Extracting the femtometer structure of strange baryons using the vacuum polarization effect

The BESIII Collaboration*

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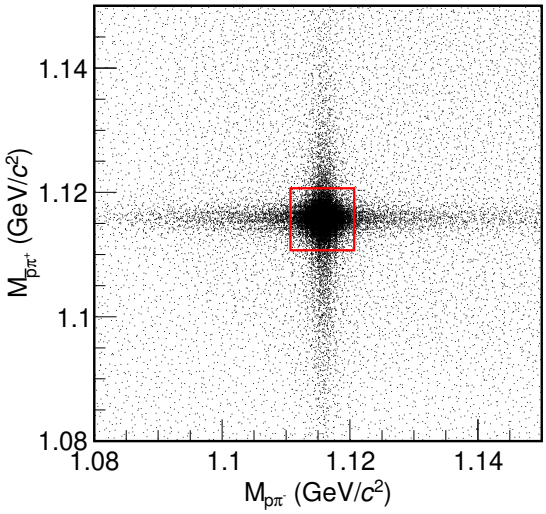
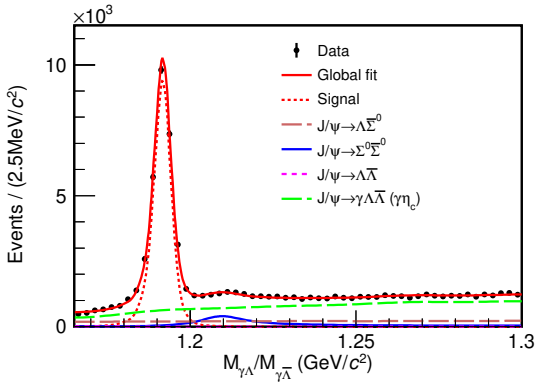
Supplementary Information

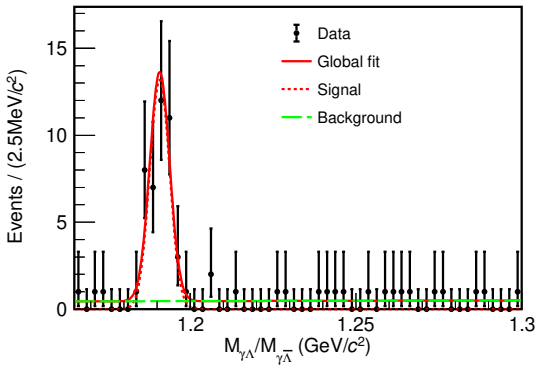
Figures and Tables used in paper are listed accordingly.



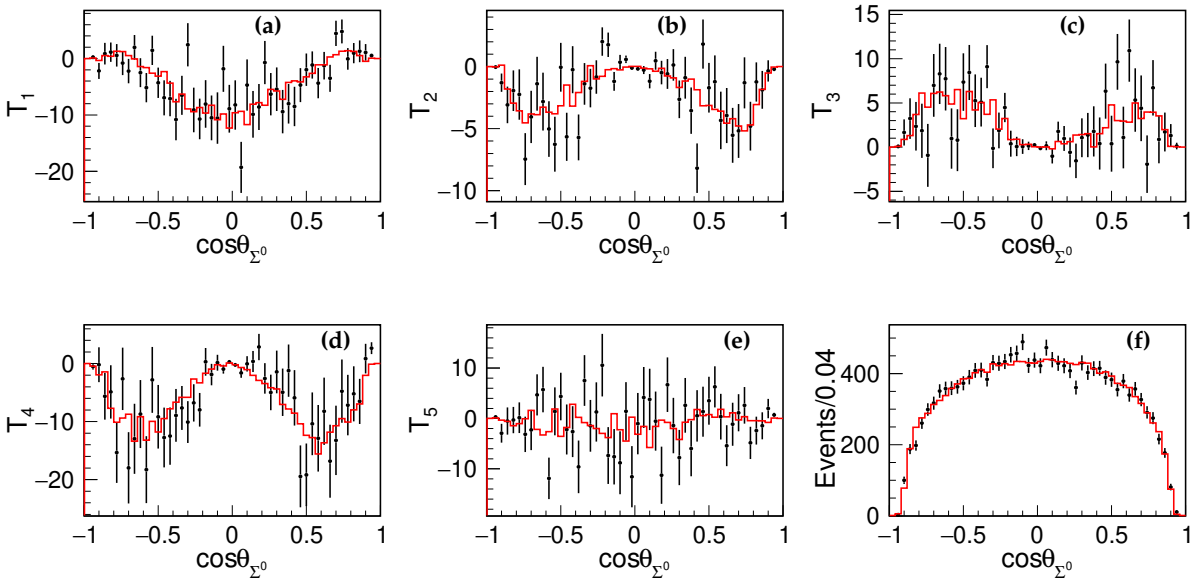
Supplementary Fig. 1 | Distribution of $M_{p\pi^-}$ versus $M_{\bar{p}\pi^+}$ of the accepted candidates from data. The red box denotes the signal region. The clusters of Λ and $\bar{\Lambda}$ are clearly observed.



Supplementary Fig. 2 | Fit to the $M_{\gamma\Lambda}/M_{\gamma\bar{\Lambda}}$ distribution of the accepted candidates from J/ψ data. The black points with error bars are data, the red curve is the global fit, the red dotted curve is the $\Sigma^0/\bar{\Sigma}^0$ signal, the brown long-dashed curve shows the background from the conjugate channel, the blue curve is from $J/\psi \to \Sigma^0\bar{\Sigma}^0$, the pink dotted curve is from $J/\psi \to \Lambda\bar{\Lambda}$ and the green long-dashed curve is from $J/\psi \to \gamma\Lambda\bar{\Lambda}(\gamma\eta_c)$.



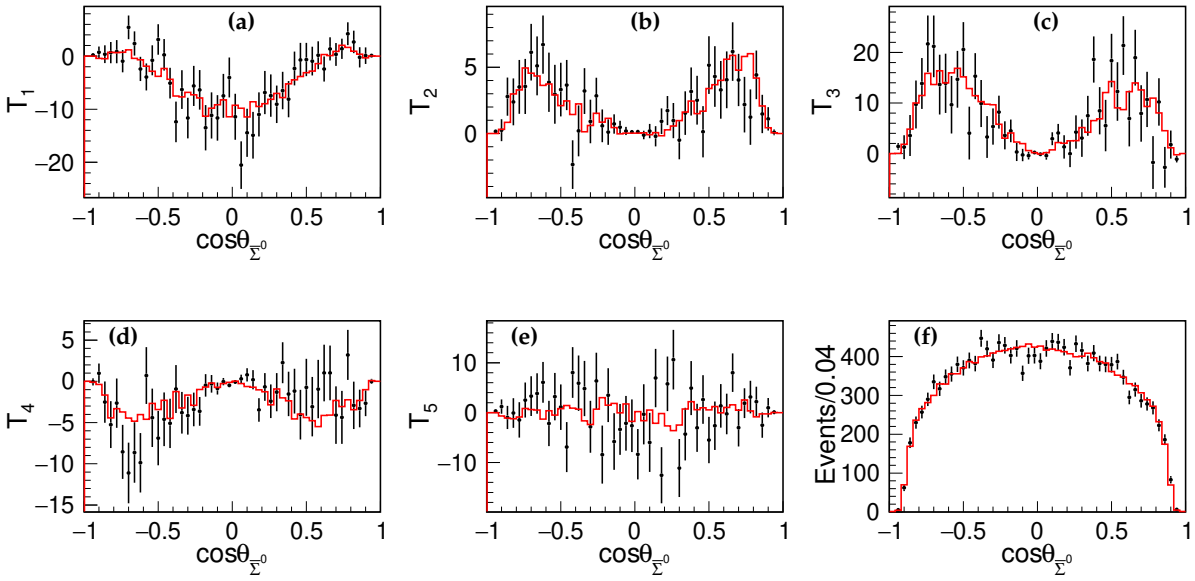
Supplementary Fig. 3 | Fit to the $M_{\gamma\Lambda}/M_{\gamma\bar{\Lambda}}$ distribution from the QED background. The black points with error bars are data, the red curve is the global fit, the red dotted curve is the signal shape described by a Breit-Wigner shape convolved with a Gaussian function and the green long-dashed curve is from the background described with a first-order Chebychev function.



Supplementary Fig. 4 | Fit results compared with data of $e^+e^- \to J/\psi \to \bar{\Lambda}(\to \bar{p}\pi^+)\,\Sigma^0(\to \gamma\Lambda)$ process. (a)-(e) are the moments T_1-T_5 respectively and (f) is the Σ^0 angular distribution. The black points with error bars are data and the red curve is the global fit.

Supplementary Table 1 | Systematic uncertainties for the parameters measurement.

Source	$\alpha_{J/\psi}$	$\Delta\Phi_{\bar{\Lambda}\Sigma^0}$ (rad)	$\Delta\Phi_{\Lambda\bar{\Sigma}^0}$ (rad)
$\Lambda/\bar{\Lambda}$ reconstruction	0.0047	0.0038	0.0036
Kinematic fit	0.0010	0.0040	0.0049
Background estimate	0.0083	0.0065	0.0070
$\alpha_{\Lambda/\bar{\Lambda}}$	0.0000	0.0050	0.0019
Total	0.014	0.010	0.010



Supplementary Fig. 5 | Fit results compared with data of $e^+e^- \to J/\psi \to \Lambda(\to p\pi^-)\,\bar{\Sigma}^0(\to \gamma\bar{\Lambda})$ process. (a)-(e) is the moments T_1-T_5 respectively and (f) is the $\bar{\Sigma}^0$ angular distribution. The black points with error bars are data and the red curve is the global fit

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