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# Testing perturbative QCD calculations with beauty-meson production in proton–proton collisions with ALICE

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Due to their large mass, beauty quarks are always produced in hard-scattering processes, and hence their production can be computed with perturbative quantum chromodynamics (pQCD) calculations. The production cross section of beauty hadrons can be theoretically described with the factorisation approach as a convolution of the parton distribution functions of the incoming projectiles, the perturbative partonic cross section, and the fragmentation functions describing the transition from quarks to hadrons. Measurements of the production cross section of beauty hadrons in proton–proton (pp) collisions are therefore excellent tests of pQCD calculations. Measurements down to low transverse momenta are also fundamental ingredients for the estimation of the $\mathrm{b\overline{b}}$ production cross section. Moreover, the relative abundances of different beauty-hadron species also gives insights about the beauty-quark hadronisation mechanisms.
Finally, measurements of beauty-hadron production cross sections in pp collisions provide a reference for Pb–Pb collisions, where modifications due to the creation of the quark–gluon plasma are expected.

In this contribution, the measurement of non-strange B-meson and $\mathrm{B_s}^0$-meson production in pp collisions at 13.6 TeV collected by the ALICE experiment during the LHC Run 3 are presented. The B mesons are fully reconstructed via their decay channels into a D meson and a charged pion. The measured production cross sections are compared with state-of-art pQCD calculations with next-to-leading order accuracy plus all-order resummation of next-to-leading logarithms.

## Category

Experiment

## Collaboration (if applicable)

ALICE

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