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Measurement of Charm and Beauty Production in Proton–Proton Collisions at $\sqrt{s} = 5$ TeV with the CMS Experiment

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Measuring the charm and beauty production cross sections is not only a crucial test of the Standard Model but also provides valuable input for refining the proton parton distribution functions at low x , and for the determination of quark masses.

In this talk, I will present a double-differential measurement of the D^* -meson production cross section in transverse momentum p_T and absolute rapidity $|y|$ in proton–proton collisions at $\sqrt{s} = 5$ TeV using the CMS detector. The decay topology of the D^* meson allows access to very low transverse momenta (p_T) and by combining these results for the high-rapidity phase space with LHCb measurements, total cross sections for heavy-flavour production can be measured with only small extrapolation.

D^* mesons can originate either directly from charm-quark hadronisation or from the decay of B hadrons. The longer lifetime of B hadrons enables the use of the impact parameter and decay length significance to effectively separate the two contributions, and therefore allows for the measurement of both the charm and beauty production cross sections.

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