Quantum numbers of the $X(3872)$ state and orbital angular momentum in its $\rho^0 J/\psi$ decay

The LHCb collaboration
Figure 1: Distribution of $M(J/\psi\pi^+\pi^- K^\pm)$ for $B^+ \to X(3872)K^+$, $X(3872) \to \pi^+\pi^- J/\psi$ candidates with the $M(J/\psi\pi^+\pi^-)$ mass within $\pm 2.5 \sigma_M$ of the $X(3872)$ mass peak (points with error bars). The vertical bars illustrate the range used in the angular analysis. The fit of $B^+$ signal over a smooth background is also shown (blue solid line).
Figure 2: Background-subtracted distribution of $M(\pi^+\pi^-)$ for $B^+ \rightarrow X(3872)K^+$, $X(3872) \rightarrow \pi^+\pi^-J/\psi$ candidates for the data (points with error bars) and for the $X(3872) \rightarrow \rho(770)J/\psi$, $\rho(770) \rightarrow \pi^+\pi^-$ simulation (histogram).
Figure 3: Background-subtracted distribution of all angles for the data (points with error bars) and for the $1^{++}$ fit projections (histograms).
Figure 4: Background-subtracted distribution of $\cos\theta_X$ for all signal candidates for the data (points with error bars) compared to the expected distributions for various $X(3872)$ $J^{PC}$ assignments (solid histograms) with the $B_{LS}$ amplitudes obtained by the fit to the data in the five-dimensional angular space. Compare to Fig. 4 in the paper.