D^+ and D_s^+ production in pp collisions at $\sqrt{s} = 7$ TeV in the ALICE detector

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1 Introduction

The ALICE experiment at the LHC measures D meson production in the central rapidity region ($|y| < 0.5$) via the exclusive reconstruction of hadronic decay channels [1]. The measurement of charm production in pp collisions provides a test of the perturbative QCD calculations based on the factorization approach. In these proceedings the results for the $D^+ \to K^-\pi^+\pi^+$ and $D_s^+ \to K^+K^-\pi^+$ analyses in pp collisions at $\sqrt{s} = 7$ TeV are presented.

2 Measurement of D meson production

The analysis strategy for the extraction of the D^+ and D_s^+ signals out of the large combinatorial background is based on the reconstruction and selection of secondary vertex topologies with significant separation from the primary vertex. The Time Projection Chamber (TPC) and the Inner Tracking System (ITS) detector provide track and vertex reconstruction with an excellent resolution on the track position in the vicinity of the primary vertex [2]. A particle identification strategy for kaons and pions that uses the TPC and the Time of Flight (TOF) detector and preserves most of the D signal was adopted. The invariant mass distributions of track combinations with required charges are fitted in order to extract the signal. The left panel of Fig. 1 shows the invariant mass distribution of D_s^+ candidates in the $p_{\rm t}$ range 2-12 GeV/c obtained with $\approx 2.52 \times 10^8$ pp minimum bias events.

The $p_{\rm t}$ differential cross section for D^+ has already been measured using ≈ 30 % of the 2010 minimum bias sample: the raw signal is corrected for acceptance and efficiency using Monte Carlo simulations based on Pythia Perugia 0 tuning [3]. The contribution of D mesons from B decays was evaluated using MC efficiencies and the FONLL prediction which describes well bottom production at the Tevatron [4] and at the LHC [5, 6]. In Fig. 1 (right) the D^+ meson $p_{\rm t}$ differential cross section in pp collisions at $\sqrt{s} = 7$ TeV is presented: the measurement is well described by pQCD calculations, namely FONLL [4] and GM-VFNS [7]. The D_s^+ analysis is under way and the preliminary $p_{\rm t}$ differential cross section will soon be available.

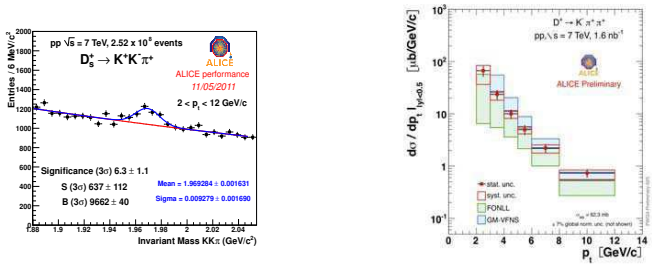

Figure 1: (Left) Invariant mass distribution of D_s^+ candidates in the $p_{\rm t}$ range 2-12 GeV/c obtained from the analysis of $\approx 2.52 \times 10^8$ pp minimum bias events. (Right) Preliminary D^+ $p_{\rm t}$ differential cross section measured with an integrated luminosity of 1.6 nb^{-1} in the $p_{\rm t}$ range 2-12 GeV/c compared to pQCD predictions.

3 Conclusions

We have shown the preliminary results of the $p_{\rm t}$ differential cross section for the D^+ meson at central rapidity in pp collisions at $\sqrt{s}$ =7 TeV in the $p_{\rm t}$ range from 2 to 12 GeV/c: the measurement is well described by the pQCD calculations. These results provide the reference data to measure the suppression of D^+ mesons in Pb-Pb collisions at the LHC [8]. The status of the D_s^+ analysis has also been presented.

References

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