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Optimisation of Decay Selections $\Lambda_b^0 \to pK^-$ e $\Lambda_b^0 \to p\pi^-$ for $\mathcal{CP}$ Asymmetry Measument

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This work presents the optimization of the selection of the $\Lambda_b^0 \to pK^-$ and $\Lambda_b^0 \to p\pi^-$ decay modes in order to measure their $\mathcal{CP}$ asymmetries. The optimization of the selection is crucial in the study of these decays, in order to obtain the lowest possible statistical uncertainty on the measured asymmetries.
The data sample used in this work corresponds to an integrated luminosity of 6 fb^{-1}, collected by the LHCb experiment in proton-proton collisions at a center-of-mass energy of 13 TeV. The obtained statistical uncertainties on the individual $\mathcal{CP}$ asymmetries are:
\begin{align*}
&\sigma (\mathcal{A}^{\mathcal{CP}}(pK)) = 0.76\%,\\
&\sigma (\mathcal{A}^{\mathcal{CP}}(p\pi)) = 0.95\%,
\end{align*}
which are about a factor of two lower than the results already published by the LHCb Collaboration.

Title

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