

Supplemental material for LHCb-PAPER-2017-049

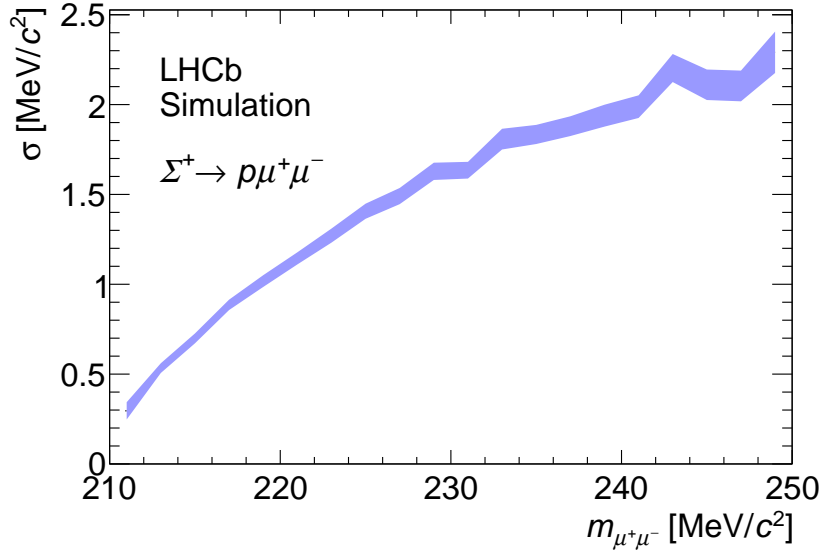


Figure 4: Resolution on the dimuon invariant mass $m_{\mu^+\mu^-}$ as a function of $m_{\mu^+\mu^-}$ for simulated $\Sigma^+ \rightarrow p\mu^+\mu^-$ decays in LHCb. The band represents the uncertainty on the resolution.

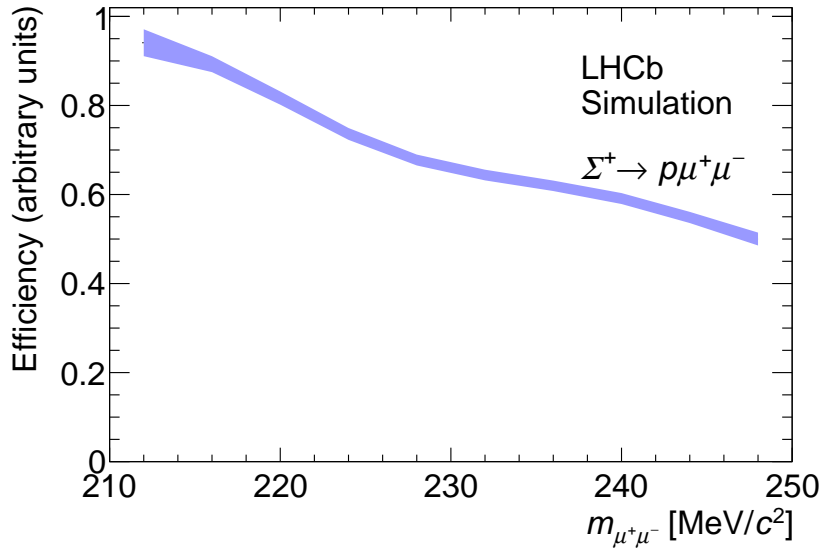


Figure 5: Efficiency as a function of the dimuon invariant mass $m_{\mu^+\mu^-}$ for simulated $\Sigma^+ \rightarrow p\mu^+\mu^-$ decays in LHCb. The band represents the uncertainty on the efficiency.

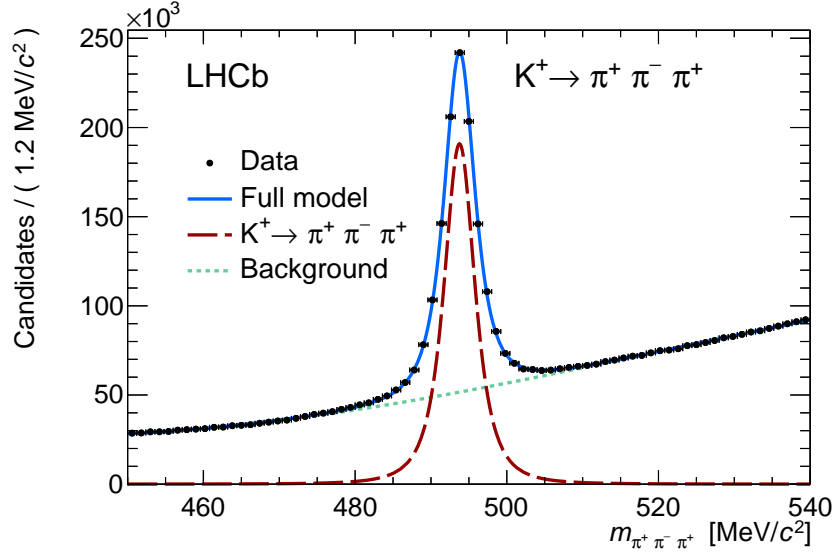


Figure 6: Invariant mass distribution of $K^+ \rightarrow \pi^+ \pi^- \pi^+$ candidates superimposed with the fit to data.

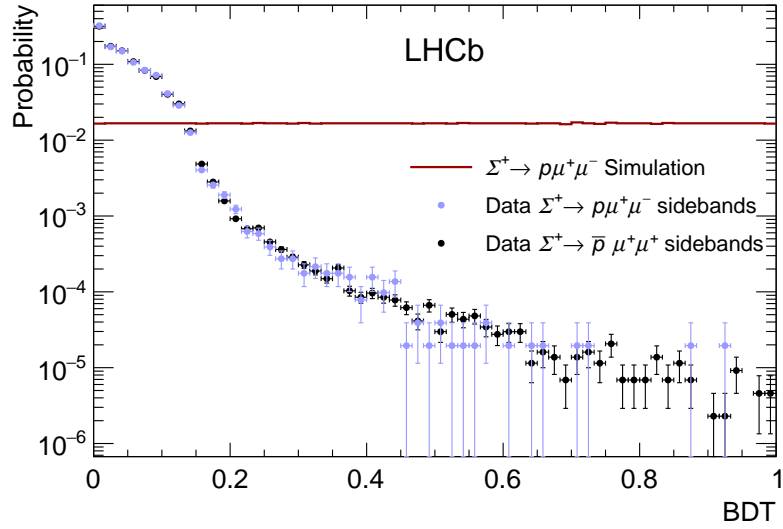


Figure 7: Distribution of the BDT output variable for simulated $\Sigma^+ \rightarrow \rho \mu^+ \mu^-$ signal events and data candidates from the sidebands of the $\Sigma^+ \rightarrow \rho \mu^+ \mu^-$ and $\Sigma^+ \rightarrow \bar{\rho} \mu^+ \mu^+$ selections.

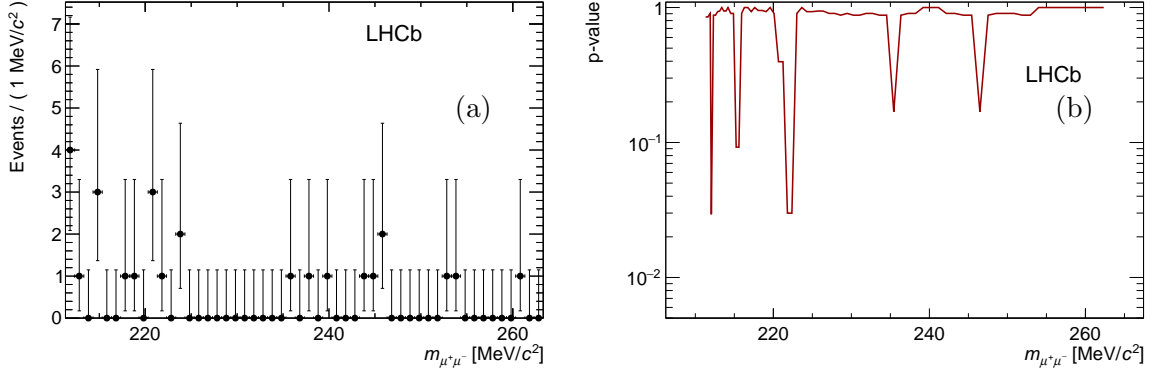


Figure 8: (a) Distribution of the dimuon invariant mass for events within two times the resolution in the $p\mu^+\mu^-$ invariant mass around the known Σ^+ mass. (b) Local p-value of the background-only hypothesis as a function of the dimuon invariant mass as obtained from this dataset (see text). No significant signal is found, and the minimum local p-value is for $m_{p\mu^+\mu^-} = 212.1 \text{ MeV}/c^2$.

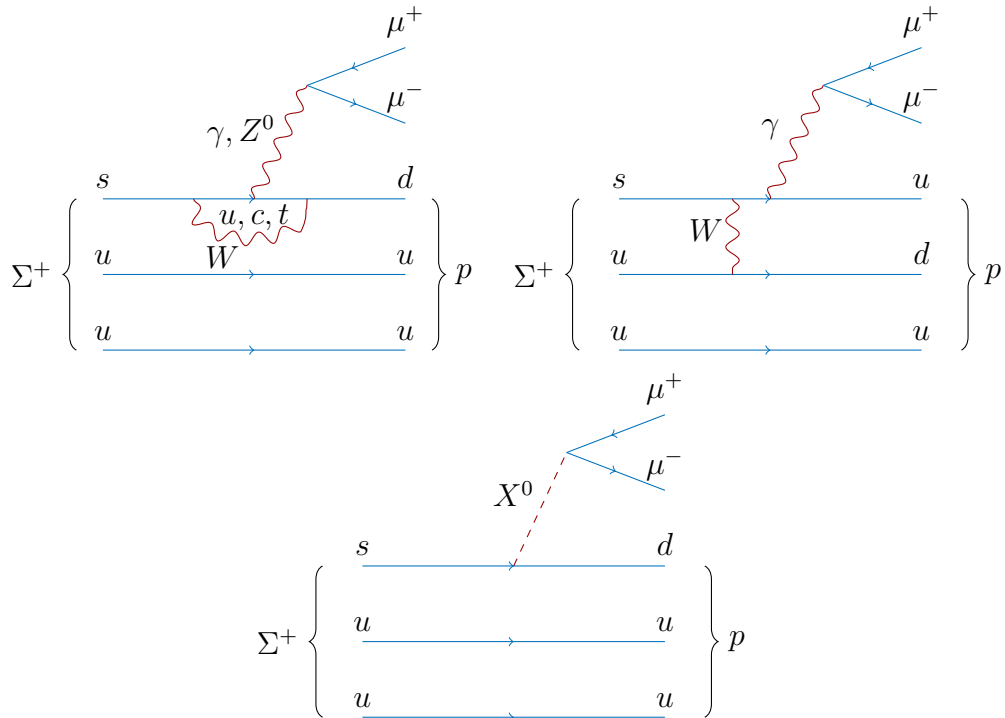


Figure 9: Example of Feynman diagrams for (a) the SM short distance contribution, (b) the SM long distance contribution, and (c) a possible NP contribution to the $\Sigma^+ \rightarrow p\mu^+\mu^-$ decay.