Chi0BB1

1. 对于$\chi_{cJ} \rightarrow \Lambda\Lambda$ 和$\chi_{cJ} \rightarrow \Lambda(1520)\Lambda(1520)$

把$\Lambda(1520)$的质量安到Λ上 ，可以运行

把Λ的质量安到$\Lambda(1520)$上，不能运行

2.对于$\chi_{cJ} \rightarrow \Xi^{*0}\bar{\Xi}^{*0}$，不能运行

```
EvtGen:Given allowed decays, resetting minMass anti-Sigma_c*--
EvtGen:Done initializing EvtGen
EvtGen:In readDecayFile, reading:chic0.dec
EvtGen:Redefined decay of psi(2S)
EvtGen:Redefined decay of chi_c0
EvtGen:Chi0BB1 did not get the correct daughter spin d=0
chi_c0 -> Xi*0 anti-Xi*0  (Chi0BB1):
EvtGen:Will terminate execution!
Abort (core dumped)
[liulu_6.6.4.p03@lxslc711 09sigmc]$
```

4.24 Chi0BB1

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Usage:
BrFr baryon antibaryon Chi0BB1;

Explanation:

This model is constructed for a scalar decays into a octet baryon plus a octet antibaryon, e.g. $\chi_{c0} \rightarrow \Lambda\bar{\Lambda}$.

Example:

Decay chi_c0
1.000 Lambda0 anti-Lambda0 Chi0BB1;
Enddecay

Notes:

Helicity amplitude used.

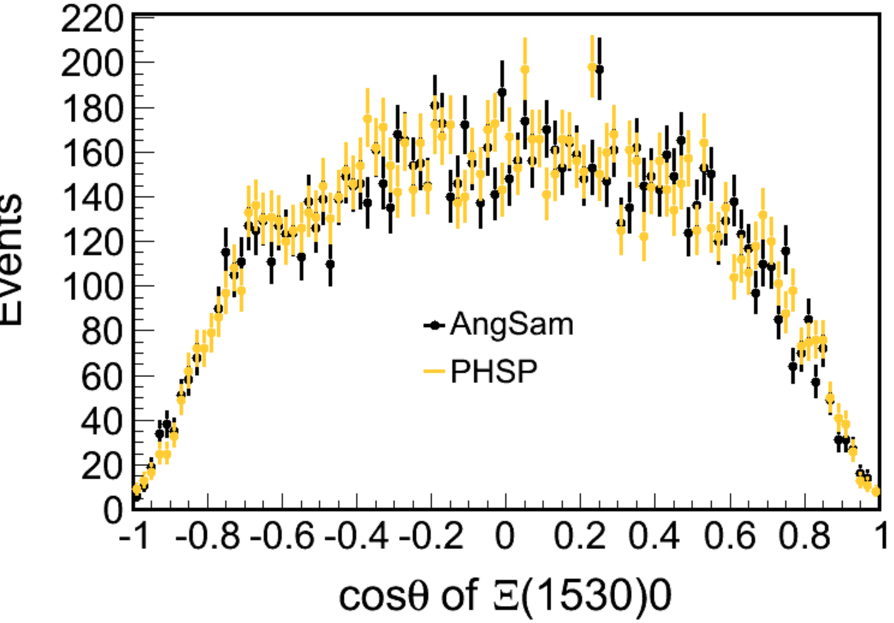
ksai Casca

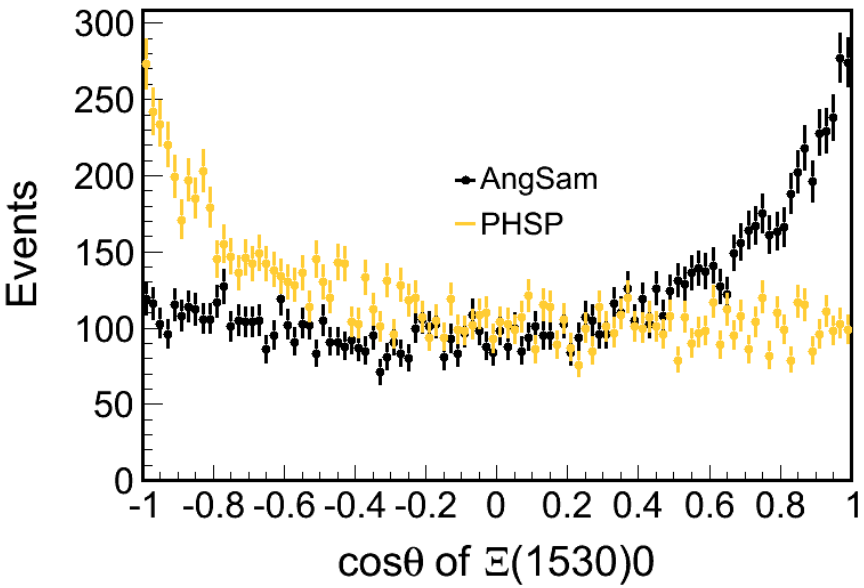
$$\psi(2S) \rightarrow \gamma\chi_{cJ} \rightarrow \gamma\bar{\Xi}^{+}\Xi^{-} \rightarrow \gamma\bar{\Lambda}\pi^{+}\Lambda\pi^{-} \rightarrow \gamma p\bar{p}\pi^{+}\pi^{-}\pi^{+}\pi^{-}$$

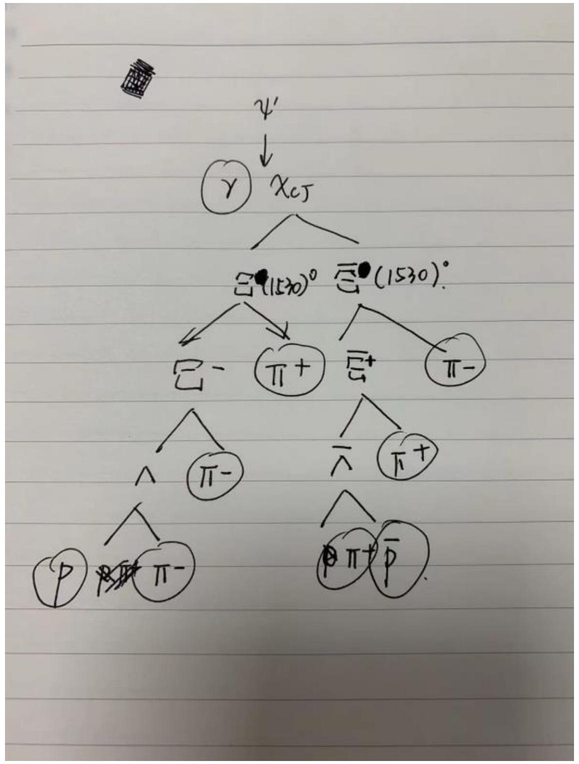
χ_{c0}	PHSP	AngSam	ChiJBB1
Sample sets	100000	100000	100000
After initial selection	9265	9366	9488

χ_{c0}	PHSP	AngSam
Sample sets	10700*5	10700*5
After initial selection	10540	10455

χ_{c2}	PHSP	AngSam
Sample sets	10700*5	10700*5
After initial selection	12043	11902







million $\psi(2S)$ inclusive MC events are used to study the possible peaking backgrounds.

This analysis is performed under the framework of BESIII Offline Software System (BOSS) which is developed from Gaudi, and the BOSS version is 6.6.4.p03.

To determine the detection efficiency, 100,000 MC events are generated for each decay mode. The decay of $\psi(2S) \to \gamma\chi_{cJ}$ (P2GCJ) is generated with the E1 transition assumption [24], where the polar angle θ of radiation photon is distributed according to $1+\alpha \cdot cos^2\theta$, and α equals to 1, -1/3, 1/13 for χ_{c0}, χ_{c1} and χ_{c2} respectively. The decay $\chi_{cJ} \to \Xi^-\bar{\Xi}^+$ and $\Xi^0\bar{\Xi}^0$ are generated with the Chi$J$BB1 model [25] with the helicity angle of Ξ satisfying $1+\alpha \cdot cos^2\theta$. The cascade decay of Ξ is simulated inclusively to all possible final states according to PDG [22] by PHSP model as shown in table 3. To obtained the efficiency correction for angular distribution measurement, 100,000 MC events are generated by pure PHSP mode to study the $cos\theta$ dependent MC efficiency.

Table 3: Decay card.

$\psi(2S) \to \gamma\chi_{cJ}$	P2GCJ [25]
$\chi_{cJ} \to \Xi\bar{\Xi}$	Chi$J$BB1 [25]
$\Xi(\bar{\Xi}) \to anything$	PHSP

Table 1: The measured branching fractions $\mathcal{B}$ and decay parameters α for the $\chi_{cJ} \to \Xi^-\bar{\Xi}^+$ and $\chi_{cJ} \to \Xi^0\bar{\Xi}^0$ processes, where $N_{\rm obs}$ is the number of signal events, ϵ is the detection efficiency and $\mathcal{R}$ is the ratio between the branching fractions of the $\chi_{cJ} \to \Xi^-\bar{\Xi}^+$ and $\chi_{cJ} \to \Xi^0\bar{\Xi}^0$ processes. The first uncertainty is statistical and the second is systematic. Systematic uncertainties arising from the same source cancel when calculating the ratio $\mathcal{R}$.

Channel		$N_{\rm obs}$	ϵ (%)	α	$\mathcal{B}$ ($\times 10^{-4}$)	$\mathcal{R}$
$\chi_{c0} \to$	$\Xi^-\bar{\Xi}^+$	4932 ± 92	25.4	$0.09 \pm 0.11 \pm 0.17$	$4.43 \pm 0.08 \pm 0.18$	$0.95 \pm 0.04 \pm 0.05$
	$\Xi^0\bar{\Xi}^0$	1741 ± 71	8.5	$-0.23 \pm 0.19 \pm 0.36$	$4.67 \pm 0.19 \pm 0.24$	
$\chi_{c1} \to$	$\Xi^-\bar{\Xi}^+$	692 ± 44	27.3	$-0.52 \pm 0.29 \pm 0.48$	$0.58 \pm 0.04 \pm 0.04$	$0.77 \pm 0.12 \pm 0.07$
	$\Xi^0\bar{\Xi}^0$	325 ± 49	9.9	$-0.54 \pm 0.52 \pm 0.43$	$0.75 \pm 0.11 \pm 0.05$	
$\chi_{c2} \to$	$\Xi^-\bar{\Xi}^+$	1691 ± 66	27.6	$-0.34 \pm 0.18 \pm 0.30$	$1.44 \pm 0.06 \pm 0.10$	$0.79 \pm 0.07 \pm 0.08$
	$\Xi^0\bar{\Xi}^0$	804 ± 67	10.3	$-0.65 \pm 0.31 \pm 0.22$	$1.83 \pm 0.15 \pm 0.14$	

3. Event Selection

Since the full reconstruction method suffers from low selection efficiency, a partial reconstruction technique [19, 32, 33] is used in this analysis. The radiative photon from the decay $\psi(3686) \to \gamma\chi_{cJ}$ is reconstructed to infer the presence of a χ_{cJ} meson. The Ξ^- (Ξ^0) baryon is reconstructed by the decay to $\Lambda\pi^-$ ($\Lambda\pi^0$) with the subsequent decay $\Lambda \to p\pi^-$ ($\pi^0 \to \gamma\gamma$), and the presence of the anti-baryon $\bar{\Xi}^+$ ($\bar{\Xi}^0$) is inferred from the invariant mass of the system recoiling against the