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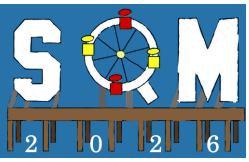

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Measurement of the $\mathrm{B}^{\pm}$-meson production cross section in proton-proton collisions at $\sqrt{s} = 13.6$ TeV with ALICE

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Beauty quarks, produced in the initial hard scatterings of heavy-ion collisions, are sensitive to the entire evolution of the quark–gluon plasma (QGP) and thus serve as excellent probes of its properties. Since beauty quarks are detected through their hadronic decays, understanding both their production and subsequent hadronization is essential if we want to use them as reliable QGP probes. The production cross section of $\mathrm{B}^{\pm}$ mesons provides an important test of perturbative QCD (pQCD) calculations and beauty hadronization models. The latter remains under active investigation, as measurements indicate tensions between data and model predictions, particularly at low transverse momentum (p_{T}).

With Run 3, ALICE can access beauty production in the low-p_{T} region for the first time at LHC energies. The improved vertex resolution and increased interaction rate enable beauty measurements through the direct reconstruction of the secondary vertex, down to $p_{\mathrm{T}} \approx 0$ GeV/c at midrapidity. In this poster, we present the first measurement of the $\mathrm{B}^{\pm}$-meson production cross section in ALICE in pp collisions at $\sqrt{s} = 13.6$ TeV, reconstructed via $\mathrm{B}^{\pm} \rightarrow \mathrm{J}/\psi\, K^{\pm}, \mathrm{J}/\psi \rightarrow e^{+}e^{-}$, and compare them with theoretical calculations. These studies aim at contributing to a more complete understanding of beauty production and hadronization, laying the groundwork for using $\mathrm{B}^{\pm}$ mesons as probes of the QGP in Pb–Pb collisions in ALICE.

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