Supplementary material for LHCb-PAPER-2019-002

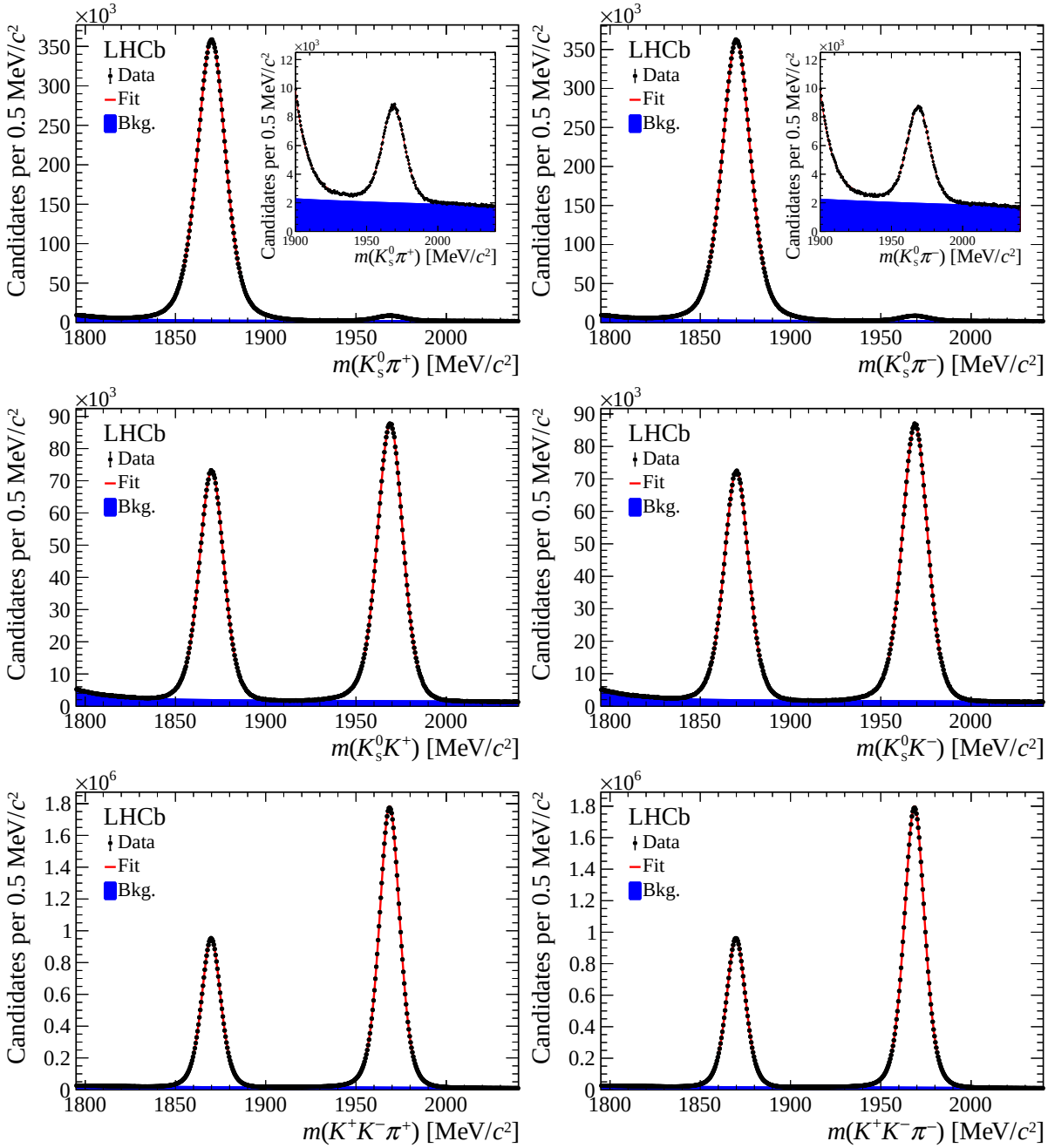

Figure 3: Distributions of the (top) $K^0_S\pi^+$, (middle) $K^0_SK^+$ and (bottom) $\phi\pi^+$ mass for (left) $D^+_{(s)}$ and (right) $D^-_{(s)}$ candidates, with fit projections overlaid. The insets in the top plots show the mass distributions zoomed around the $D^+_s \to K^0_S\pi^+$ signal region.

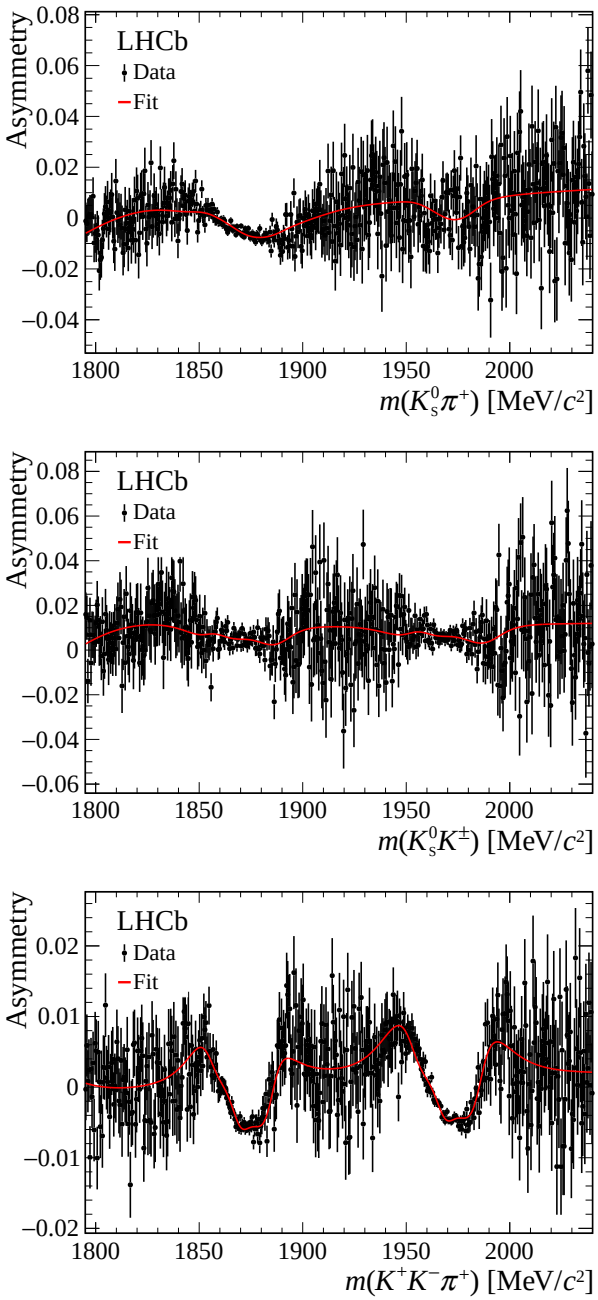

Figure 4: Distributions of the raw asymmetry as a function of the (top) $K^0_S\pi^+$, (middle) $K^0_S K^+$ and (bottom) $\phi\pi^+$ mass for $D^+_{(s)}$ candidates, with fit projections overlaid. The variation of the raw asymmetry follows the relative proportions between signal, control and background decays as a function of mass and reflects the differences between the mass shapes of $D^+_{(s)}$ and $D^-_{(s)}$ candidates.

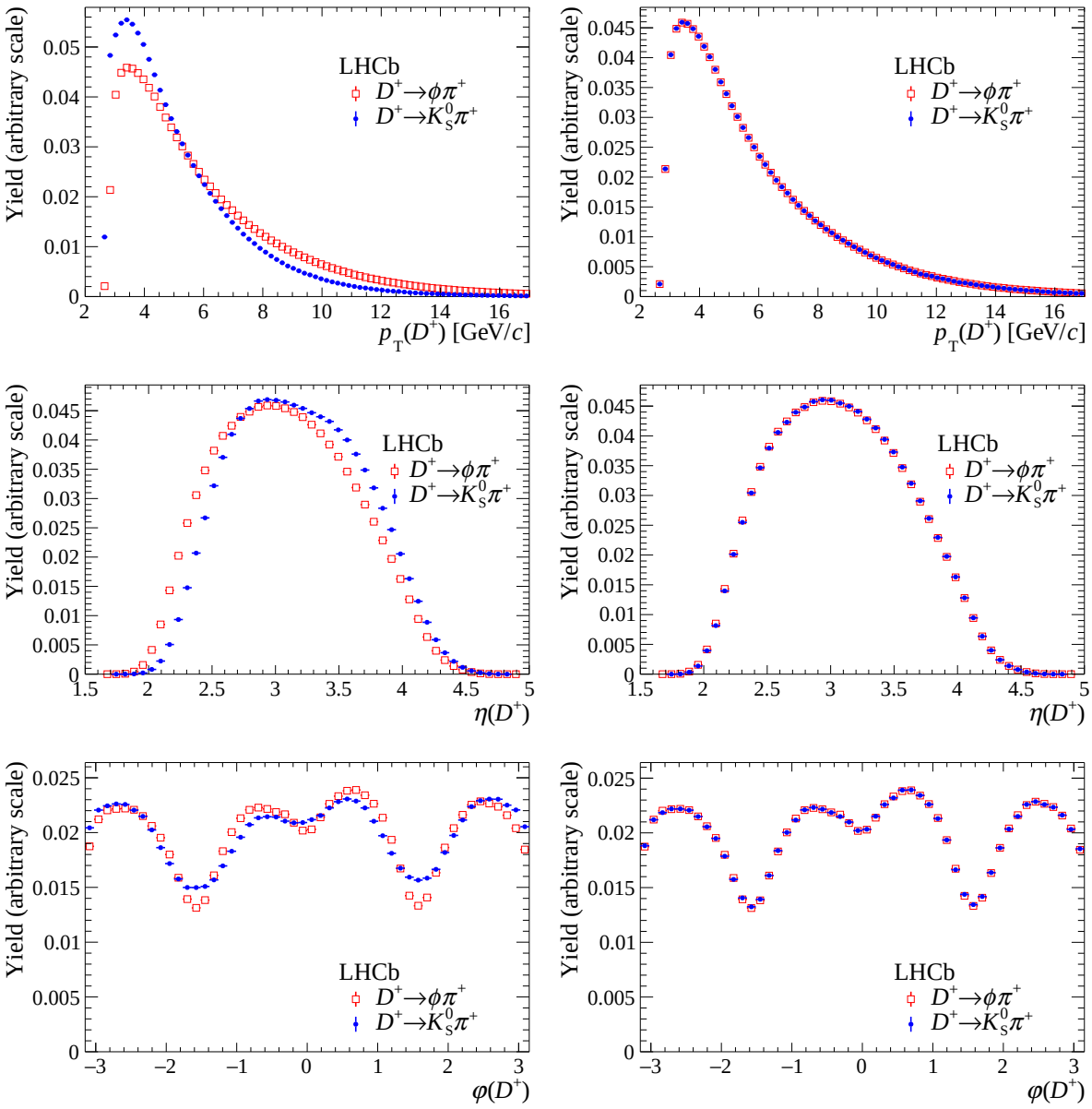

Figure 5: Comparison between normalized and background-subtracted distributions of (top) transverse momentum, (middle) pseudorapidity and (bottom) azimuthal angle for D^+ candidates from the $D^+ \to \phi\pi^+$ and $D^+ \to K^0_S\pi^+$ samples, (left) before and (right) after the kinematic weighting targeting the measurement of $\mathcal{A}_{CP}(D^+ \to \phi\pi^+)$. Only magnet-down 2016 data are shown.

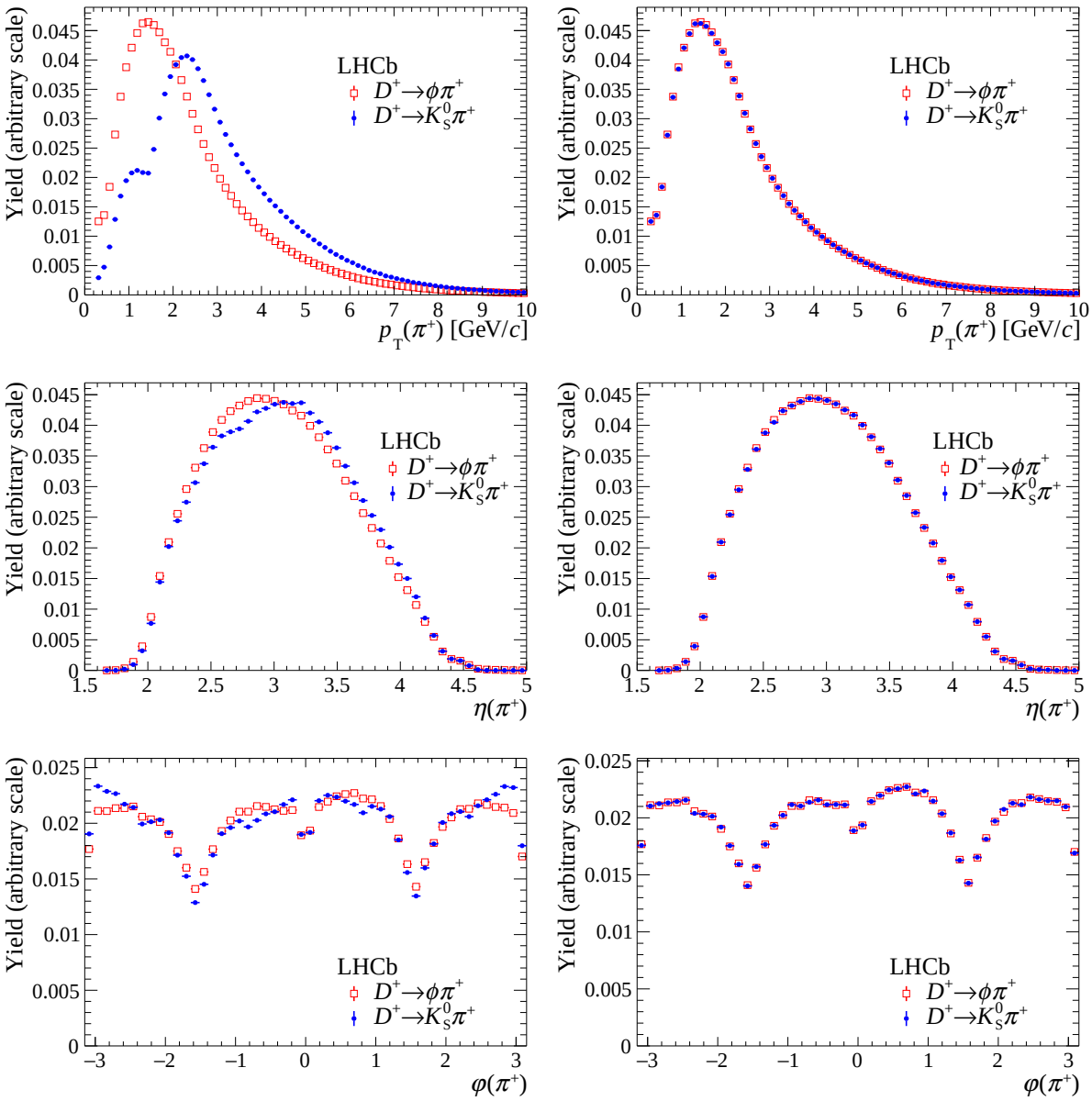

Figure 6: Comparison between normalized and background-subtracted distributions of (top) transverse momentum, (middle) pseudorapidity and (bottom) azimuthal angle for the companion pion candidates from the $D^+ \to \phi\pi^+$ and $D^+ \to K^0_S\pi^+$ samples, (left) before and (right) after the kinematic weighting targeting the measurement of $\mathcal{A}_{CP}(D^+ \to \phi\pi^+)$. Only magnet-down 2016 data are shown.

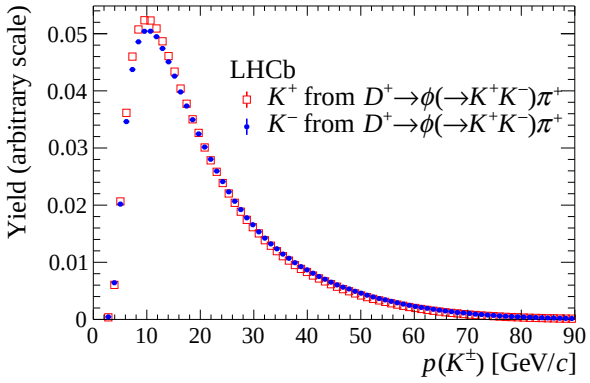

Figure 7: Comparison between normalized and background-subtracted distributions of the kaon momentum for the kaon with same and opposite charge as the D^+ candidate for the $D^+ \to \phi\pi^+$ sample. Only magnet-down 2016 data are shown.

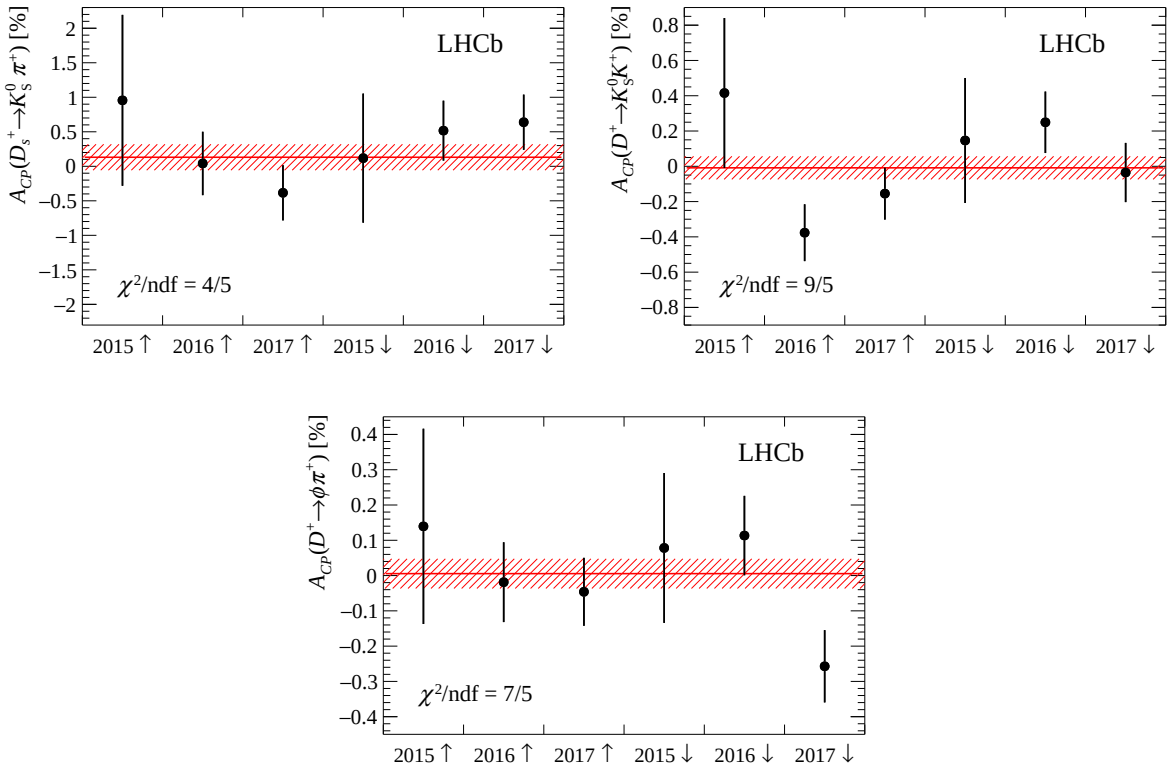

Figure 8: Comparison between $\mathcal{A}_{CP}$ results in different data-taking years and magnet polarities. The uncertainties are statistical only. The red band corresponds to the result obtained from the integrated sample.