

# 1 Supplementary material for LHCb-PAPER-2019-040

This appendix contains supplementary material that will be posted on the public CDS record but will not appear in the paper.

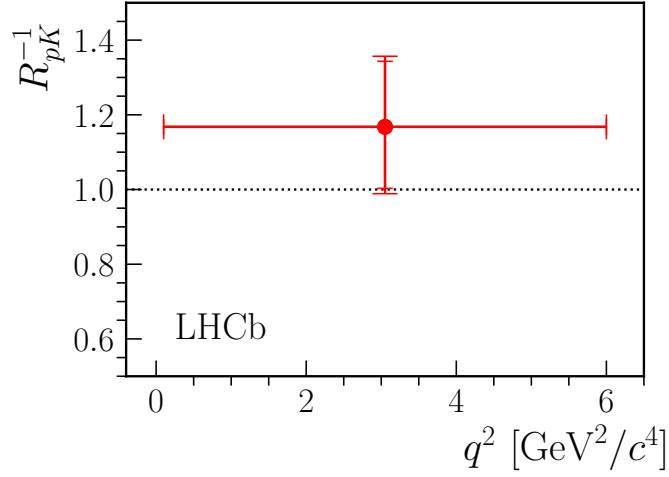


Figure 1: Measured value of  $R_{pK}^{-1}$  in the range  $0.1 < q^2 < 6$  GeV<sup>2</sup>/c<sup>4</sup> and  $m(pK^-) < 2600$  MeV/c<sup>2</sup> (red point), including statistical and systematic uncertainties, compared to unity (dashed line).

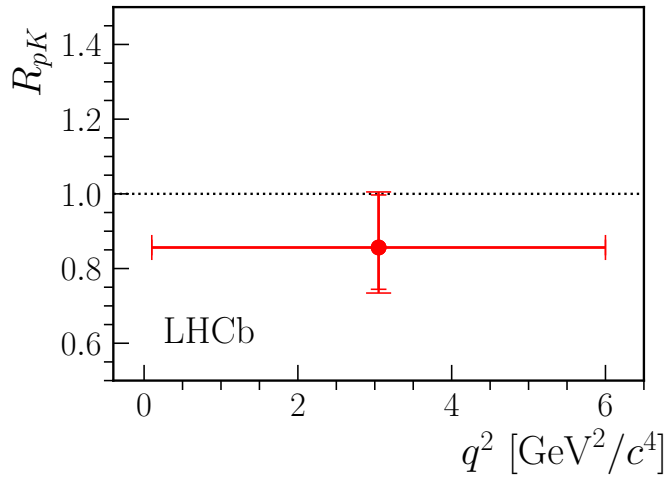
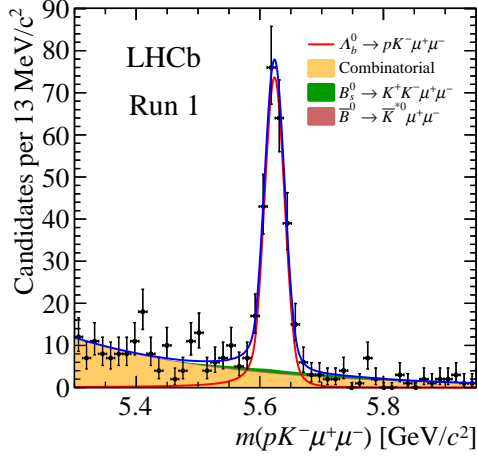
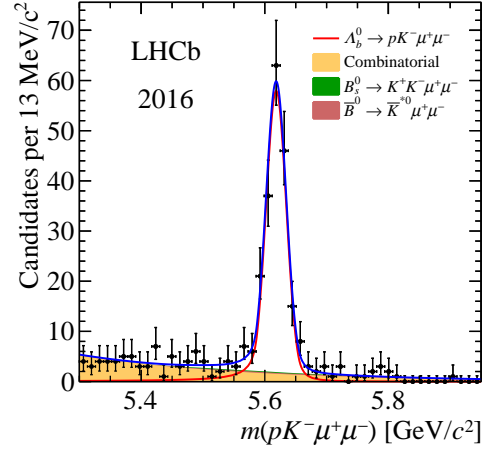


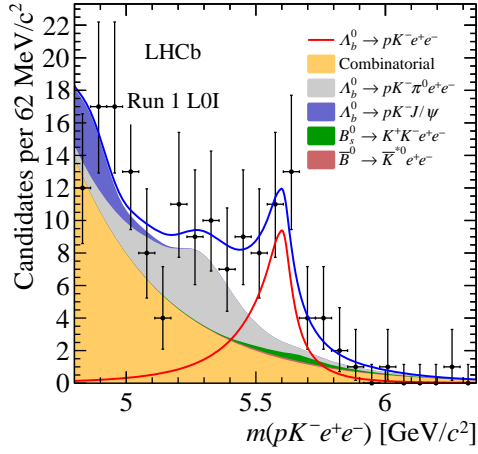
Figure 2: Measured value of  $R_{pK}$  in the range  $0.1 < q^2 < 6$  GeV<sup>2</sup>/c<sup>4</sup> and  $m(pK^-) < 2600$  MeV/c<sup>2</sup> (red point), including statistical and systematic uncertainties, compared to unity (dashed line).



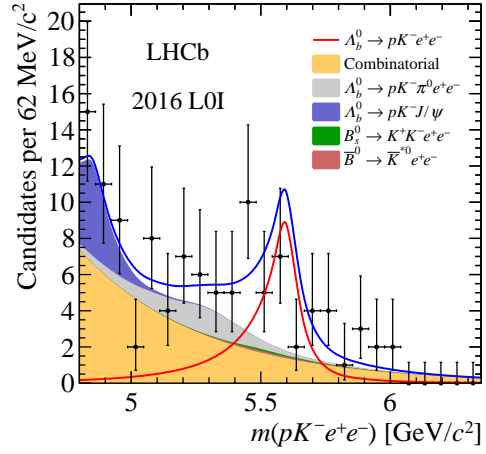
(a)  $\Lambda_b^0 \rightarrow pK^- \mu^+ \mu^-$  Run 1



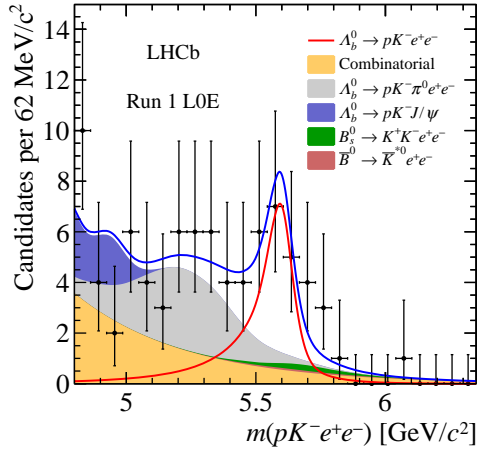
(b)  $\Lambda_b^0 \rightarrow pK^- \mu^+ \mu^-$  Run 2



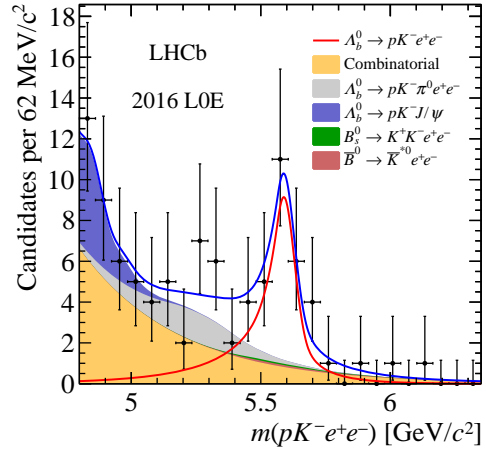
(c)  $\Lambda_b^0 \rightarrow pK^- e^+ e^-$  Run 1 LOI



(d)  $\Lambda_b^0 \rightarrow pK^- e^+ e^-$  Run 2 LOI



(e)  $\Lambda_b^0 \rightarrow pK^- e^+ e^-$  Run 1 LOE



(f)  $\Lambda_b^0 \rightarrow pK^- e^+ e^-$  Run 2 LOE

Figure 3: Invariant-mass distribution of (top)  $\Lambda_b^0 \rightarrow pK^- \mu^+ \mu^-$ , (middle)  $\Lambda_b^0 \rightarrow pK^- e^+ e^-$  LOI and (bottom)  $\Lambda_b^0 \rightarrow pK^- e^+ e^-$  LOE candidates in (left) Run 1 and (right) Run 2 data. The black points represent the data, while the solid blue curve shows the total PDF.

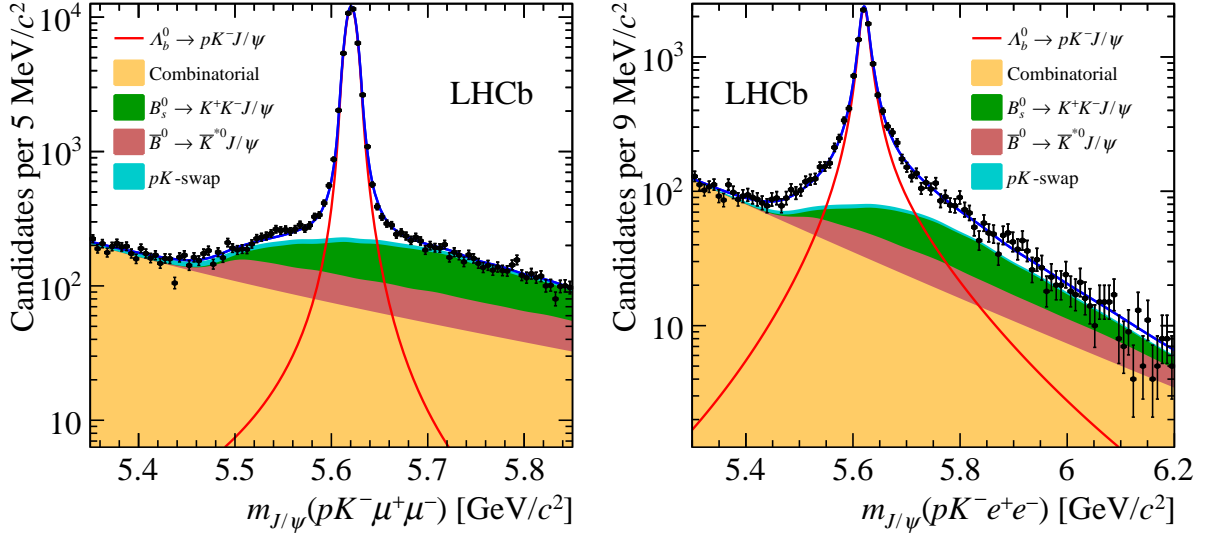


Figure 4: Invariant-mass distribution, with the  $J/\psi$  mass constraint applied, of  $\Lambda_b^0 \rightarrow pK^- J/\psi (\rightarrow \mu^+ \mu^-)$  (left) and  $\Lambda_b^0 \rightarrow pK^- J/\psi (\rightarrow e^+ e^-)$  (right) candidates, summed over trigger and data-taking categories. The black points represent the data, while the solid blue curve shows the result of the fit.

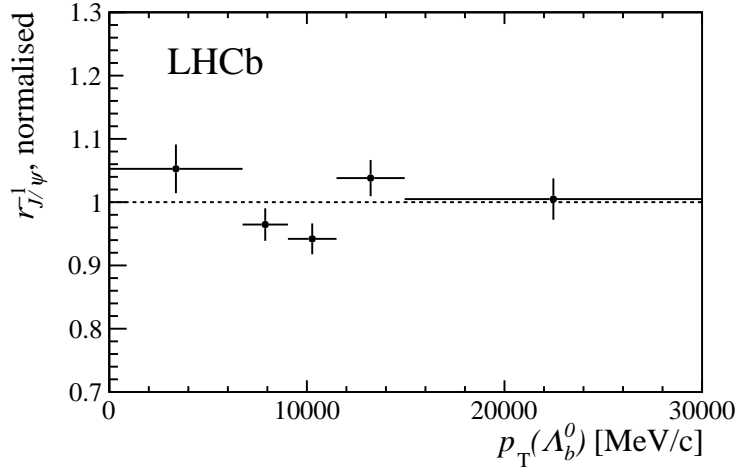


Figure 5:  $r_{J/\psi}^{-1}$  as a function the  $\Lambda_b^0$  transverse momentum, normalised to its average value.

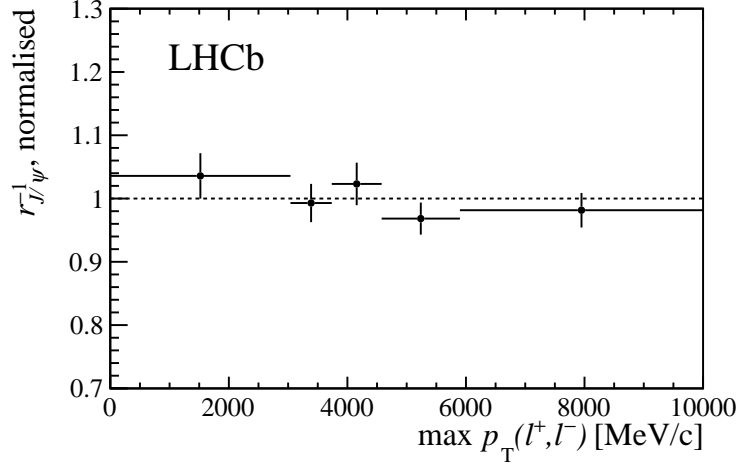


Figure 6:  $r_{J/\psi}^{-1}$  as a function of the maximum transverse momentum of the two leptons, normalised to its average value.

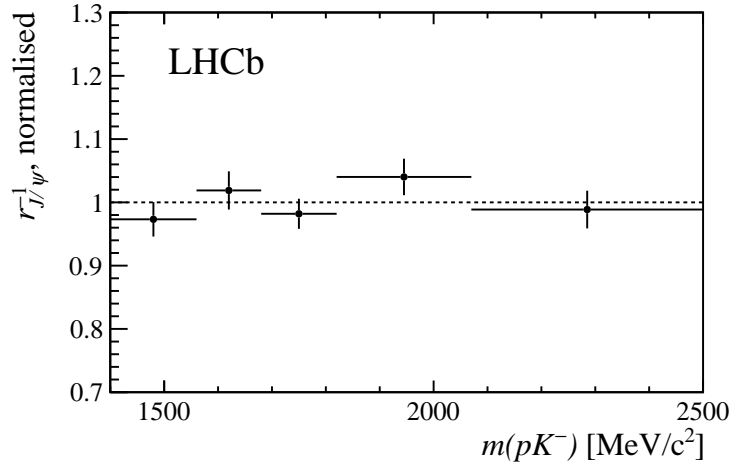


Figure 7:  $r_{J/\psi}^{-1}$  as a function of  $m(pK^-)$ , normalised to its average value.

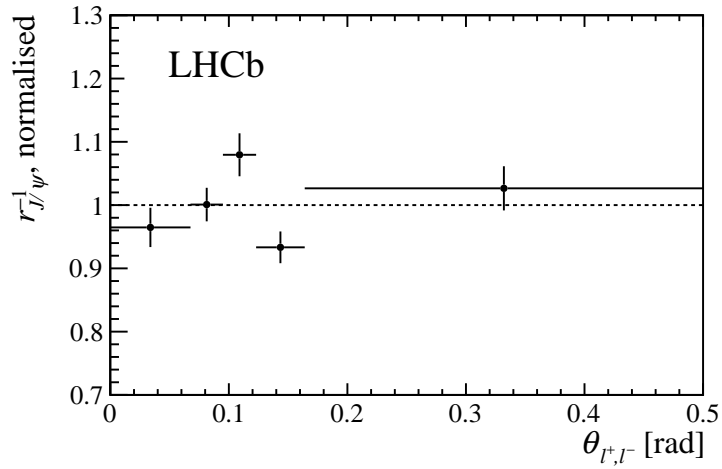


Figure 8:  $r_{J/\psi}^{-1}$  as a function of the opening angle of the two leptons, normalised to its average value.

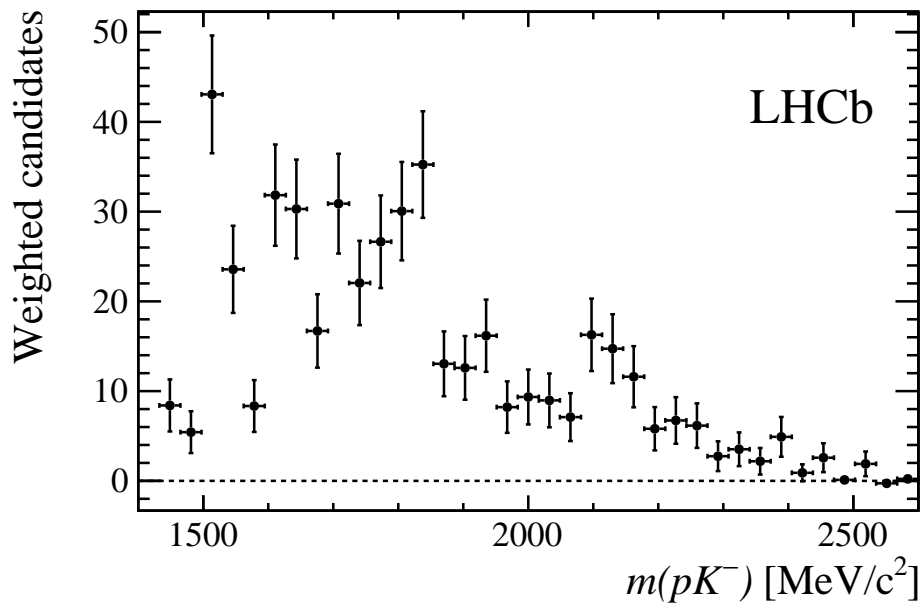


Figure 9: Background-subtracted distribution of  $m(pK^-)$  from  $\Lambda_b^0 \rightarrow pK^- \mu^+ \mu^-$  decays in  $0.1 < q^2 < 6.0 \text{ GeV}^2/c^4$ .