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(poster-only) Helicity amplitude and branching fraction measurement of $\chi_{cJ} \to \Lambda\bar{\Lambda}$

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We present a comprehensive partial wave analysis of $\psi(3686) \to \gamma\chi_{cJ} \to \gamma\Lambda\bar{\Lambda}$ decays ($J = 0, 1, 2$) using 2712.4 ± 14.3 million $\psi(3686)$ events collected by the BESIII experiment. This analysis provides the first determination of the helicity amplitude ratio for $\chi_{c2} \to \Lambda\bar{\Lambda}$ decay, yielding $R_{\chi_{c2}} = 0.575 \pm 0.048 \pm 0.018$ with relative phase angle $\Delta\Phi_{\chi_{c2}} = 0.37 \pm 0.15 \pm 0.05$ rad. The angular distribution parameters are measured as $\alpha_{\chi_{c2}} = -0.211 \pm 0.100 \pm 0.050$ and $\beta_{\chi_{c2}} = -0.039 \pm 0.089 \pm 0.033$, based on the distribution $\frac{dN}{d\cos\theta} = 1 + \alpha_{\chi_{c2}}\cos^2\theta + \beta_{\chi_{c2}}\cos^4\theta$. In our partial wave analysis, we have incorporated detector resolution effects in the invariant mass spectrum of χ_{cJ} states, and extracted the width of χ_{c0} as $12.31 \pm 0.26 \pm 0.12$ MeV. Additionally, we report precise branching fraction measurements: $\mathcal{B}(\chi_{c0} \to \Lambda\bar{\Lambda}) = (3.662 \pm 0.048 \pm 0.111) \times 10^{-4}$, $\mathcal{B}(\chi_{c1} \to \Lambda\bar{\Lambda}) = (1.182 \pm 0.026 \pm 0.042) \times 10^{-4}$, and $\mathcal{B}(\chi_{c2} \to \Lambda\bar{\Lambda}) = (1.704 \pm 0.035 \pm 0.057) \times 10^{-4}$, where uncertainties are statistical and systematic, respectively. These results provide crucial insights into the helicity selection rule violations in P-wave charmonium states decays.

Primary author: ZHAO, Ruoping (University of Chinese Academy of Sciences)

Presenter: ZHAO, Ruoping (University of Chinese Academy of Sciences)

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