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Distributions of charged particles' transverse momentum and pseudorapidity in *pp* collisions at 0.9 TeV

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The p_T-spectra of hadrons can be used to deduce the mechanism of particle production in (proton-proton) *pp* collisions. The study of charged particle production in *pp* collisions at high energies provides dynamics of hard as well as soft interactions [1–4]. The perturbative Quantum Chromodynamics (pQCD) quantitatively describe, large momentum transfer, hard parton-parton scattering processes [5].

Measurements of high-p_T charged particles production at Large Hadron Collider (LHC) energies play a vital role to constrain fragmentation and parton distribution functions in current pQCD calculations of next-to-Leading-Order (NLO) [6]. However, production of particle is dominated by soft interactions at low momentum where most of the particles are produced.

We have studied the charged particles spectra for the pseudorapidity region of $|\eta| < 2.5$, the multiplicity of charged particles, its dependence on p_T as well as on η and the relationship between average p_T and charged particles multiplicity in *pp* collisions at $\sqrt{s} = 0.9$ TeV. For simulations, we have used EPOS-LHC, EPOS-1.99, QGSJETII-04, and SIBYLL-2.3c models and compared their predictions with the experimental data of ATLAS experiment. For the p_T distribution, predictions of the Sibyll-2.3c are matching with the experimental data in a region of $0.5 < p_T < 0.8$ GeV/c and EPOS-1.99 model results are near to the experimental data for $0.5 < p_T < 1.5$ GeV/c. For the case of average p_T, EPOS-LHC and Sibyll-2.3c predictions are closer to the experimental data. For the pseudorapidity charged particle density distributions QGSJETII-04 model predictions are better describing the experimental data.

Figure 1 shows the comparison of charged particle multiplicity distributions as a function of p_T in *pp* collisions for the pseudorapidity interval of $|\eta| < 2.5$ at $\sqrt{s} = 0.9$ TeV.

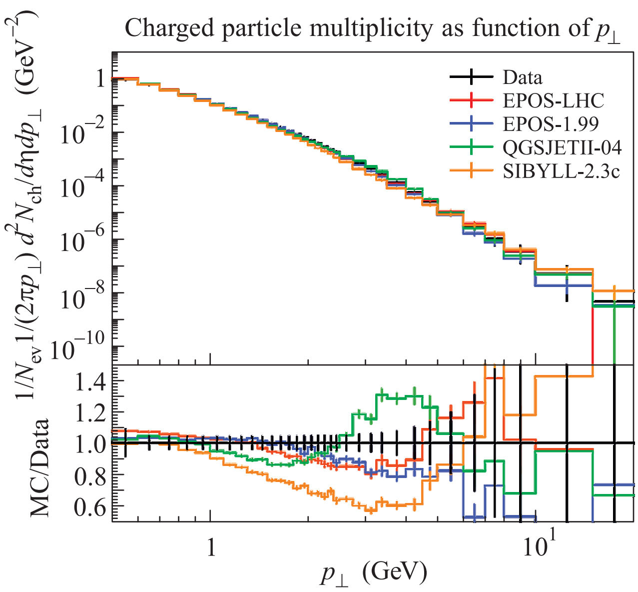

Fig. 1. (Color online) Comparison of the models' predictions of p_T-distributions of the differential yield of hadrons for $|\eta| < 2.5$ with the ATLAS data. Filled circle is used to represent experimental data, solid blue line for EPOS-1.99, solid red line shows EPOS-LHC, solid green line shows the QGSJETII-04 and orange yellow shows the SIBYLL-2.3c model

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