Article No.2

Strangeness Production from Proton–Proton Collisions at Different Energies by Using Monte Carlo Simulation

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Abstract

Nuclear matter, at sufficiently energy density and high temperature, undergoes a transition to a state of strongly interacting QCD matter in which quarks and gluons are not confined known as the Quark–Gluon Plasma (QGP). QGP is usually produced in high-energy collisions of heavy nuclei in the laboratory, where an enhancement of strange hadrons' production is observed. Many of the effects which are typical of heavy ion phenomenology have been observed in high-multiplicity proton–proton (pp) collisions. The enhancement of strange particles' production in pp collisions was reported at $\sqrt{s}$= 7 TeV and $\sqrt{s}$= 13 TeV in 2017 and 2020, respectively, and it was found that the integrated yields of strange particles, relative to pions, increase notably with the charged-particle multiplicity of events. Here, we report the multiplicity dependence of strange particles at |y| < 0.5 in pp collisions at $\sqrt{s}$= 7 TeV, 13 TeV, 20 TeV, and 27 TeV from a Monte Carlo simulation using PYTHIA8, EPOS-LHC, and Herwig.