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Title of Thesis: "Pseudorapidity distribution of charged hadrons in proton- proton collisions at $\sqrt{s}$=13TeV by using the pixel cluster method"
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ABSTRACT

The pseudorapidity distribution of charged hadrons in pp collisions at $\sqrt{s}$ = 13 TeV is measured using the first data sample obtained with the Compact Muon Solenoid CMS detector which operated at zero Tesla magnetic field, at the Large Hadron Collider LHC, CERN, Geneva, Switzerland.

The yield of primary charged long-lived hadrons produced in inelastic pp collisions is determined in the central region of the CMS pixel detector ($|\eta| < 2$) by using the pixel cluster counting method which is companied with tracklet and full tracking methods, for central pseudorapidites ($|\eta| < 0.5$), the charged- hadron multiplicity density is $dN_{ch}/d\eta|_{|\eta|<0.5}$ = 5.49$\pm$0.01(stat) $\pm$ 0.17(syst). The result is compared with two different Monte Carlo event generators.

This thesis consists of three chapters. Chapter1 gives an introduction, and introduces the theoretical motivation such as the standard model, the process in proton-proton collisions, Feynman Scaling, (KNO) scaling, rapidity, and pseudorapidity concept.

Chapter 2 gives a description for the LHC also each part of the CMS detector at CERN located at Geneva.

Chapter3 gives the results of the pixel cluster counting method such as the smiley plots, cluster size along local y and x, angle corrected cluster charge, cluster multiplicity, and number of pixel cluster versus η for 3 layers of the silicon pixel detector that all analysis is based on cluster size, and gives also a small description about tracklet and full tracking methods. The pseudorapidity distribution of charged hadrons in pp collisions at $\sqrt{s}$ = 13 TeV is presented in details and at pervious center of mass energies. The center-of-mass energy dependence of $dN_{ch}/d\eta$ at $\sqrt{s} = 13\ TeV$ and at pervious center of mass energies are presented.
