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Data-driven measurements of the total beauty production in pp collisions at the LHC

Beauty hadron production in proton-proton (pp) collisions can be used to test the predictions of perturbative Quantum Chromodynamics (pQCD), providing constraints on parton distribution functions and hadronization processes. Furthermore, it serves as a reference for studying nuclear medium effects in heavy-ion collisions. This work presents Bayesian unfolding data-driven measurements of the open beauty hadron production, utilizing ALICE and LHCb data to recover full kinematic information from the measured non-prompt D^0 and non-prompt J/ψ. The beauty hadron production cross sections are consistent within their uncertainties across different decay channels from two collaborations. The precision of new results significantly improves upon worldwide measurements, providing valuable validation and constraints on mechanisms of heavy-flavour production in pp collisions at $\sqrt{s}$ = 5.02 and 13 TeV [1].

In this talk, the data-driven measurements of the p_{T}-differential $\mathrm{b\overline{b}}$ cross section $\mathrm{d}\sigma/\mathrm{d}y\mathrm{d}p_{\mathrm{T}}$, p_{T}-integrated $\mathrm{b\overline{b}}$ cross section $\mathrm{d}\sigma/\mathrm{d}y$ as well as the total $\mathrm{b\overline{b}}$ cross section $\sigma_{\mathrm{b\overline{b}}}$ at midrapidity in pp collisions at $\sqrt{s}$ = 5.02 and 13 TeV will be reported. The results are compared with existing measurements and theoretical calculations.

Reference:

[1] X. Bai, G. Li, Y. Zhang et. al, JHEP11(2024)018, arXiv.2405.01444v2

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