郑州大学
ZHENGZHOU UNIVERSITY

第八届强子谱与强子结构研讨会

Phys. Rev. D 111 (2025) 016004

The $\Lambda_c^+ \to \eta\pi^+\Lambda$ reaction and the $\Lambda a_0^+(980)$ and $\pi^+\Lambda(1670)$ contributions

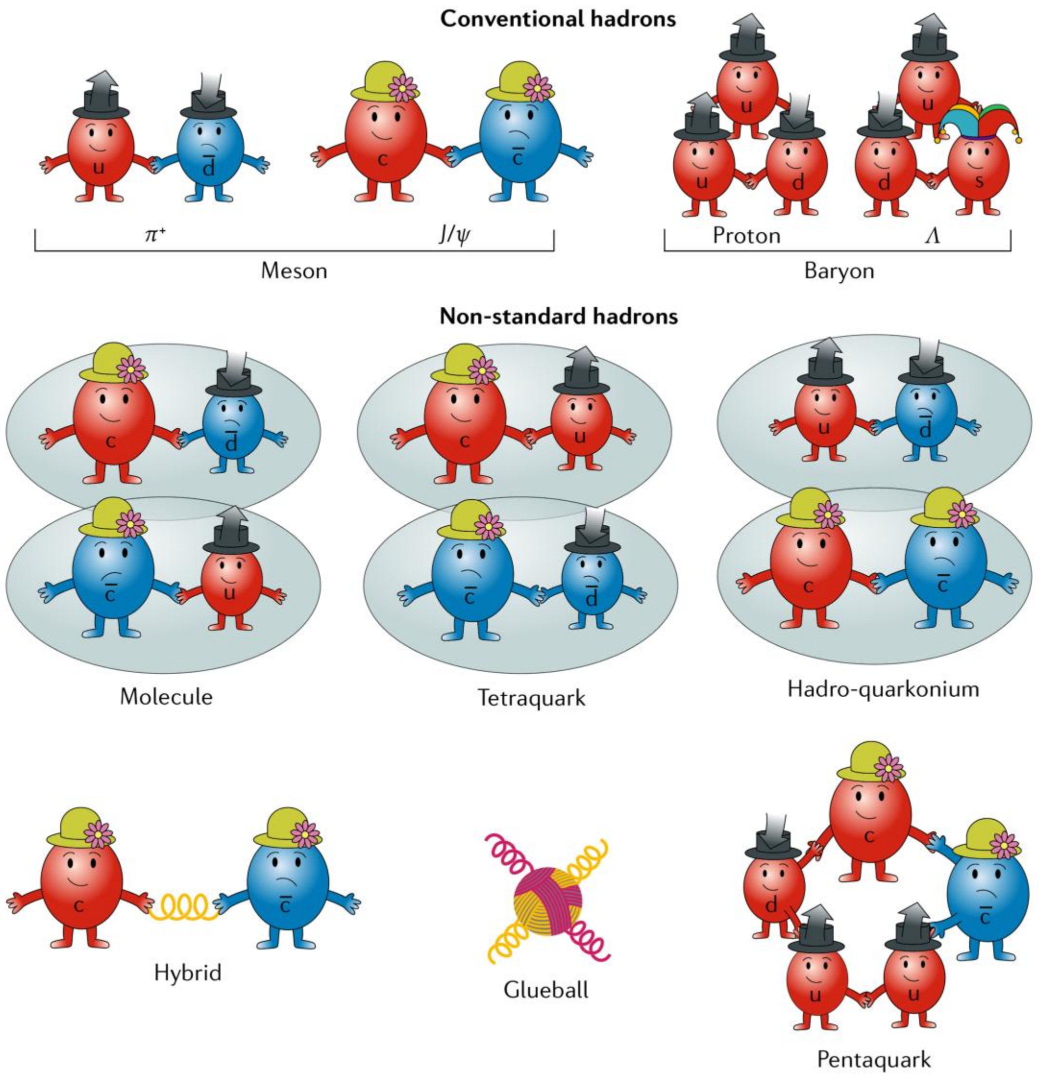
吕文韬 郑州大学

合作者：段漫玉，肖楮文，王恩，谢聚军，陈殿勇，Eulogio Oset

2025年7月13日@桂林

Background

郑州大学 ZHENGZHOU UNIVERSITY



- **Conventional hadrons:**

  Meson

  Baryon

- **Non-standard hadrons:**

  Molecule

  Tetraquark

  Pentaquark

  Hybrid

  Glueball

Nature Rev. Phys. 1 , 480 (2019)

Low-lying baryons with $J^P=1/2^-$

Workman R L, *et al.*, Review of Particle Physics (2024).

p	$1/2^+$	****	$\Delta(1232)$	$3/2^+$	****	Σ^+	$1/2^+$	****	Λ_c^+	$1/2^+$	****	Λ_b^0	$1/2^+$	***
n	$1/2^+$	****	$\Delta(1600)$	$3/2^+$	****	Σ^0	$1/2^+$	****	$\Lambda_c(2595)^+$	$1/2^-$	***	$\Lambda_b(5912)^0$	$1/2^-$	***
$N(1440)$	$1/2^+$	****	$\Delta(1620)$	$1/2^-$	****	Σ^-	$1/2^+$	****	$\Lambda_c(2625)^+$	$3/2^-$	***	$\Lambda_b(5920)^0$	$3/2^-$	***
$N(1520)$	$3/2^-$	****	$\Delta(1700)$	$3/2^-$	****	$\Sigma(1385)$	$3/2^+$	****	$\Lambda_c(2765)^+$		*	$\Lambda_b(6070)^0$	$1/2^+$	***
$N(1535)$	$1/2^-$	****	$\Delta(1750)$	$1/2^+$	*	$\Sigma(1580)$	$3/2^-$	*	$\Lambda_c(2860)^+$	$3/2^+$	***	$\Lambda_b(6146)^0$	$3/2^+$	***
$N(1650)$	$1/2^-$	****	$\Delta(1900)$	$1/2^-$	***	$\Sigma(1620)$	$1/2^-$	*	$\Lambda_c(2880)^+$	$5/2^+$	***	$\Lambda_b(6152)^0$	$5/2^+$	***
$N(1675)$	$5/2^-$	****	$\Delta(1905)$	$5/2^+$	****	$\Sigma(1660)$	$1/2^+$	***	$\Lambda_c(2910)^+$		*	Σ_b	$1/2^+$	***
$N(1680)$	$5/2^+$	****	$\Delta(1910)$	$1/2^+$	****	$\Sigma(1670)$	$3/2^-$	****	$\Lambda_c(2940)^+$	$3/2^-$	***	Σ_b^*	$3/2^+$	***
$N(1700)$	$3/2^-$	***	$\Delta(1920)$	$3/2^+$	***	$\Sigma(1750)$	$1/2^-$	***	$\Sigma_c(2455)$	$1/2^+$	****	$\Sigma_b(6097)^+$		***
$N(1710)$	$1/2^+$	****	$\Delta(1930)$	$5/2^-$	***	$\Sigma(1775)$	$5/2^-$	****	$\Sigma_c(2520)$	$3/2^+$	***	$\Sigma_b(6097)^-$		***
$N(1720)$	$3/2^+$	****	$\Delta(1940)$	$3/2^-$	**	$\Sigma(1780)$	$3/2^+$	*	$\Sigma_c(2800)$		***	Ξ_b^-	$1/2^+$	***
$N(1860)$	$5/2^+$	**	$\Delta(1950)$	$7/2^+$	****	$\Sigma(1880)$	$1/2^+$	**	Ξ_c^+	$1/2^+$	***	Ξ_b^0	$1/2^+$	***
$N(1875)$	$3/2^-$	***	$\Delta(2000)$	$5/2^+$	**	$\Sigma(1900)$	$1/2^-$	**	Ξ_c^0	$1/2^+$	****	$\Xi'_b(5935)^-$	$1/2^+$	***
$N(1880)$	$1/2^+$	***	$\Delta(2150)$	$1/2^-$	*	$\Sigma(1910)$	$3/2^-$	***	$\Xi_c'^+$	$1/2^+$	***	$\Xi_b(5945)^0$	$3/2^+$	***
$N(1895)$	$1/2^-$	****	$\Delta(2200)$	$7/2^-$	***	$\Sigma(1915)$	$5/2^+$	****	$\Xi_c'^0$	$1/2^+$	***	$\Xi_b(5955)^-$	$3/2^+$	***
$N(1900)$	$3/2^+$	****	$\Delta(2300)$	$9/2^+$	**	$\Sigma(1940)$	$3/2^+$	*	$\Xi_c(2645)$	$3/2^+$	***	$\Xi_b(6087)^0$	$3/2^-$	***
$N(1990)$	$7/2^+$	**	$\Delta(2350)$	$5/2^-$	*	$\Sigma(2010)$	$3/2^-$	*	$\Xi_c(2790)$	$1/2^-$	***	$\Xi_b(6095)^0$	$3/2^-$	***
$N(2000)$	$5/2^+$	**	$\Delta(2390)$	$7/2^+$	*	$\Sigma(2030)$	$7/2^+$	****	$\Xi_c(2815)$	$3/2^-$	***	$\Xi_b(6100)^-$	$3/2^-$	***
$N(2040)$	$3/2^+$	*	$\Delta(2400)$	$9/2^-$	**	$\Sigma(2070)$	$5/2^+$	*	$\Xi_c(2882)$		*	$\Xi_b(6227)^-$		***
$N(2060)$	$5/2^-$	***	$\Delta(2420)$	$11/2^+$	****	$\Sigma(2080)$	$3/2^+$	*	$\Xi_c(2923)$		**	$\Xi_b(6227)^0$		***
$N(2100)$	$1/2^+$	***	$\Delta(2750)$	$13/2^-$	**	$\Sigma(2100)$	$7/2^-$	*	$\Xi_c(2930)$		**	$\Xi_b(6327)^0$		***
$N(2120)$	$3/2^-$	***	$\Delta(2950)$	$15/2^+$	**	$\Sigma(2110)$	$1/2^-$	*	$\Xi_c(2970)$	$1/2^+$	***	$\Xi_b(6333)^0$		***
$N(2190)$	$7/2^-$	****				$\Sigma(2230)$	$3/2^+$	*	$\Xi_c(3055)$		***	Ω_b^-	$1/2^+$	***
$N(2220)$	$9/2^+$	****	Λ	$1/2^+$	****	$\Sigma(2250)$		**	$\Xi_c(3080)$		***	$\Omega_b(6316)^-$		***
$N(2250)$	$9/2^-$	****	$\Lambda(1380)$	$1/2^-$	**	$\Sigma(2455)$		*	$\Xi_c(3123)$		*	$\Omega_b(6330)^-$		***
$N(2300)$	$1/2^+$	**	$\Lambda(1405)$	$1/2^-$	****	$\Sigma(2620)$		*	Ω_c^0	$1/2^+$	***	$\Omega_b(6340)^-$		***
$N(2570)$	$5/2^-$	**	$\Lambda(1520)$	$3/2^-$	****	$\Sigma(3000)$		*	$\Omega_c(2770)^0$	$3/2^+$	***	$\Omega_b(6350)^-$		***
$N(2600)$	$11/2^-$	***	$\Lambda(1600)$	$1/2^+$	****	$\Sigma(3170)$		*	$\Omega_c(3000)^0$		***			
$N(2700)$	$13/2^+$	**	$\Lambda(1670)$	$1/2^-$	****				$\Omega_c(3050)^0$		***	$P_{c\bar{c}}(4312)^+$		*
			$\Lambda(1690)$	$3/2^-$	****	Ξ^0	$1/2^+$	****	$\Omega_c(3065)^0$		***	$P_{c\bar{c}s}(4338)^0$	$1/2^-$	*
			$\Lambda(1710)$	$1/2^+$	*	Ξ^-	$1/2^+$	****	$\Omega_c(3090)^0$		***	$P_{c\bar{c}}(4380)^+$		*

These exotic properties of the low-lying excited baryons with the quantum numbers of spin-parity $J^P = 1/2^-$ are difficult to explain in the simple quenched quark model.

EW-Geng-Wu-Xie-Zou, CPL. 41 (2024) 101401

$1/2^-$ baryon nonet with strangeness

Zou, EPJA 35 (2008) 325

- Mass pattern : quenched or unquenched ?

uds (L=1) $1/2^-$ ~ $\Lambda^*(1670)$ ~ $[us][ds]\bar{s}$
uud (L=1) $1/2^-$ ~ $N^*(1535)$ ~ $[ud][us]\bar{s}$
uds (L=1) $1/2^-$ ~ $\Lambda^*(1405)$ ~ $[ud][su]\bar{u}$
uus (L=1) $1/2^-$ ~ $\Sigma^*(1390)$ ~ $[us][ud]\bar{d}$

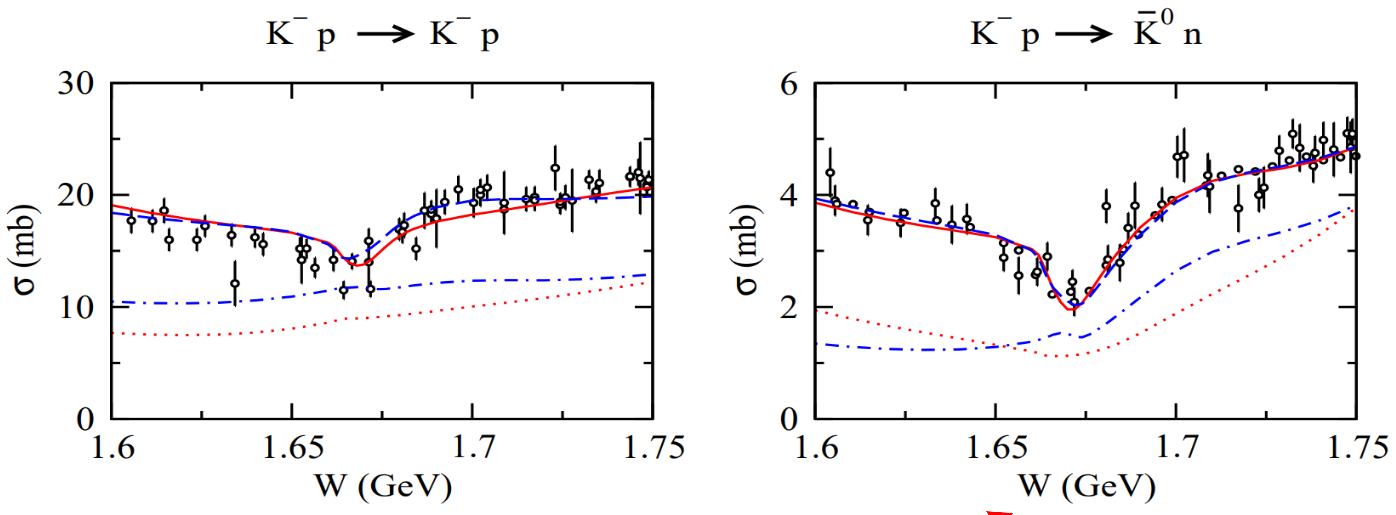
Zou et al, NPA835 (2010) 199 ; CLAS, PRC87(2013)035206

- Strange decays of $N^*(1535)$ and $\Lambda^*(1670)$:
  $N^*(1535)$ large couplings $g_{N^*N\eta}$, $g_{N^*K\Lambda}$, $g_{N^*N\eta'}$, $g_{N^*N\phi}$
  $\Lambda^*(1670)$ large coupling $g_{\Lambda^*\Lambda\eta}$

Report of Bing-Song Zou

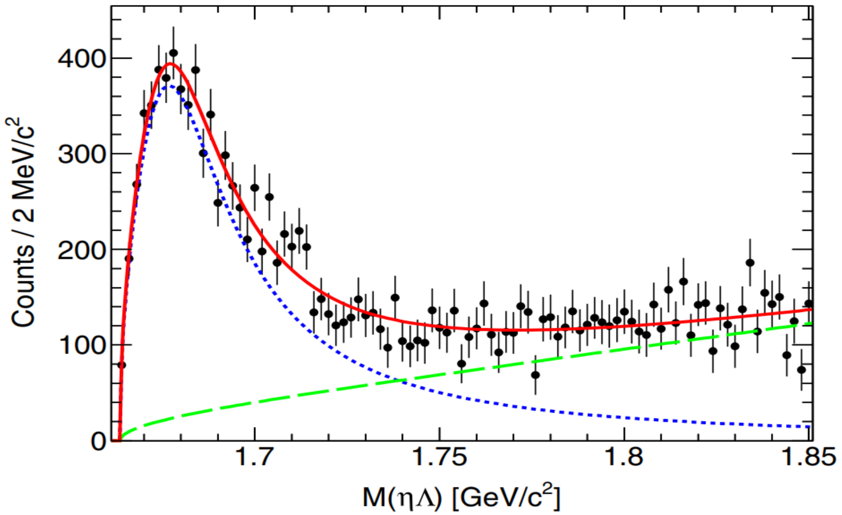
**** Existence is certain, and properties are at least fairly explored.
*** Existence ranges from very likely to certain, but further confirmation is desirable and/or quantum numbers, branching fractions, etc. are not well determined.
** Evidence of existence is only fair.
* Evidence of existence is poor.

The spectrum shape of Λ(1670)



PRC 92 (2015) 025205

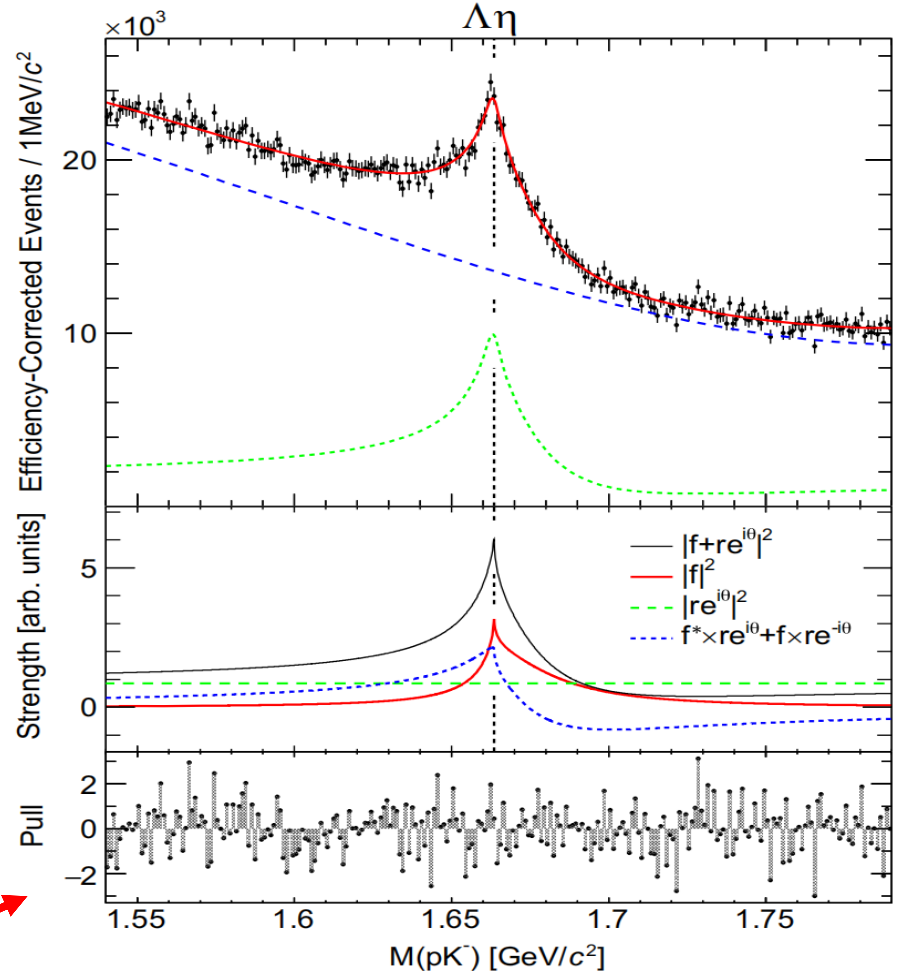
Dip?



Belle Collaboration, PRD 103 (2021) 052005

Peak?

Cusp?



Belle Collaboration, PRD 108 (2023) L031104

Background

郑州大学 ZHENGZHOU UNIVERSITY

PART of theoretical explanations of spectrum shape of $\Lambda(1670)$

- **Cusp:**

  Phys. Rev. D 100 (2019) 054006: Considering the Triangle mechanism (a_0-loop and $\Sigma(1660)$-loop)

  Eur. Phys. J. C (2024) 84:1253 : Considering the Triangle mechanism (a_0-loop)

  Phys. Lett. B 857 (2024) 139003 : Considering the meson-baryon rescattering

- **Dip:**

  Phys. Rev. C 92 (2015) 025205: Comprehensive partial-wave analysis of K^-p reactions

  Nucl. Phys. B 119 (1977) 362-400: Partial wave analyses of $\bar{K}N$ two-body reactions

- **Peak :**

  Phys. Rev. D 106 (2022) 056001: Considering the meson-baryon rescattering

  Phys. Rev. D 110 (2024) 054020: Considering the meson-baryon rescattering

Scalar meson

郑州大学 ZHENGZHOU UNIVERSITY

☐ Masses puzzle

- **Traditional quark model**

$$f_0(500) \approx a_0(980) < K_0^*(700) < f_0(980)$$

- **Experiment**

$$f_0(500) < K_0^*(700) < a_0(980) < f_0(980)$$

The light scalar meson $a_0(980)$ has been explained to be either a molecular state, a tetraquark state, a conventional $q\bar{q}$ meson, or the mixing of different components.

☐ PART of theoretical interpretation of $a_0(980)$

- **$K\bar{K}$ molecular state:**

  Phys. Rev. Lett. 48 (1982) 659

  Phys. Rev. D 41 (1990) 2236

- **Compact tetraquark state:**

  Phys. Rev. Lett. 92 (2004) 102001

  Eur. Phys. J. A 30 (2006) 423-426

  Phys. Rev. Lett. 111 (2013) 062001

- **Dynamically generated states:**

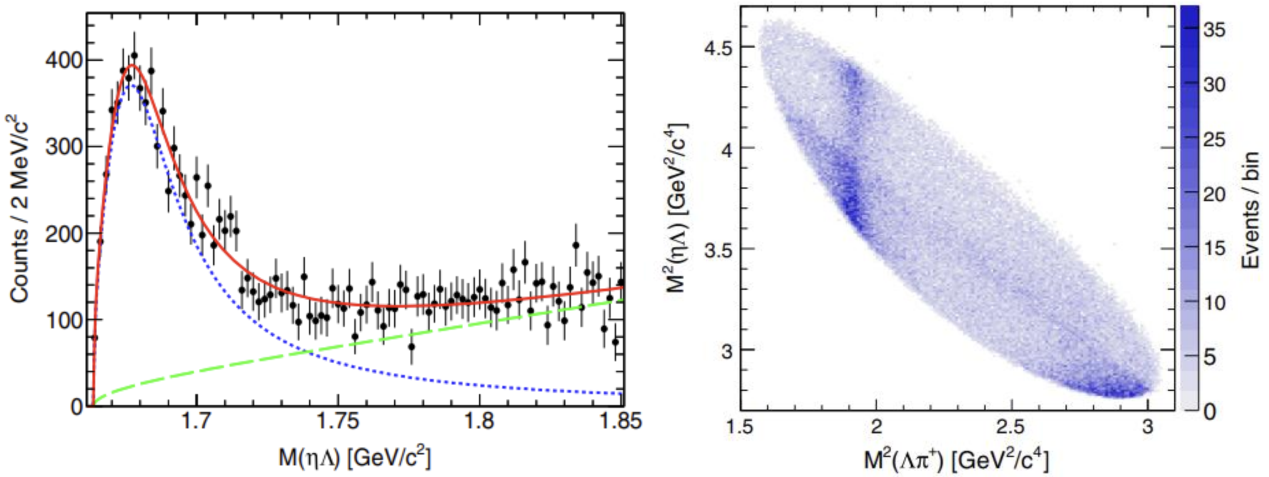
  Phys. Rev. D 52 (1995) 2690

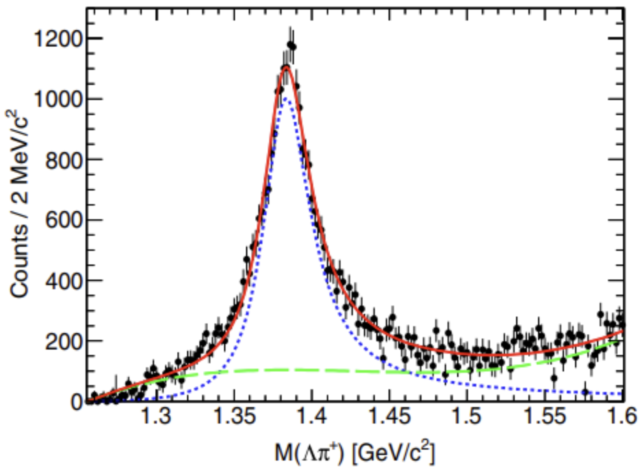
  Phys. Lett. B 803 (2020) 135279

  Phys. Lett. B 846 (2023) 138185

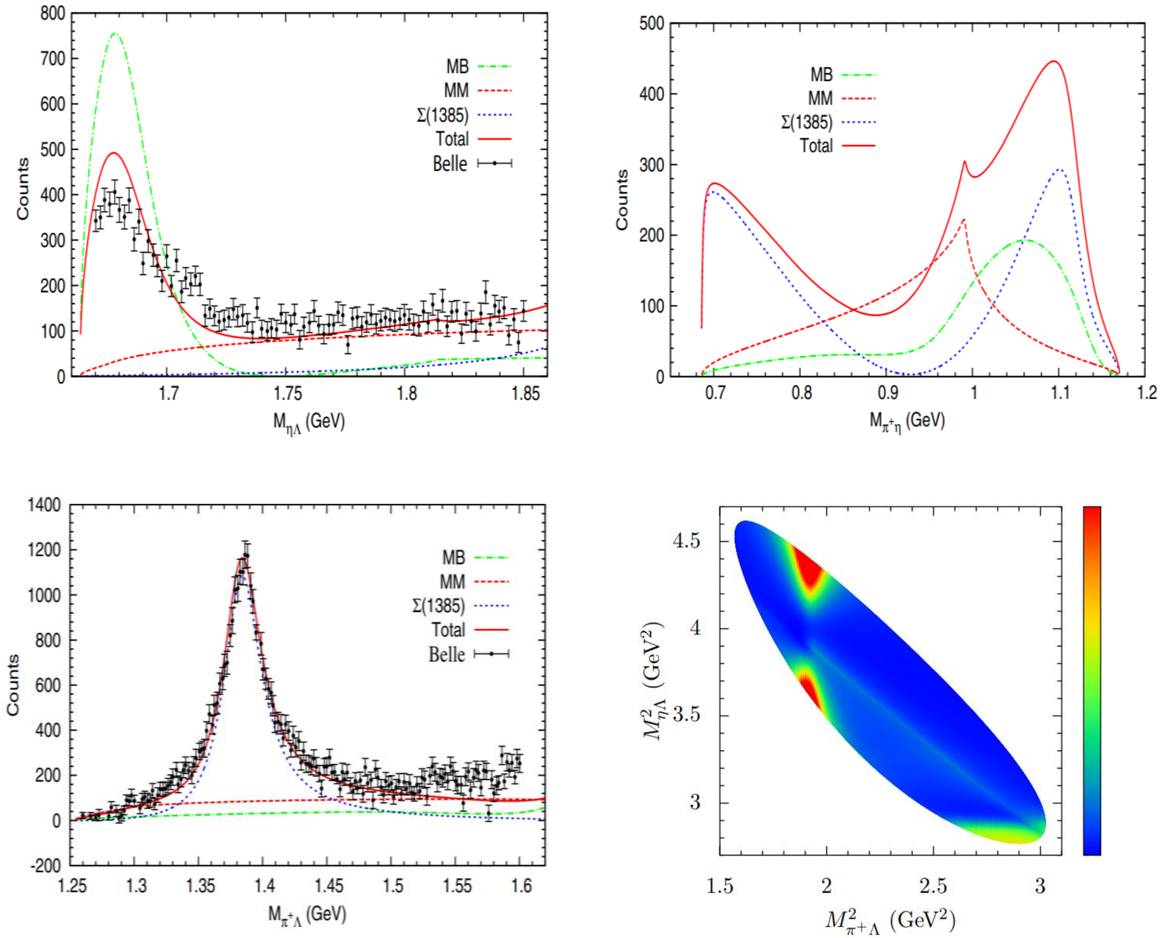
Analysis the Belle data

- In 2021, Belle Collaboration have measured the process $\Lambda_c^+ \to \Lambda\eta\pi^+$





By regarding the $\Lambda(1670)$ as the molecule and considering the contributions of $a_0(980)$ and $\Sigma(1385)$, this work could well reproduce the Belle data of the mass distributions.



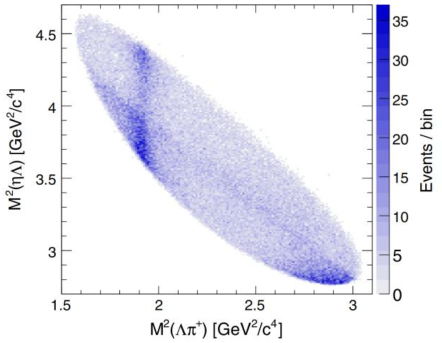
Belle Collaboration, PRD 103 (2021) 052005

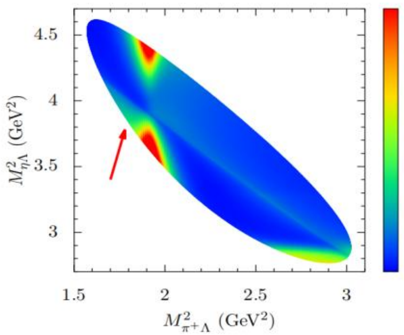
PRD 106 (2022) 056001

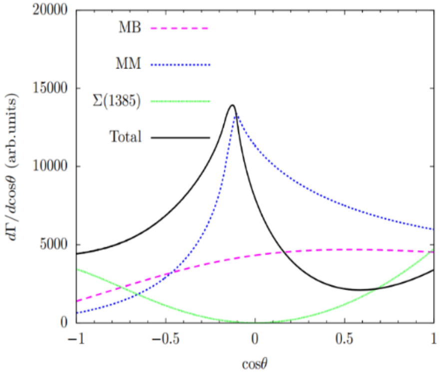
Reanalysis the Belle data

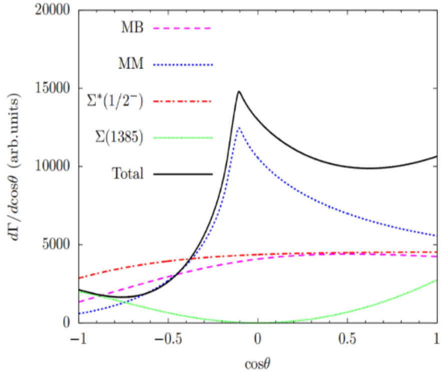
□ $\Lambda_c^+ \to \Lambda\eta\pi^+$

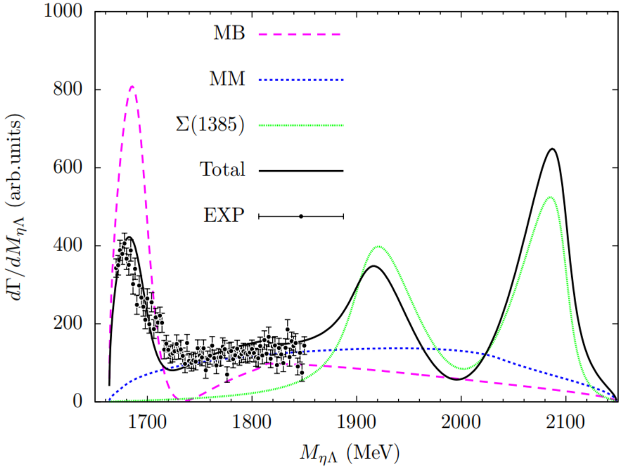
$$|\mathcal{T}^{\text{Total}}|^2 = |\mathcal{T}^{MM} + \mathcal{T}^{MB} e^{i\phi} + \mathcal{T}^{\Sigma(1385)} e^{i\phi'} + \mathcal{T}^{\Sigma^*(1/2^-)} e^{i\phi''}|^2,$$

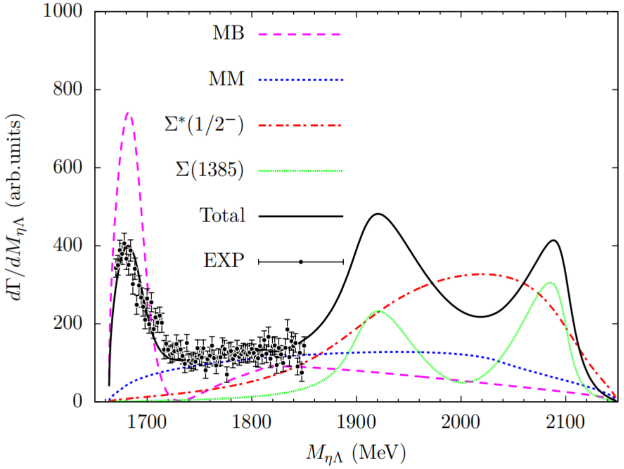


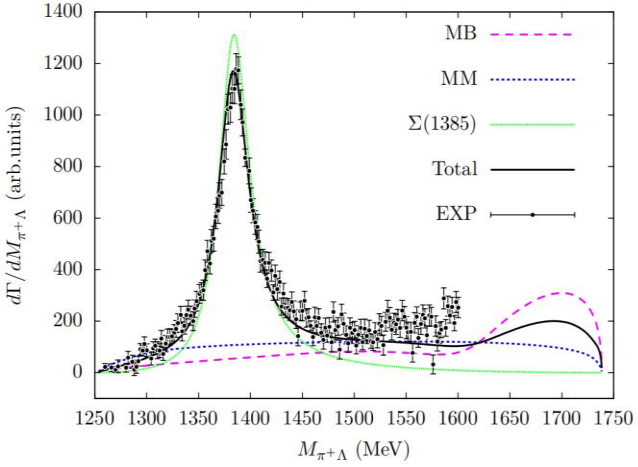


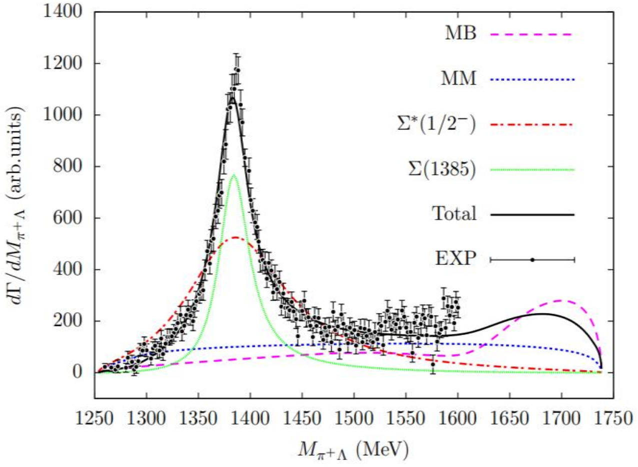












Restricted to $M_{\pi\Lambda} \geq 1440$ MeV and $M_{\eta\Lambda} \geq 1720$ MeV

Phys. Rev. D 110 (2024) 054020

The BESIII measurement

- In 2025, $\Lambda_c^+ \to \Lambda\eta\pi^+$ has been posteriorly measured by the BESIII Collaboration **BESIII Collaboration, Phys. Rev. Lett. 134 (2025) 021901**

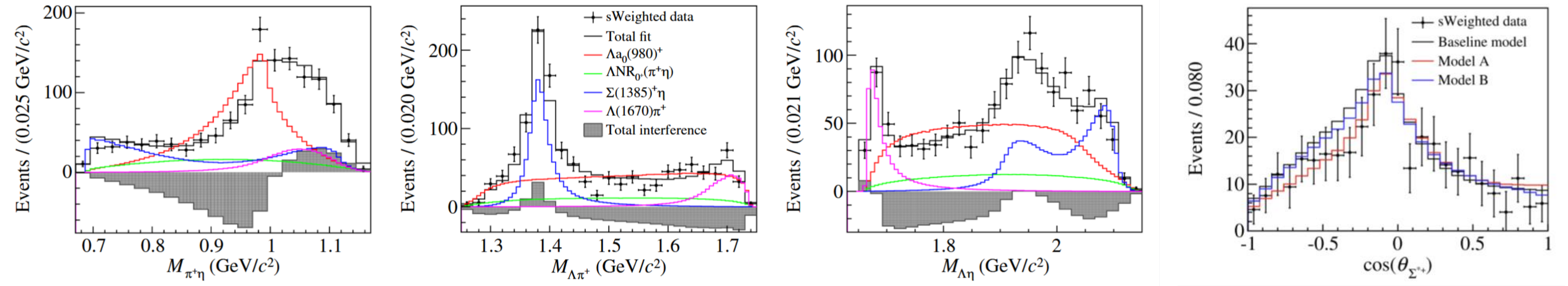
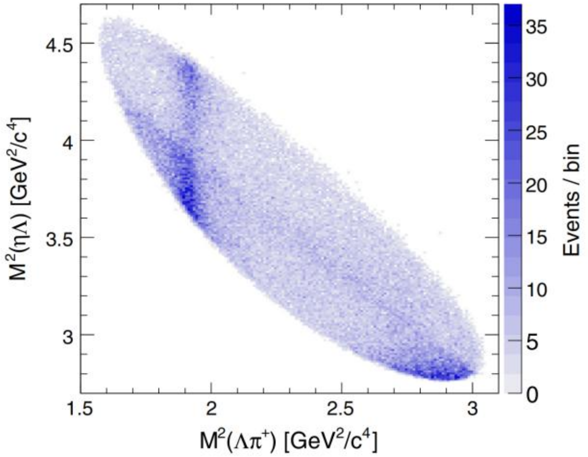


TABLE II. Fit results of FFs and statistical significances for different components in alternative models including $\Sigma(1380)^+$. The total FFs are 115.8% and 119.8% for models A and B, respectively. The uncertainties are statistical only.

Process	Model A	Model B
$\Lambda a_0(980)^+$	$52.9 \pm 4.5 (13.4\sigma)$	$50.6 \pm 8.0 (11.1\sigma)$
$\Sigma(1385)^+\eta$	$36.6 \pm 2.6 (15.8\sigma)$	$31.3 \pm 3.0 (14.6\sigma)$
$\Lambda(1670)\pi^+$	$10.7 \pm 1.4 (15.0\sigma)$	$9.0 \pm 1.6 (11.9\sigma)$
$\Sigma(1380)^+\eta$	$15.5 \pm 4.4 (6.1\sigma)$	$17.7 \pm 5.7 (3.3\sigma)$
ΛNR_{0^+}	...	$11.3 \pm 4.4 (4.2\sigma)$



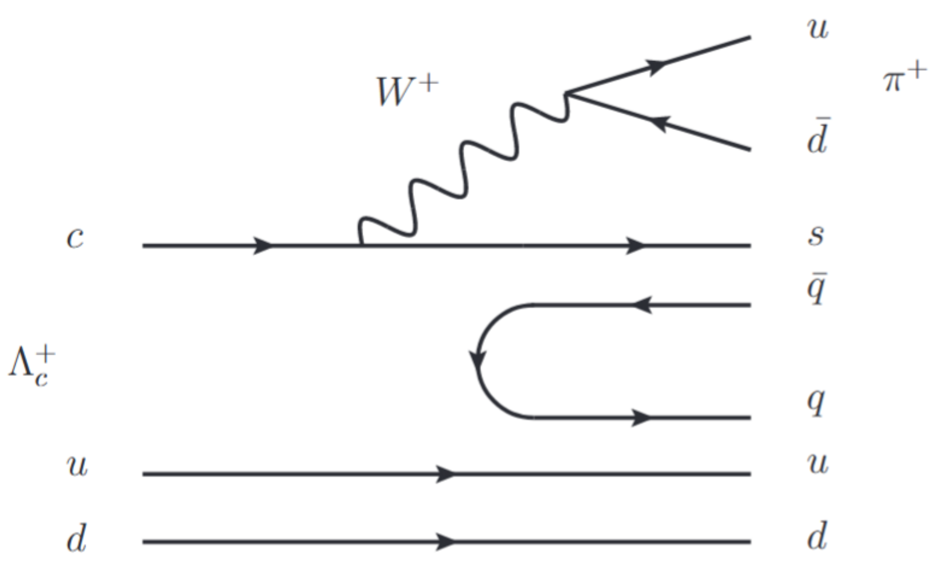
Belle Collaboration, PRD 103 (2021) 052005

In spite of the small signal seen in the Dalitz plot, the analysis reports a branching fraction of approximately 50% for the $\Lambda a_0^+(980)$ decay mode.

Formalism

ZHENGZHOU UNIVERSITY

Quark level diagram



$$P = \begin{pmatrix} \frac{\eta}{\sqrt{3}} + \frac{\pi^0}{\sqrt{2}} + \frac{\eta'}{\sqrt{6}} & \pi^+ & K^+ \\ \pi^- & \frac{\eta}{\sqrt{3}} - \frac{\pi^0}{\sqrt{2}} + \frac{\eta'}{\sqrt{6}} & K^0 \\ K^- & \bar{K}^0 & \sqrt{\frac{2}{3}}\eta' - \frac{\eta}{\sqrt{3}} \end{pmatrix}$$

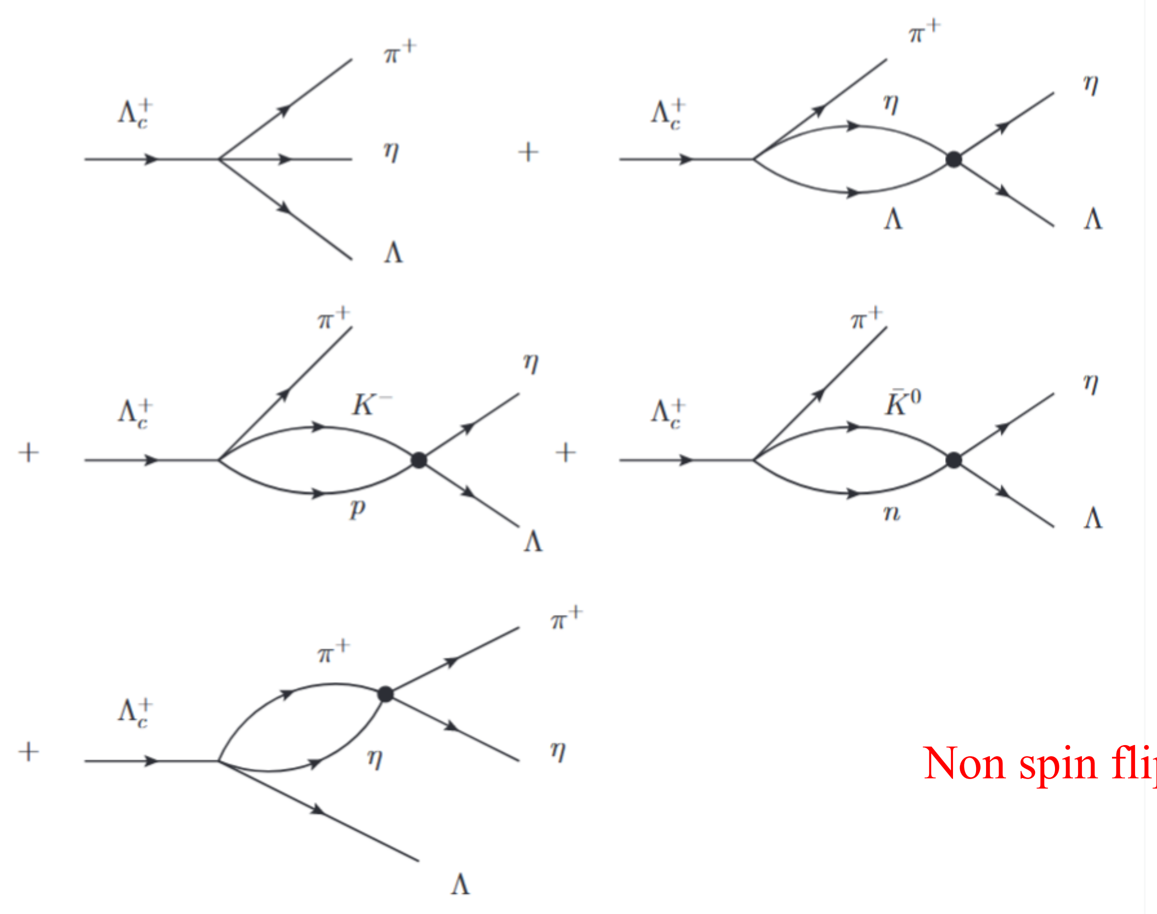
Hadronization

$$\begin{aligned} \Lambda_c^+ &= \frac{1}{\sqrt{2}} c(ud - du)\chi_{MA} \to \pi^+ \frac{1}{\sqrt{2}} s(ud - du)\chi_{MA} \\ &= \pi^+ \sum_i \frac{1}{\sqrt{2}} s\bar{q}_i q_i (ud - du)\chi_{MA} \\ &= \frac{1}{\sqrt{2}} \pi^+ \sum_i P_{3i} q_i (ud - du)\chi_{MA} \\ &= \frac{1}{\sqrt{2}} \pi^+ \left\{ K^-(uud - udu) + \bar{K}^0(dud - ddu) \right. \\ &\quad \left. - \frac{\eta}{\sqrt{3}}(sud - sdu) \right\}, \end{aligned}$$

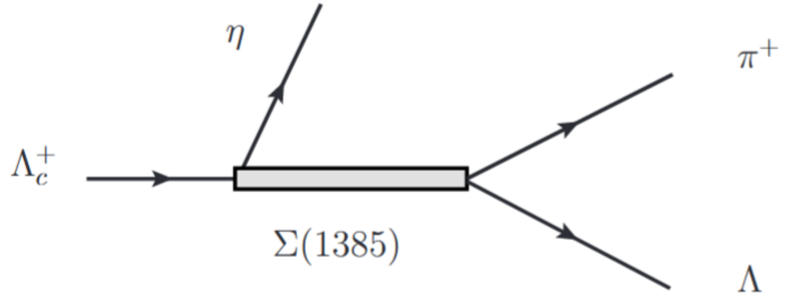
$$H = \pi^+ \left\{ \frac{1}{\sqrt{2}} K^- p + \frac{1}{\sqrt{2}} \bar{K}^0 n + \frac{1}{3} \eta \Lambda \right\}$$

Formalism

Mechanisms for tree level and rescattering



The mechanisms from the intermediate Σ(1385)



$$
\begin{aligned}
t_{\Sigma(1385)} &= \alpha \left\langle m' \left| S_i \vec{P}^*_{\pi^+ i} \right| M \right\rangle \left\langle M \left| S_j^\dagger \vec{P}^*_{\eta j} \right| m \right\rangle D \\
&= \alpha D \left\langle m' \left| \frac{2}{3}\delta_{ij} - \frac{i}{3}\epsilon_{ijs}\sigma_s \right| m \right\rangle \vec{P}^*_{\pi^+ i} \vec{P}^*_{\eta j} \\
&= \alpha D \left\langle m' \left| \frac{2}{3}\vec{P}^*_{\pi^+} \cdot \vec{P}^*_{\eta} - \frac{i}{3}\epsilon_{ijs}\sigma_s \vec{P}^*_{\pi^+ i} \vec{P}^*_{\eta j} \right| m \right\rangle,
\end{aligned}
$$

Spin flip part

Non spin flip part

$$
D = \frac{1}{M_{\rm inv}(\pi^+\Lambda) - M_{\Sigma(1385)} + i\Gamma_{\Sigma(1385)}/2},
$$

$$
M_{\Sigma(1385)} = 1382.8 \text{ MeV}, \quad \Gamma_{\Sigma(1385)} = 36.0 \text{ MeV},
$$

Formalism

The total decay amplitude

$$t = t_1 + t_2,$$

$$\begin{aligned} t_1 \;=\; & A\Big\{h_{\pi^+\eta\Lambda} + h_{\pi^+\eta\Lambda}G_{\eta\Lambda}(M_{\rm inv}(\eta\Lambda))t_{\eta\Lambda,\eta\Lambda}(M_{\rm inv}(\eta\Lambda)) \\ & +h_{\pi^+\eta\Lambda}G_{\pi^+\eta}(M_{\rm inv}(\pi^+\eta))t_{\pi^+\eta,\pi^+\eta}(M_{\rm inv}(\pi^+\eta)) \\ & +h_{\pi^+\bar{K}N}G_{K^-p}(M_{\rm inv}(\eta\Lambda))t_{K^-p,\eta\Lambda}(M_{\rm inv}(\eta\Lambda)) \\ & +h_{\pi^+\bar{K}N}G_{\bar{K}^0n}(M_{\rm inv}(\eta\Lambda))t_{\bar{K}^0n,\eta\Lambda}(M_{\rm inv}(\eta\Lambda)) \\ & +\frac{\beta}{M_\Lambda}\frac{2}{3}\vec{P}^*_\pi\cdot\vec{P}^*_\eta D\Big\}, \end{aligned}$$

$$h_{\pi^+\eta\Lambda} = \frac{1}{3}; \quad h_{\pi^+\bar{K}N} = \frac{1}{\sqrt{2}},$$

$$t_2 = -\frac{i}{3}\frac{A\beta}{M_\Lambda}\epsilon_{ijs}\sigma_s\vec{P}^*_{\pi i}\vec{P}^*_{\eta j}D,$$

The $\Lambda(1670)$ amplitudes

Nucl. Phys. A 635 (1998) 99-120

	K^-p	$\bar{K}^0n$	$\pi^0\Lambda$	$\pi^0\Sigma^0$	$\eta\Lambda$	$\eta\Sigma^0$	$\pi^+\Sigma^-$	$\pi^-\Sigma^+$	$K^+\Xi^-$	$K^0\Xi^0$
K^-p	2	1	$\frac{\sqrt{3}}{2}$	$\frac{1}{2}$	$\frac{3}{2}$	$\frac{\sqrt{3}}{2}$	0	1	0	0
$\bar{K}^0n$		2	$-\frac{\sqrt{3}}{2}$	$\frac{1}{2}$	$\frac{3}{2}$	$-\frac{\sqrt{3}}{2}$	1	0	0	0
$\pi^0\Lambda$			0	0	0	0	0	0	$\frac{\sqrt{3}}{2}$	$-\frac{\sqrt{3}}{2}$
$\pi^0\Sigma^0$				0	0	0	2	2	$\frac{1}{2}$	$\frac{1}{2}$
$\eta\Lambda$					0	0	0	0	$\frac{3}{2}$	$\frac{3}{2}$
$\eta\Sigma^0$						0	0	0	$\frac{\sqrt{3}}{2}$	$-\frac{\sqrt{3}}{2}$
$\pi^+\Sigma^-$							2	0	1	0
$\pi^-\Sigma^+$								2	0	1
$K^+\Xi^-$									2	1
$K^0\Xi^0$										2

$$V_{ij} = -C_{ij}\frac{1}{4f^2}(k^0 + k'^0)$$

$$T = [1 - VG]^{-1}V,$$

Formalism

ZHENGZHOU UNIVERSITY

The $a_0(980)$ amplitudes

$K^+\bar{K}^0$ (1) and $\pi^+\eta$ (2)

$$V_{11} = -\frac{s}{4f^2}, \quad (f = 93\ \mathrm{MeV}),$$
$$V_{12} = -\frac{1}{3\sqrt{3}f^2}(3s - 2m_K^2 - m_\eta^2),$$
$$V_{22} = -\frac{2m_\pi^2}{3f^2},$$

The $a_0(980)$ amplitudes

$$Gt(M_{\mathrm{inv}}) = Gt(M_{\mathrm{cut}})e^{-\alpha(M_{\mathrm{inv}}-M_{\mathrm{cut}})}, \text{ for } M_{\mathrm{inv}} > M_{\mathrm{cut}}$$

$\mathbf{M_{cut} = 1050\ MeV}$

The cutoff method

$$G(s) = \frac{1}{16\pi^2 s}\left\{\sigma\left(\arctan\frac{s+\Delta}{\sigma\lambda_1} + \arctan\frac{s-\Delta}{\sigma\lambda_2}\right) - \left[(s+\Delta)\ln\frac{q_{\max}(1+\lambda_1)}{m_1} + (s-\Delta)\ln\frac{q_{\max}(1+\lambda_2)}{m_2}\right]\right\},$$

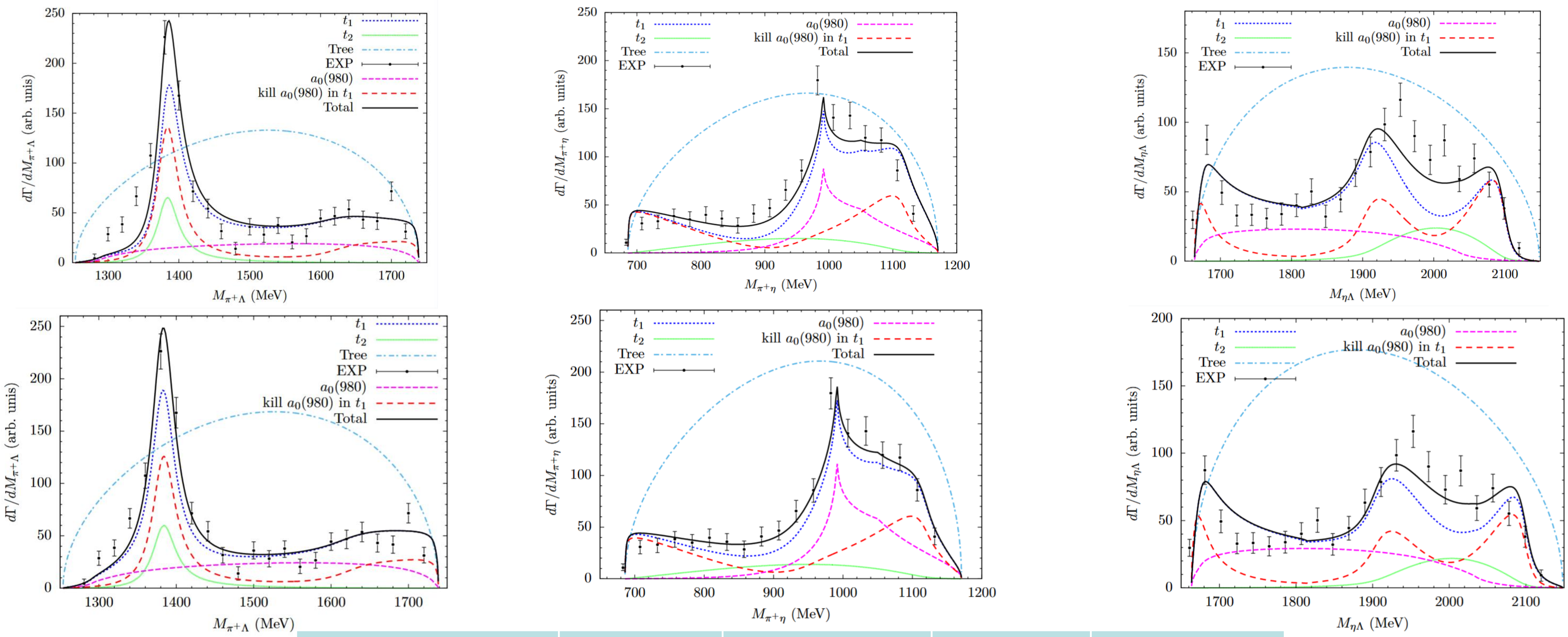
$$\sigma = \left[-\left(s-(m_1+m_2)^2\right)\left(s-(m_1-m_2)^2\right)\right]^{1/2},$$

$$\Delta = m_1^2 - m_2^2,$$

$$\lambda_1 = \sqrt{1+\frac{m_1^2}{q_{\max}^2}}, \quad \lambda_2 = \sqrt{1+\frac{m_2^2}{q_{\max}^2}},$$

Results

□ The invariant mass distributions of the $\Lambda_c^+ \to \Lambda\eta\pi^+$ decay

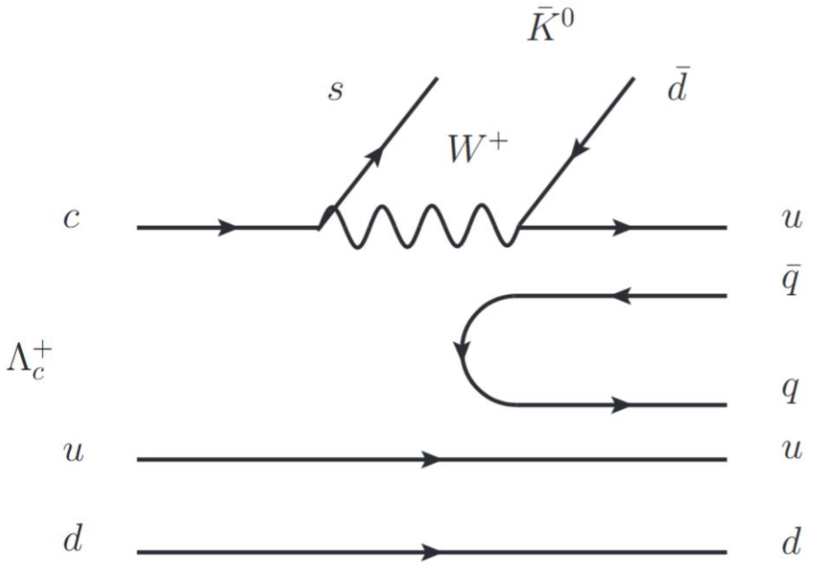


Parameters	A	β	ϕ	χ^2 / d.o.f
Value	0.457	0.098		3.42
	0.515	0.084	0.44π	2.09

Formalism-internal emission

郑州大学 ZHENGZHOU UNIVERSITY

☐ Quark level diagram



☐ Hadronization

$$\frac{1}{\sqrt{2}}c(ud-du)\chi_{MA} \to \frac{1}{\sqrt{2}}\bar{K}^0(u\bar{q}_iq_i(ud-du))\chi_{MA}$$
$$= \frac{1}{\sqrt{2}}\bar{K}^0\left\{\left(\frac{\pi^0}{\sqrt{2}}+\frac{\eta}{\sqrt{3}}\right)u(ud-du)+\pi^+d(ud-du)\right.$$
$$\left.+K^+s(ud-du)\right\}\chi_{MA}$$
$$= \frac{\bar{K}^0}{\sqrt{2}}\left\{\left(\frac{\pi^0}{\sqrt{2}}+\frac{\eta}{\sqrt{3}}\right)p+\pi^+n-\sqrt{\frac{2}{3}}K^+\Lambda\right\}\chi_{MA},$$

☐ The internal emission amplitudes

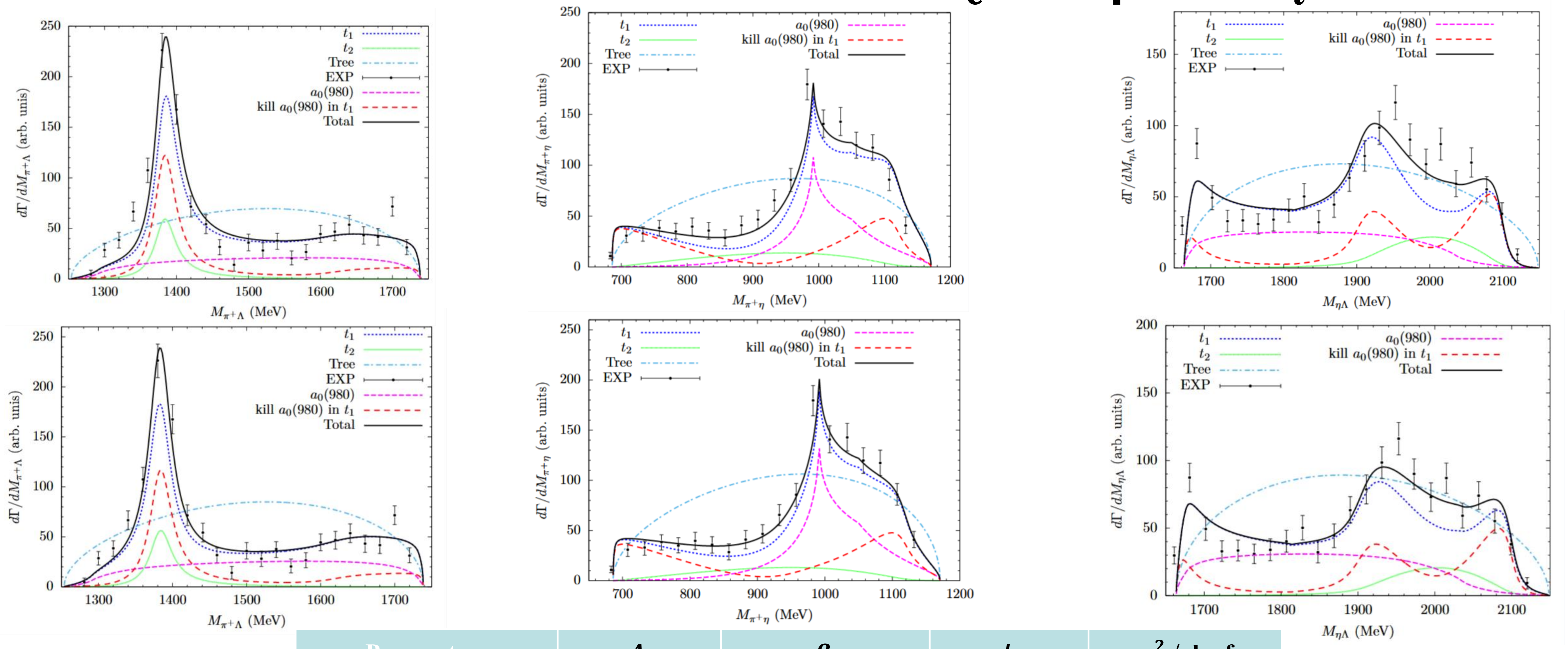
$$t^{\rm ie} = \gamma h_{\bar{K}^0K^+\Lambda}G_{\bar{K}^0K^+}(M_{\rm inv}(\pi^+\eta))t_{\bar{K}^0K^+,\pi^+\eta}(M_{\rm inv}(\pi^+\eta)),$$

$$\gamma = -\frac{1}{3}$$

$$h_{\bar{K}^0K^+\Lambda} = -\frac{1}{\sqrt{3}},$$

Results

□ The invariant mass distributions of the $\Lambda_c^+ \to \Lambda\eta\pi^+$ decay



Parameters	A	β	ϕ	χ^2 / d.o.f
Value	0.33	0.12		2.58
	0.365	0.11	0.34π	1.69

Summary

郑州大学 ZHENGZHOU UNIVERSITY

- The consideration of the $a_0(980)$ and $\Lambda(1670)$ as **dynamically generated** has allowed us to find a reasonable description of the invariant mass distributions for the $\Lambda_c^+ \to \eta\pi^+\Lambda$.
- While **the spin flip part** of the $\Sigma(1385)$ contribution appears with a strength of $1/4$ with respect to **the non spin flip part** in the mass distributions, the different dependence on the invariant masses of these two terms, **makes them to show up with different shapes** in the mass distributions.

Thank you very much!