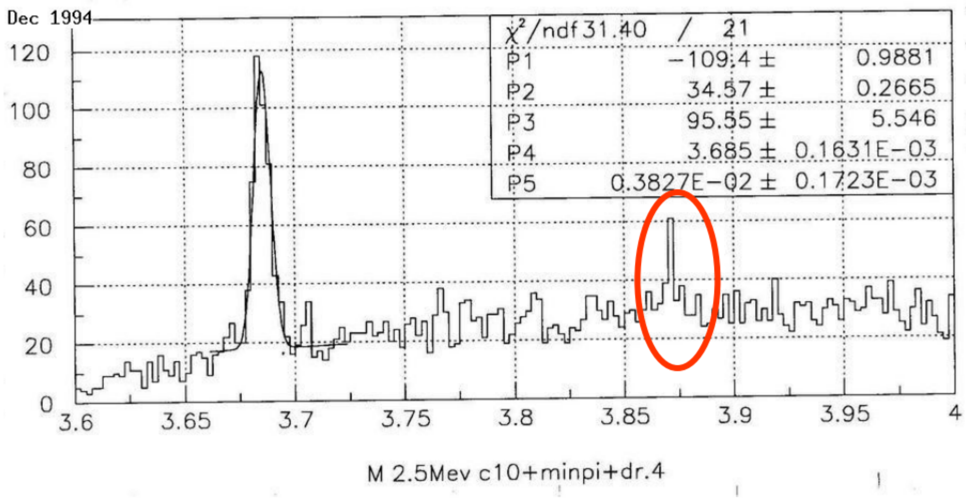
https://indico.ihep.ac.cn/event/8040

1.精彩的历史回顾

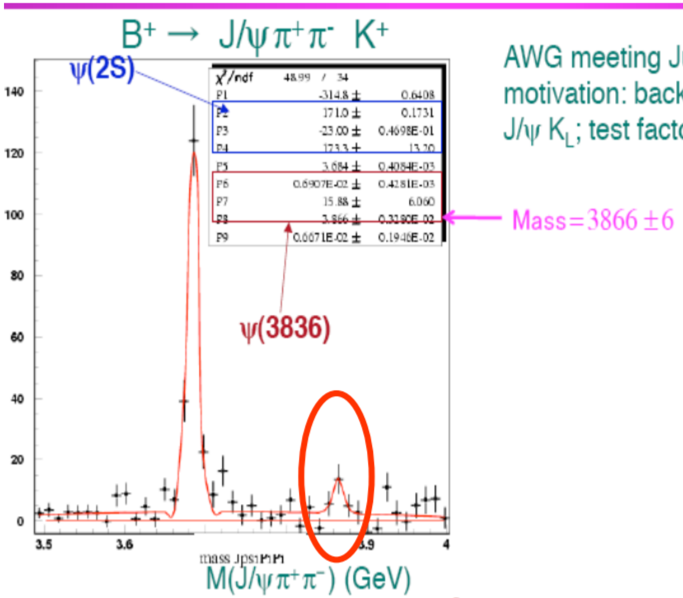
Hints before the discovery of X(3872)→J/ψπ⁺π⁻

CDF internal, 1994

易凯



BaBar internal, 2003



AWG meeting June 2003
motivation: background to
J/ψ K_L; test factorization…

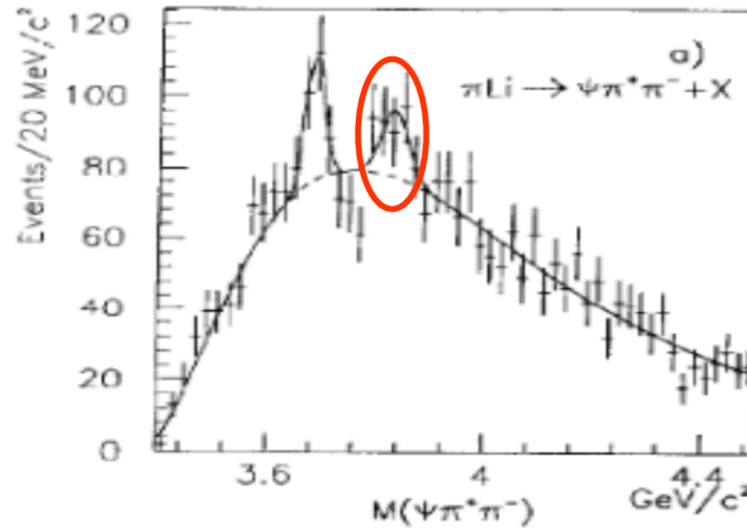
From BaBar B-Factory Symposium (C. Hearty)

http://www-conf.slac.stanford.edu/b-factory-symposium/talks.asp

E705, PRD 50, 4258 (1994)

E705 saw ψ(3836) (2^{--}) in 1994, 3.836±0.013 GeV

PRL 115 011803, PRL 111 032001



CDF saw a hint in 1994, unpublished

BaBar saw a hint in 2003, unpublished

Both CDF and Babar spotted hints of X(3872) before its discovery!

2.最近的实验/理论XYZ review

Y(4260) review in theory

郭奉坤

- Hadron-charmonium model — M. B. Voloshin, PPNP61(2008)455
- Tetraquark model — Maiani et al. PRD89(2014)114010
- Interference model — D.-Y. Chen, J. He, X. Liu, PRD83(2011)054021
- D1D hadronic molecular model — Q. Wang, C. Hanhart, Q. Zhao, PRL111(2013)132003
- A light quark perspective — **Yun-Hua Chen**, L.-Y. Dai et al., arXiv:181x.abcde

- Hadro-charmonium model for Y(4260) unlikely; tetraquark model a la Maiani et al. leads to too many states; so far data are consistent with a strong coupling of Y(4260) to $D_1\bar{D}$+c.c.
- A new analysis of the $\pi\pi$ distribution of $\mathrm{Y}(4260) \to J/\psi\pi^+\pi^-$ shows about Y(4260) contains a large SU(3) octet component

应用QCD的求和规则研究四夸克态

王志刚

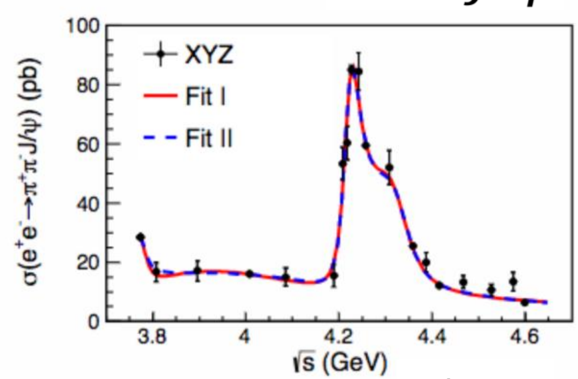
利用QCD求和规则，研究四夸克态，单从重现质量的实验值来说，成功的描述大概如下(这里 $[Qq]_S, [Qq]_P, [Qq]_V, [Qq]_A$ 是色反三重态标量、赝标、矢量、轴矢量双夸克态，$Q=c,b$):

$$
\begin{aligned}
X^*(3860) &= [cq]_S[\overline{cq}]_S \ (\text{with } 0^{++}), \\
X(3872) &= \frac{1}{2}\left([cu]_A[\overline{cu}]_S + [cd]_A[\overline{cd}]_S + [cu]_S[\overline{cu}]_A + [cd]_S[\overline{cd}]_A\right) \ (\text{with } J^{PC}=1^{++}), \\
Z_c(3900/3885) &= \frac{1}{\sqrt{2}}\left([cu]_A[\overline{cd}]_S - [cu]_S[\overline{cd}]_A\right) \ (\text{with } 1^{+-}) \ ? \ \surd, \\
Y(3915) &= [cs]_A[\overline{cs}]_A \text{ or } [cs]_S[\overline{cs}]_S \ (\text{with } 0^{++}), \\
Z_c(4020/4025) &= [cu]_A[\overline{cd}]_A \ (\text{with } 1^{+-} \text{ or } 2^{++}), \\
Y(4140) &= [cs]_A[\overline{cs}]_A \ (\text{with } 2^{++}), \\
Z_c(4200) &= \frac{1}{\sqrt{2}}\left([cu]_A[\overline{cd}]_S - [cu]_S[\overline{cd}]_A\right) \ (\text{with } 1^{+-}) \ ?, \\
Y(4360/4320) &= \frac{1}{\sqrt{2}}\left([cq]_V[\overline{cq}]_S + [cq]_S[\overline{cq}]_V\right) \ (\text{with } 1^{--}), \\
Z(4430) &= \frac{1}{\sqrt{2}}\left([cu]_A[\overline{cd}]_S - [cu]_S[\overline{cd}]_A\right) \ (2\text{S}) \ (\text{with } 1^{+-}), \\
X(4500) &= [cs]_A[\overline{cs}]_A \ (2\text{S}) \ (\text{with } 0^{++}),
\end{aligned}
$$

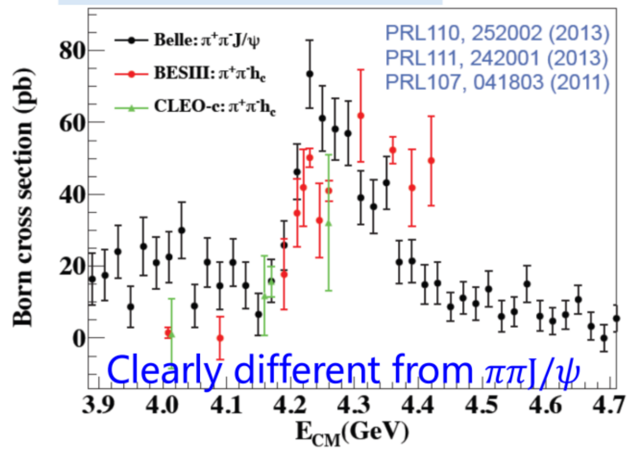
Y review in experiment

吕晓睿

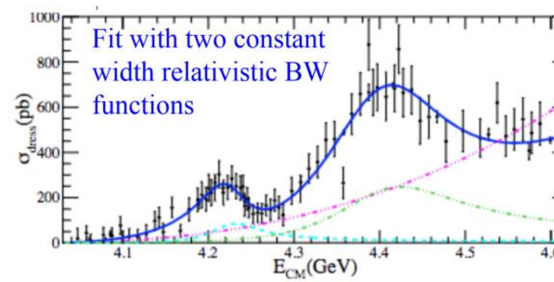
$\pi^+\pi^-J/\psi$



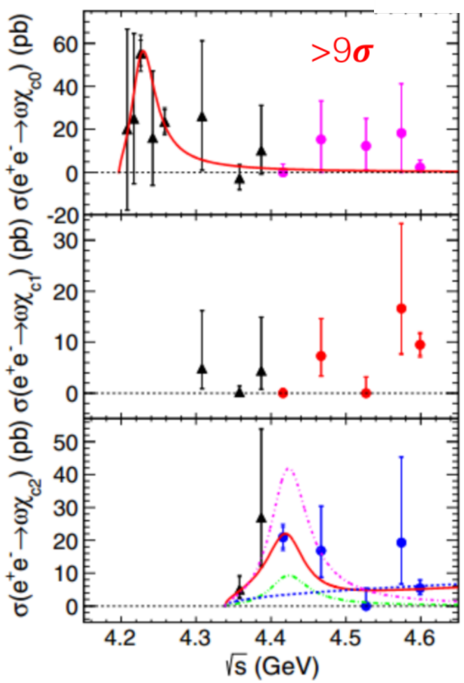
$e^+e^- \to \pi^+\pi^- h_c$ at BESIII (direct)



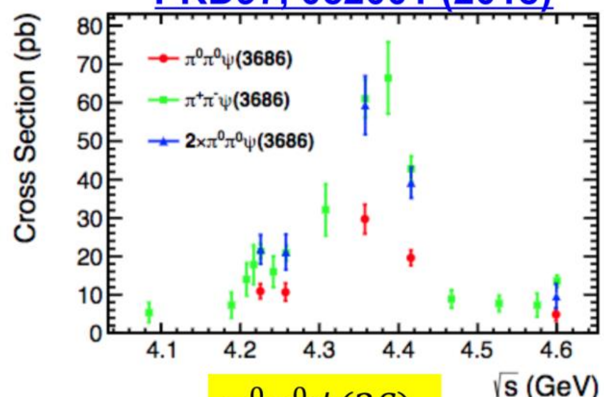
$\pi^+D^0D^{*-}$



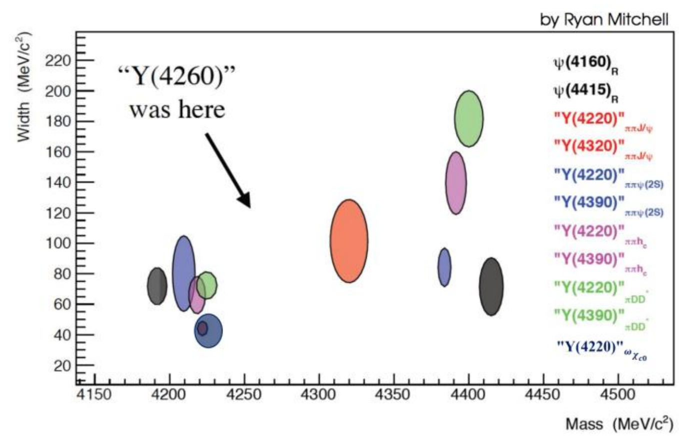
$\omega/\phi\chi_{cJ}$



PRD97, 052001 (2018)



$\pi^0\pi^0\psi(2S)$

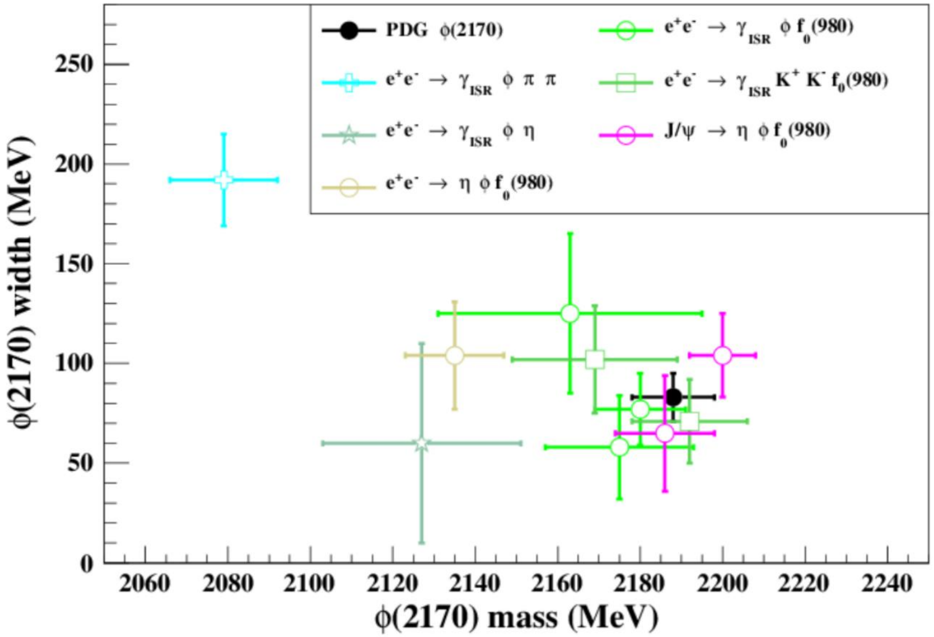


$J/\psi\eta\pi^0$ $\eta/\eta' J/\psi$ ηh_c $\gamma\eta_c$ $\gamma\chi_{cJ}$

open charm $K_sK^+\pi^-$ $p\bar{p}\pi^0$ $pK_s\bar{n}K^-$

Y(2175) review in experiment

鄢文标



- Theorists explain $\phi(2170)$ as
  - ✓ $s\bar{s}g$ hybrid
  - ✓ 2^3D_1 or 3^3S_1 $s\bar{s}$
  - ✓ tetraquark
  - ✓ Molecular state $\Lambda\bar{\Lambda}$
  - ✓ $\phi f_0(980)$ resonance with FSI
  - ✓ Three body system ϕKK
  - ✓ Estimated or ruled out: not yet

Zc review in experiment

平荣刚
孙振田

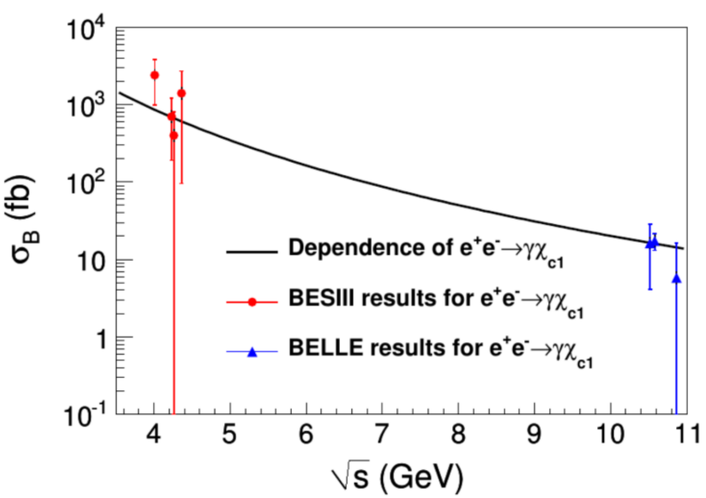
Year	State	M (MeV)	Γ (MeV)	Process	Exp.
2008	$Z_c(4430)^+$	4458±15	166^{+37}_{-38}	$\overline{B_0} \to K^-(\psi(2S)\pi^+)$, $\overline{B_0} \to K^-(J/\psi\pi^+)$	Belle, LHCb
2008	$Z_c(4250)^+$	4248^{+185}_{-45}	177^{+321}_{-72}	$\overline{B_0} \to K^-(\chi_{c1}\pi^+)$	Belle
2008	$Z_c(4050)^+$	4051^{+24}_{-43}	82^{+51}_{-55}	$\overline{B_0} \to K^-(\chi_{c1}\pi^+)$	Belle
2013	$Z_c(3900)^\pm$	3891.2±3.3	40±8	$Y(4260) \to \pi^\pm(J/\psi\pi^\mp)$	BESIII
2013	$Z_c(4020)^\pm$	4022.9 ± 2.8	7.9 ± 3.7	$Y(4260{,}4360) \to \pi^\pm(h_c\pi^\mp)$	BESIII
2014	$Z_c(4200)^+$	4196^{+35}_{-38}	370^{+99}_{-110}	$\overline{B_0} \to K^-(J/\psi\pi^+)$	Belle
2014	$Z_c(4025)^\pm$	4026.3 ± 4.5	24.8±9.5	$Y(4260) \to \pi^-(\bar{D}^{*-}D^{*+})$	BESIII
2014	$Z_c(4020)^0$	4023.9 ± 4.3	7.9 ± 3.7	$Y(4260{,}4360) \to \pi^0(h_c\pi^0)$	BESIII
2014	$Z_c(3885)^\pm$	3883.9 ± 4.5	25 ±12	$Y(4260) \to \pi^-(\bar{D}^{*-}D^+)$	BESIII

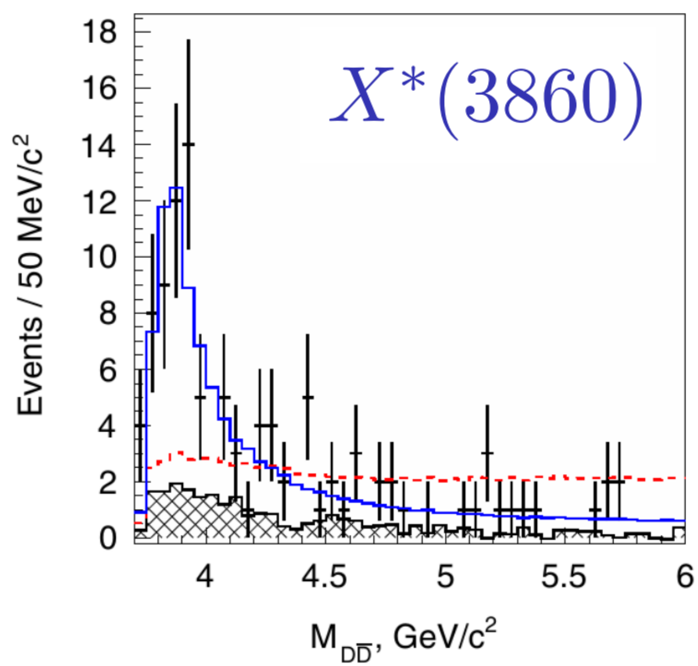
Year	State	M (MeV)	Γ (MeV)	Process	Exp.
2015	$Z_c(4055)^\pm$	4032.1 ± 2.4	26.1 ±5.3	$Y(4360) \to \pi^\pm(\psi(2S)\pi^\mp)$	Belle
2015	$Z_c(4025)^0$	4025.5±4.6	23.0 ±6.1	$e^+e^- \to \pi^0(\bar{D}^*D^*)^0$	BESIII
2015	$Z_c(3885)^0$	3885.7 ± 9.8	35 ±19	$e^+e^- \to \pi^0(\bar{D}^*D)^0$	BESIII
2018	$Z_c(4100)^-$	$4096 \pm 20^{+18}_{-22}$	$152 \pm 58^{+60}_{-35}$	$B^0 \to \eta_c K^+\pi^-$	LHCb

XYZ review at Belle

王小龙

- $e^+e^- \to \gamma + \chi_{cJ}/\eta_c$
- Observation of $\chi_{c0}(2P)$ in $e^+e^- \to J/\psi + D\overline{D}$
- Inclusive $B \to X_{cc}K$ and $\mathcal{B}(X(3872) \to f)$
- η-transitions between quarkonim(-like) states

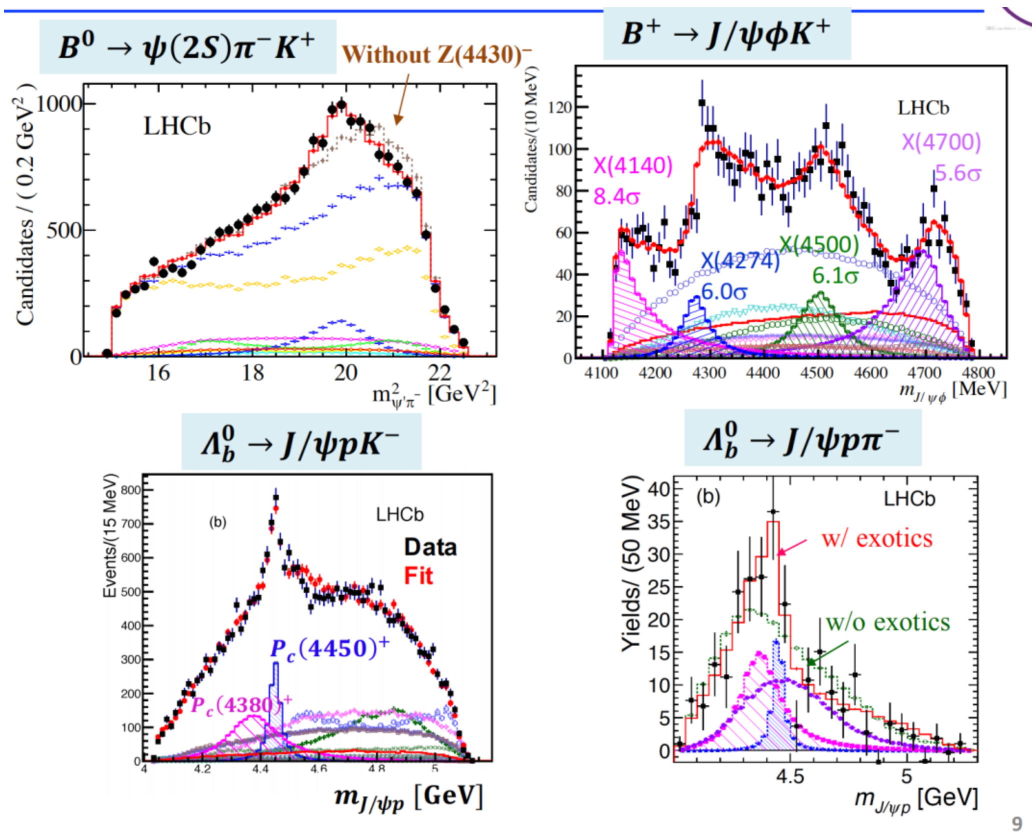




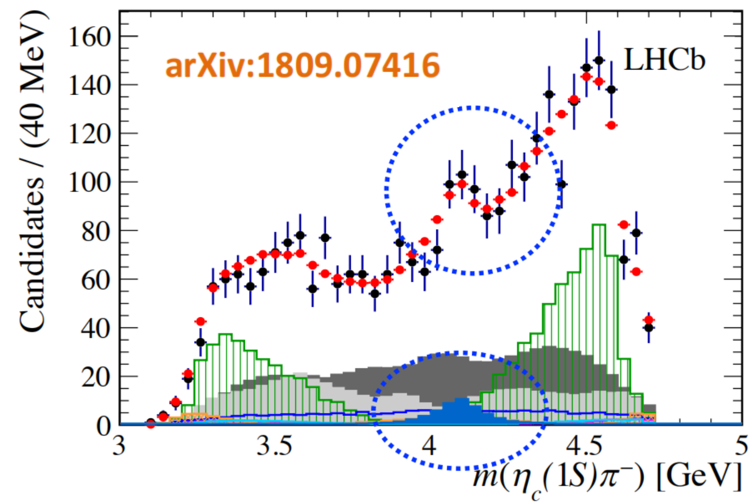
XYZ review at LHCb

张黎明

- Exotic states
  - Evidence of an $\eta_c\pi^-$ resonance in $B^0 \to \eta_c K^+\pi^-$
  - Model independent confirmation for Z_c^- in $B^0 \to J/\psi K^+\pi^-$
  - Other searches for exotic states



- $m_0 = 4096 \pm 20^{+18}_{-22}$ MeV and $\Gamma = 152 \pm 58^{+60}_{-35}$ MeV



Significance is reduced to 3.4σ after considering systematics

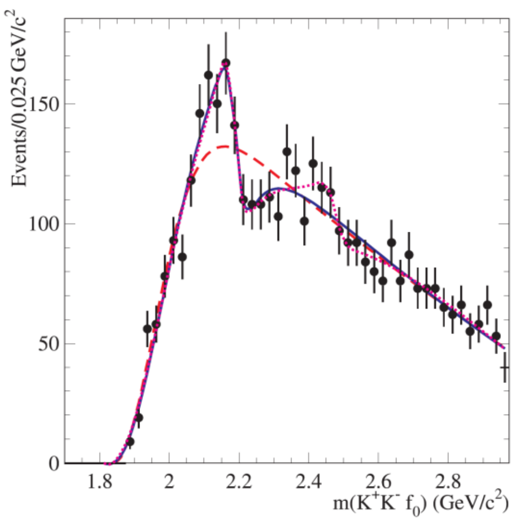
3.理论上对一些XYZ态的预言，实验的任务

Y(2175) partner?

陈华星

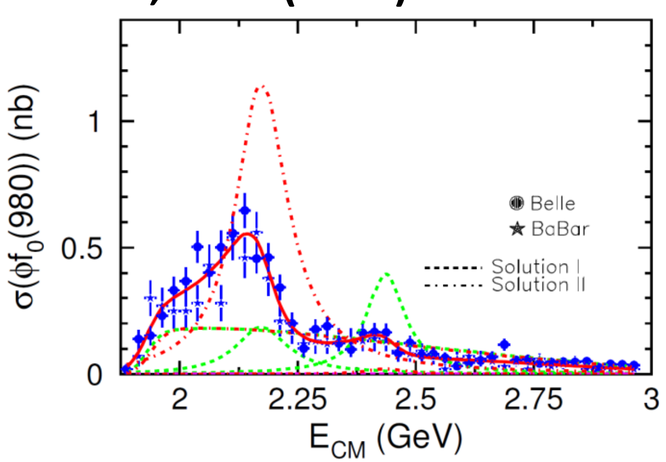
- We diagonalize the two $ss\bar{s}\bar{s}$ interpolating currents of $J^{PC} = 1^{--}$, and use QCD sum rule to study the Y(2175).
- It may have a partner state whose mass is 2.41 ± 0.25 GeV.

BaBar, PRD76, 012008 (2007)



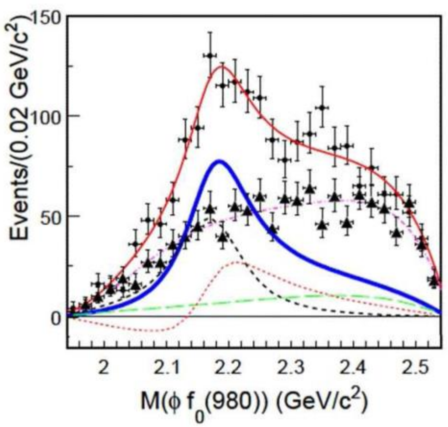
(b)The $K^+K^-\pi^+\pi^-$ invariant mass distribution in the $K^+K^-f_0(980)$ threshold region. The fits are done by including no (dashed), one (solid) and two (dotted) resonances. Taken from BaBar [12].

C. P. Shen and C. Z. Yuan, CPC34, 1045 (2010)



(d)Fits to the BaBar [11, 12] and Belle [16] measurements of the $e^+e^- \to \phi f_0(980)$ cross sections with two coherent Briet-Wigner functions, performed by Shen and Yuan and taken from Ref. [19].

BESIII, PRD91, 052017 (2015)



(f)The $\phi f_0(980)$ invariant mass spectrum. Taken from BESIII [17].

A puzzle: X(4140) width ?

王恩

The large width of X(4140)

Experiment	N_B	Mass (MeV)	Width (MeV)	σ	Fraction (%)
CDF [1]	58	$4143.0 \pm 2.9 \pm 1.2$	$11.7^{+8.3}_{-5.0} \pm 3.7$	3.8	
Belle [19]	*325*	*4143.0 fixed*	*11.7 fixed*	*1.9*	
CDF [26]	*115*	$4143.4^{+2.9}_{-3.0} \pm 0.6$	$15.3^{+10.4}_{-6.1} \pm 2.5$	*5.0*	$15 \pm 4 \pm 2$
D0 [25]		$4152.5 \pm 1.7^{+6.2}_{-5.4}$	$16.3 \pm 5.6 \pm 11.4$	4.7–5.7	
Average		4147.1 ± 2.4	15.7 ± 6.3		

The deduced width of X(4140), 83±21 MeV, larger than the former experimental measurements, and also the average of the PDG.

PRL118,2017

$X(4140)$ $I^G(J^{PC}) = 0^+(1^{++})$

Seen by AALTONEN 2009AH, ABAZOV 2014A, CHATRCHYAN 2014M, AAIJ 2017C in $B^+ \to XK^+$, $X \to J/\psi\phi$, and by ABAZOV 2015M separately in both prompt (4.7 σ) and non-prompt (5.6 σ) production in $p\overline{p} \to J/\psi\phi+$ anything. Not seen by SHEN 2010 in $\gamma\gamma \to J/\psi\phi$ and ABLIKIM 2015 in $e^+e^- \to \gamma J/\psi\phi$ at $\sqrt{s}$ = 4.23, 4.26, 4.36 GeV.

$X(4140)$ MASS	4146.8 ± 2.5 MeV (S = 1.1)
$X(4140)$ WIDTH	19^{+8}_{-7} MeV (S = 1.4)

PDG2017

11

A new decay mode of higer charmonium states

肖立叶

EPJC78,605(2018)

TABLE I: The $\Lambda_c\bar{\Lambda}_c$ partial decay widths (MeV) of the vector charmonium with a mass of M = 4643 MeV. $\mathcal{B}$ represents the branching ratio of the $\Lambda_c\bar{\Lambda}_c$ pair.

$M(Y(4660)) = 4643 \pm 9 MeV$

$\Gamma_{tot}(Y(4660)) = 72 \pm 11 MeV$

State	$\psi(4^3S_1)$	$\mathcal{B}$	$\psi(5^3S_1)$	$\mathcal{B}$	$\psi(6^3S_1)$	$\mathcal{B}$
$\Gamma_{\Lambda_c\bar{\Lambda}_c}$	6.57	9%	2.44	3%	0.84	1%
State	$\psi(3^3D_1)$	$\mathcal{B}$	$\psi(4^3D_1)$	$\mathcal{B}$	$\psi(5^3D_1)$	$\mathcal{B}$
$\Gamma_{\Lambda_c\bar{\Lambda}_c}$	0.33	0.4%	0.19	0.3%	0.09	0.1%

$\Gamma(\psi(4S/5S/6S) \to \Lambda_c\bar{\Lambda}_c)$ ∽ a few MeV

$\Gamma(\psi(3D/4D/5D) \to \Lambda_c\bar{\Lambda}_c)$ ∽ less than one MeV

If the enhancement Y(4630) in the $\Lambda_c\bar{\Lambda}_c$ invariant-mass distribution is the same atructure as Y(4660), the Y(4660) resoannce is most likely to be a S-wave charmonium state.

Where is X_b?

周智勇

Where is its counterpart in Bottomonium sector? Predictions:

- Meson-exchange model
  10562 MeV Tornqvist, Phys. Rev. Lett. 67, 556 (1991), Z. Phys. C61, 525 (1994)
  10561 MeV Swanson, Phys. Rept. 429, 243 (2006)
  10585 MeV Karliner and Nussinov, JHEP 07, 153 (2013)
  qualitative prediction Karliner and Rosner, Phys. Rev. Lett. 115, 122001 (2015)
- Effective Field theory
  10604 MeV in an unpublished version AlFiky, Gabbiani, and Petrov, Phys. Lett. B640, 238 (2006)

- A lineshape peak at about 10615 MeV with a width about 10 MeV above $B\bar{B}^*$ threshold is predicted. It could be regarded as X_b but it main comes from the convolution of wave functions.
- Another dynamically generated state at about $10672 \pm 39i$ MeV
- The physical $\chi_{b1}(4P)$ is at about $10771 \pm 3i$ MeV

Productions and decays of $Z_b^{(\prime)}$

陈殿勇

✓ productions of $Z_b^{(\prime)}$

dominant from $B_1^{\prime}B^{(*)}/B_0B^*$ loops;

From $\Upsilon(5S)$; From $\Upsilon(6S)$

Predictions for 6S: $\frac{B(\Upsilon(6S)\to Z_b\pi)}{B(\Upsilon(6S)\to Z_b^{\prime}\pi)} \sim 2,$

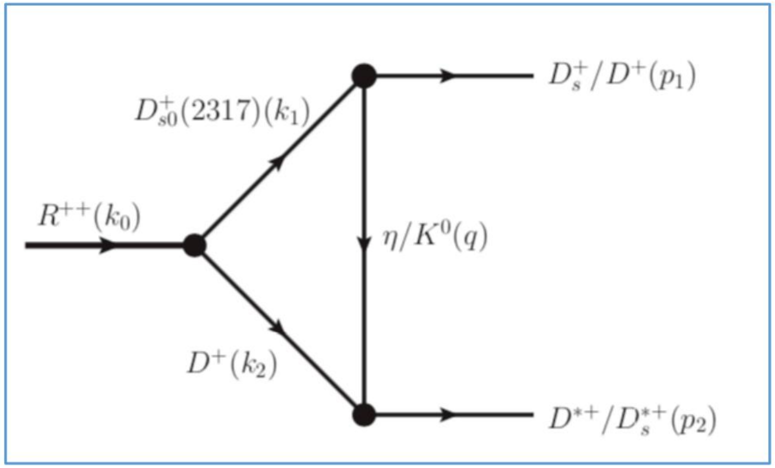
	f_{Z_b}	$f_{Z_b^{\prime}}$
$\Upsilon(6S) \to h_b(1P)\pi^+\pi^-$	46%	54%
$\Upsilon(6S) \to h_b(2P)\pi^+\pi^-$	40%	60%

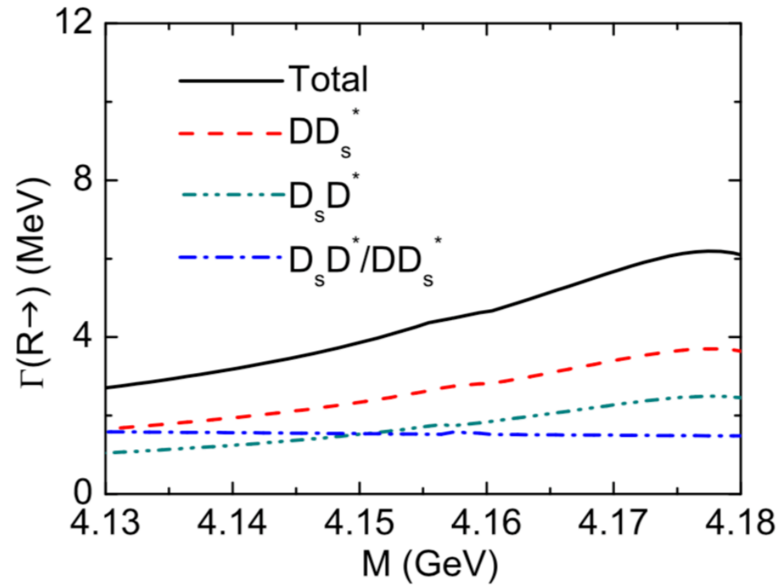
$$\mathcal{B}(\Upsilon(6S) \to Z_b^+\pi^-) \sim 5\%\,,$$
$$\mathcal{B}(\Upsilon(6S) \to Z_b^{\prime +}\pi^-) \sim 3\%\,,$$

Need further check from Belle II

On the existence of a doubly charmed DDK bound state

耿立升





$R^{++}(4140)$

- DDK molecule
- ½(0-)
- $cc\bar{d}\bar{s}$
- Decay strongly—10 MeV
- Production mechanism to be studied

Tcc

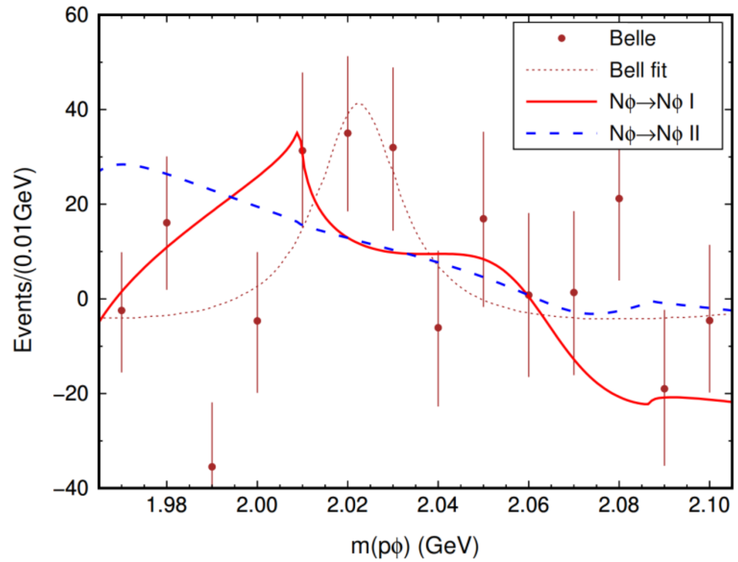
- Compact tetraquark
- $0(1^+)$
- $cc\bar{q}\bar{q}$
- Decay weakly
- Production in PP/e+e- collisions studied extensively

Very preliminary result:
$\Gamma \sim 4$ MeV

Need search for them in experiments !

隐粲五夸克态及其隐奇异伴随态

何军



Three 3/ 2⁻ nucleon resonances:

- N (1875):

  $\Sigma^{*}K$ molecular state, partner of Pc(4380)

- N (2100) in ϕ photoproduction:

  ΣK* molecular state, partner of Pc(4450)

- N (2120) in KΛ(1520) photoproduction

  $[N(3/2^{-})]_3$ in constituent quark model

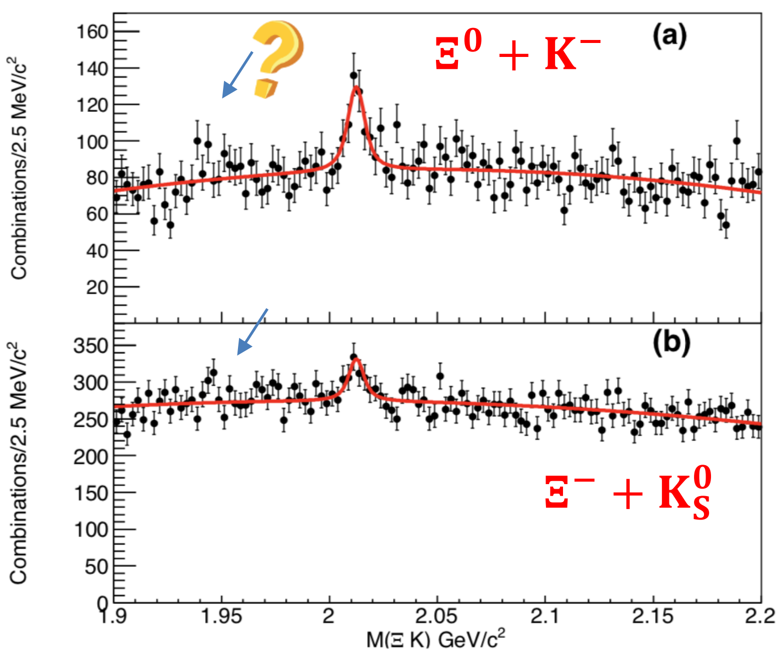
4. 理论和实验上重子、粲重子、双粲重子的讨论

Observation of an excited Ω^- baryon

Results & Summary

$$\mathcal{R} = \frac{\mathcal{B}(\Omega^{*-} \to \Xi^0 K^-)}{\mathcal{B}(\Omega^{*-} \to \Xi^- \bar{K}^0)} = 1.2 \pm 0.3$$

Data	Mode	Mass (MeV/c^2)	Yield	Γ(MeV)	χ^2/d.o.f.	n_σ
$\Upsilon(1S,2S,3S)$	$\Xi^0 K^-$, $\Xi^- K^0_S$ (simultaneous)	2012.4 ± 0.7	242 ± 48, 279 ± 71	$6.4^{+2.5}_{-2.0}$	227/230	8.3
$\Upsilon(1S,2S,3S)$	$\Xi^0 K^-$	2012.6 ± 0.8	239 ± 53	6.1 ± 2.6	115/114	6.9
$\Upsilon(1S,2S,3S)$	$\Xi^- K^0_S$	2012.0 ± 1.1	286 ± 87	6.8 ± 3.3	101/114	4.4
Other	$\Xi^0 K^-$	2012.4 (Fixed)	209 ± 63	6.4 (Fixed)	102/116	3.4
Other	$\Xi^- K^0_S$	2012.4 (Fixed)	153 ± 89	6.4 (Fixed)	133/116	1.7



PRL 121, 052003 (2018)

- The gap in the spectrum between the ground state and this excited state (~340 MeV) is smaller than other Ω^- excited states, which is more close to the negative-parity orbital excitations of many other baryons.
- The narrow width observed implies that the quantum number $J^P = \frac{3}{2}^-$ is preferable.

The number of expected Ω(2012) events at Belle

$$N^{\text{expected}} = N_{\Omega}^{\text{total}} \times \mathcal{B}^{\text{product}} \times \varepsilon \times \mathcal{B}(\Omega(2012) \to K\Xi/K\Xi\pi)$$

Channel	ε	$\mathcal{B}^{\text{decay}}$	$\mathcal{B}(\Omega(2012) \to K\Xi/K\Xi\pi)$	N^{obs}	N^{expected}
$\Xi^- K_S^0$	15.7%	$\mathcal{B}(K_S^0 \to \pi^+\pi^-) \times \mathcal{R}(\bar{K}^0 \to K_S^0)$	6.5%	279	-
$\Xi^0 K^-$	4.0%	$\mathcal{B}(\pi^0 \to \gamma\gamma)$	7.8%	242	
$\Xi^- K^- \pi^+$	9.4%	-	28.6%	-	**2091**
$\Xi^- K_S^0 \pi^0$	1.5%	$\mathcal{B}(K_S^0 \to \pi^+\pi^-) \times \mathcal{B}(\pi^0 \to \gamma\gamma) \times \mathcal{R}(\bar{K}^0 \to K_S^0)$	14.3%	-	**55**
$\Xi^0 K_S^0 \pi^-$	2.3%	$\mathcal{B}(\pi^0 \to \gamma\gamma) \times \mathcal{B}(K_S^0 \to \pi^+\pi^-) \times \mathcal{R}(\bar{K}^0 \to K_S^0)$	28.6%	-	**177**
$\Xi^0 K^- \pi^0$	0.8%	$\mathcal{B}(\pi^0 \to \gamma\gamma) \times \mathcal{B}(\pi^0 \to \gamma\gamma)$	14.3%	-	**82**

- $\mathcal{B}(\Omega(2012) \to K\Xi)$: $\mathcal{B}(\Omega(2012) \to K\Xi\pi)$ = 14.3 : 85.7 in Ref.[arxiv:1807.00997].
- $\mathcal{T}[\Xi^- \bar{K}^0]$: $\mathcal{T}[\Xi^0 K^-]$ = 1 : 1.2 from PRL121, 052003 (2018)
- The isospin analysis shows $\mathcal{T}[\Xi^- K^- \pi^+]$: $\mathcal{T}[\Xi^- \bar{K}^0 \pi^0]$: $\mathcal{T}[\Xi^0 \bar{K}^0 \pi^-]$: $\mathcal{T}[\Xi^0 K^- \pi^0]$ = 2:1:2:1
- In the calculation of $\mathcal{B}^{\text{decay}}$, the common $\mathcal{B}$, e.g., $\mathcal{B}(\Lambda \to p\pi^-)$ is cancelled. $\mathcal{R}(\bar{K}^0 \to K_S^0) = 0.5$
- If theoretical predictions are correct, we will most likely observe $\Omega(2012)$ in mode $\Omega(2012) \to \Xi^- K^- \pi^+$.

Measurements of absolute Brs of Ξ_c^0

Summary of the measured branching fractions and the ratios of Ξ_c^0 decays

preliminary

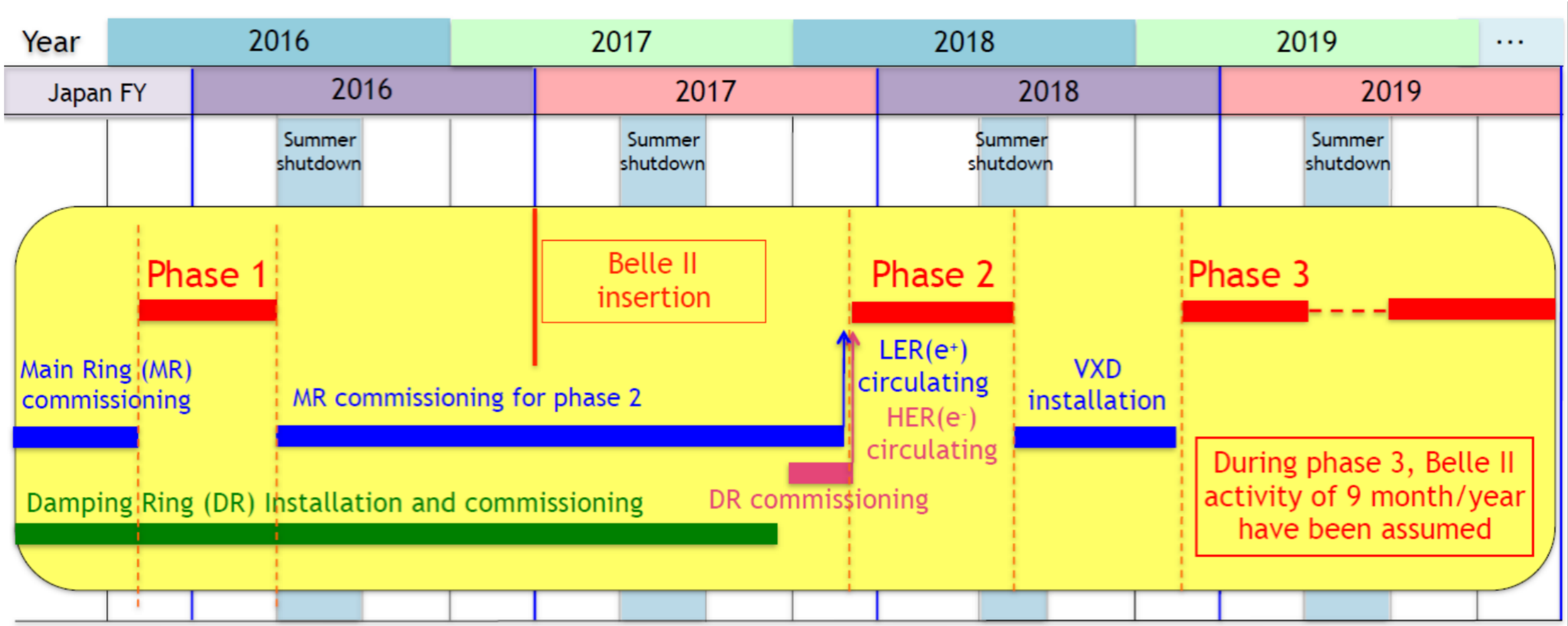
Channel	Br/Ratio	
$B(\boldsymbol{B}^- \to \overline{\boldsymbol{\Lambda}}_c^- \Xi_c^0)$	$(9.51 \pm 2.10 \pm 0.88) \times 10^{-4}$	
$B(\boldsymbol{B}^- \to \overline{\boldsymbol{\Lambda}}_c^- \Xi_c^0)\, B(\Xi_c^0 \to \Xi^- \pi^+)$	$(1.71 \pm 0.28 \pm 0.15) \times 10^{-5}$	$(2.4 \pm 0.9) \times 10^{-5}$
$B(\boldsymbol{B}^- \to \overline{\boldsymbol{\Lambda}}_c^- \Xi_c^0)\, B(\Xi_c^0 \to \Lambda K^- \pi^+)$	$(1.11 \pm 0.26 \pm 0.10) \times 10^{-5}$	$(2.1 \pm 0.9) \times 10^{-5}$
$B(\boldsymbol{B}^- \to \overline{\boldsymbol{\Lambda}}_c^- \Xi_c^0)\, B(\Xi_c^0 \to p K^- K^- \pi^+)$	$(5.47 \pm 1.78 \pm 0.57) \times 10^{-6}$	
$B(\Xi_c^0 \to \Xi^- \pi^+)$	$(1.80 \pm 0.50 \pm 0.14)\%$	
$B(\Xi_c^0 \to \Lambda K^- \pi^+)$	$(1.17 \pm 0.37 \pm 0.09)\%$	PDG
$B(\Xi_c^0 \to p K^- K^- \pi^+)$	$(0.58 \pm 0.23 \pm 0.05)\%$	
$B(\Xi_c^0 \to \Lambda K^- \pi^+)/B(\Xi_c^0 \to \Xi^- \pi^+)$	$0.65 \pm 0.18 \pm 0.04$	1.07 ± 0.14
$B(\Xi_c^0 \to p K^- K^- \pi^+)/B(\Xi_c^0 \to \Xi^- \pi^+)$	$0.32 \pm 0.12 \pm 0.07$	0.34 ± 0.04

- We have performed an analysis of $\boldsymbol{B}^- \to \overline{\boldsymbol{\Lambda}}_c^- \Xi_c^0$ inclusively and exclusively
- First model-independent measurement of absolute Brs of Ξ_c^0 decays
- The branching fraction $B(\boldsymbol{B}^- \to \overline{\boldsymbol{\Lambda}}_c^- \Xi_c^0)$ is measured for the first time
- The measured $B(\Xi_c^0 \to \Xi^- \pi^+)$ can be used to determine the BR of other Ξ_c^0 decays.

5.未来和即将运行的实验

SuperKEKB and Belle II Schedule

李春花



- ✅ **Phase1, Feb.-June, 2016**
  - **Accelerator commissioning, no collision**
- ✅ **Phase2, Feb.-July 17, 2018**
  - **Collision w/o vertex detectors**
  - **Understand background and detector performance**
  - **Instantaneous luminosity reach ~0.5×10^{34} $cm^{-2}s^{-1}$**
  - **~0.5 fb^{-1} data at the Υ(4S) resonance was collected**

Phase 3

- **Installation of VXD**
- **Start physics run with full detectors in Spring 2019**
- **Operate 9 months per year**

Prospects of DCB in a nutshell

何吉波

- LHCb ($7.5\ \mathrm{fb}^{-1}$, 2018)
  - Ξ_{cc}^{++} properties better known, >1k signal
  - Ξ_{cc}^{+} probably observed
  - Ω_{cc}^{+} evidence?
- LHCb upgrade ($50\ \mathrm{fb}^{-1}$, 2030)
  - Ξ_{cc}^{++}, $\mathcal{O}(10\mathrm{k})$ signals, excited states, new decays, CPV study?
  - Ξ_{cc}^{+}, $\mathcal{O}(1\mathrm{k})$ signals, properties better known
  - Ω_{cc}^{+}, observation
- LHCb upgrade-II, another factor of 6

不忘初心

研讨会将特别关注BESIII和Belle II能提供的哪些测量将对理解XYZ性质有重要意义，实验上需要哪些理论的输入以便对数据有更好的理解，哪些特征量可以有效区分粲偶素与奇特态介子等

致谢

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- 所有报告人，参会者

预祝大家回程旅途顺利、愉快！