Multiplicity dependence of strange and multi-strange particle in jets in pp collisions at $\sqrt{s} = 7$ TeV

authors

Abstract

Comprehensive results on the production of unidentified charged particles, $\pi^{\pm}$, $K^{\pm}$, p, K^0_S, K^{*0}, ϕ, Λ, $\Xi^{\pm}$, $\Omega^{\pm}$ hadrons in jets in proton-proton (pp) collisions at $\sqrt{s} = 7$ TeV are presented with PYTHIA 8.

1 Introduction

In heavy-ion collisions at ultra-relativistic energies, it is well established that a strongly coupled Quark-Gluon-Plasma (QGP) is formed [**? ? ? ? ?**]. Recent measurements in high multiplicity pp, p–A and d–A collisions at different energies have revealed strong flow-like effects even in these small systems [**? ? ? ? ? ? ? ? ? ?**]. In a recent letter [**?**], the ALICE Collaboration reported the multiplicity dependent enhancement of strange (K_S^0, Λ and $\overline{\Lambda}$) and multi-strange (Ξ^-, $\overline{\Xi}^+$, Ω^- and $\overline{\Omega}^+$) particle in pp collisions at $\sqrt{s} = 7$ TeV. As well as, those results were complemented by the measurement of $\pi^\pm$, $K^\pm$, p, $\overline{p}$, K^{*0} and ϕ with ALICE [**?**].

The origin of these phenomena is debated in [**? ? ? ? ? ? ?**].

The role of strange hadron yields in searching for QGP was pointed out at an early stage [**?**]. It was subsequently found that in high energy nucleus-nucleus (A–A) collisions at the Super Proton Synchrotron (SPS), the Relativistic Heavy Ion Collider (RHIC) and the Large Hadron Collider (LHC) the abundances of strange and multi-strange baryons are compatible with those from thermal statistical model calculations [**? ? ? ? ? ? ? ?**]

The multi-strange baryons, Ω (sss) and Ξ (dss), are particularly important in high energy particle and nuclear physics due to their dominant strange quark (s-quark) content. The initial state colliding projectiles contain no strange valence quark, therefore all particles with non-zero strangeness quantum number are created in the course of the collision.

References