Supplemental material for LHCb-PAPER-2016-022

Diagrams of the processes

The main leading order diagrams contributing to the phase space of the B_c^+ decays to the $K^+K^-\pi^+$ final state are shown in Fig. 1.

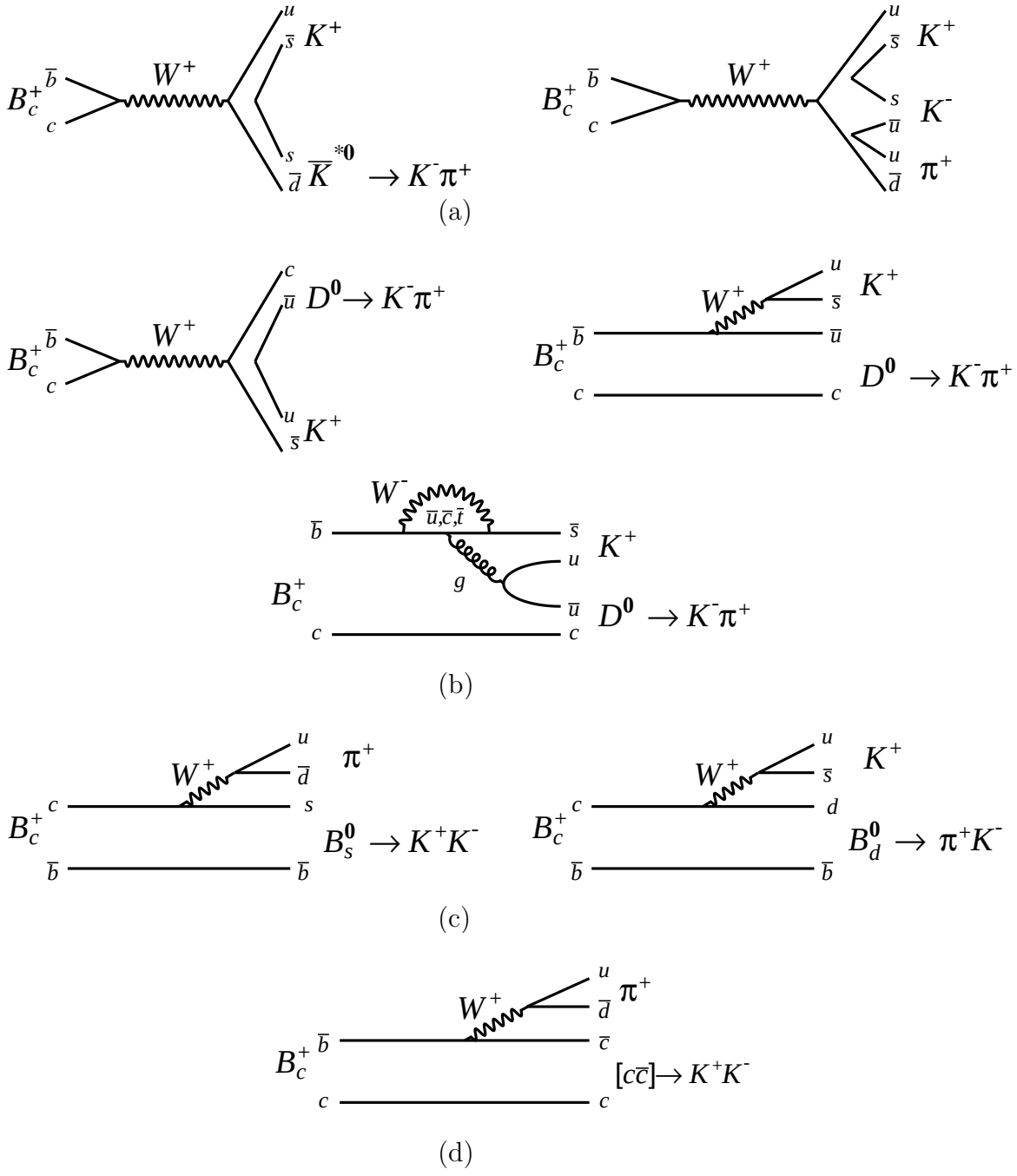

Figure 1: Different processes populating the phase space of the $B_c^+ \to K^+K^-\pi^+$ decay: (a) pure annihilation, (b) $B_c^+ \to D^0(\to K^-\pi^+)K^+$, (c) $B_c^+ \to B_s^0(\to K^+K^-)\pi^+$, $B^0(\to \pi^+K^-)K^+$ and (d) charmonium $B_c^+ \to [c\bar{c}](\to K^-K^+)\pi^+$ mode.

Fits to the regions $B_c^+ \to D^0(\to K^-\pi^+)K^+$ and $B_c^+ \to B_s^0(\to K^+K^-)\pi^+$

The results of the simultaneous fits for $B_c^+ \to D^0(\to K^-\pi^+)K^+$ and $B_c^+ \to B_s^0(\to K^+K^-)\pi^+$ are shown in Fig. 2.

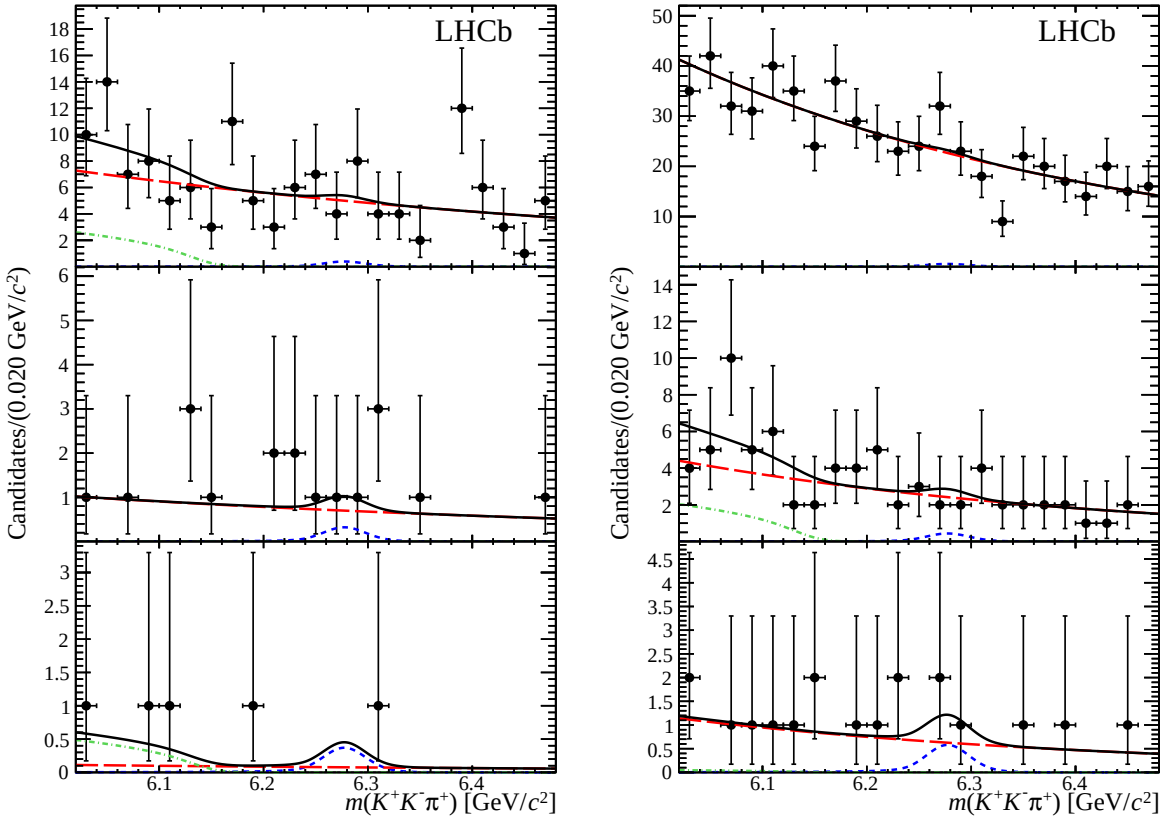

Figure 2: Projection of the fit to the to the $K^+K^-\pi^+$ invariant mass for the (left) $D^0 \to K^-\pi^+$ and (right) $B_s^0 \to K^+K^-$ regions, in the bins of BDT output (top) $0.04 < \mathcal{O}_{\rm BDT} < 0.12$, (middle) $0.12 < \mathcal{O}_{\rm BDT} < 0.18$ and (bottom) $\mathcal{O}_{\rm BDT} > 0.18$. The contributions are indicated according to the same scheme as in the first figure of the article.

p-value scans

The p-value scans for the different $R \equiv \frac{\sigma(B_c^+)}{\sigma(B^+)} \times \mathcal{B}$ measurements are shown in Figs. 3 and 4.

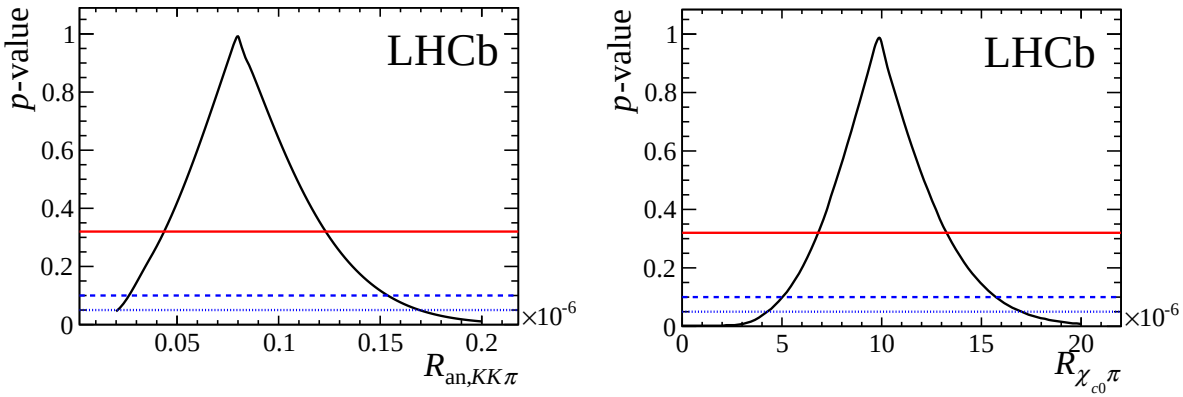

Figure 3: The p-value associated to the profile likelihoods as a function of the observables for (left) annihilation signal and (right) $B_c^+ \to \chi_{c0}\pi^+$. The horizontal solid red, dashed blue and dotted blue lines represented the values 32%, 10% and 5% defining the 68%, 90% and 95% confidence intervals, respectively.

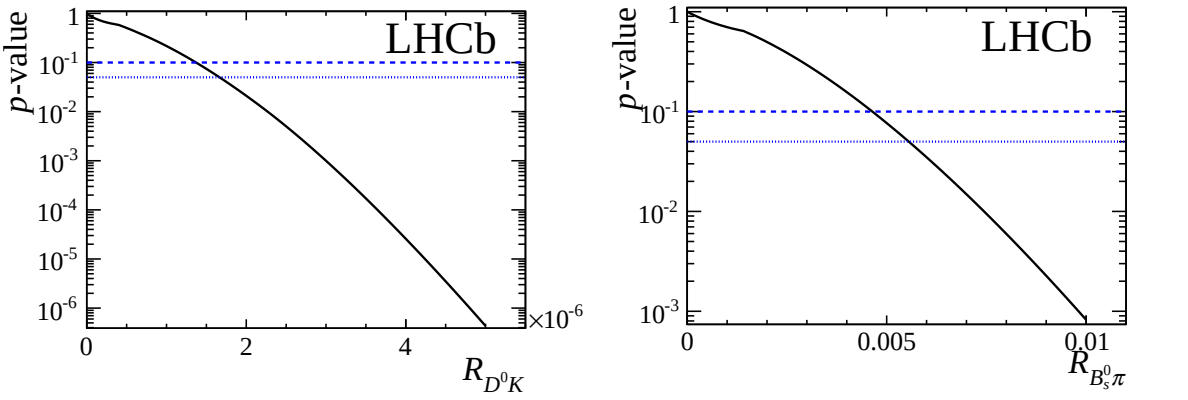

Figure 4: The p-value associated to the profile likelihoods as a function of the observables for (left) $B_c^+ \to D^0 K^+$ and (right) $B_c^+ \to B_s^0 \pi^+$. The horizontal dashed blue and dotted blue lines represented the values 10% and 5% defining the 90% and 95% confidence limits, respectively.