Neutral Pion Measurement in pp collisions at √s = 7 TeV with PHOS Detector in ALICE

Pooja Pareek (for ALICE Collaboration)
Indian Institute of Technology Indore, India

Introduction
The study of neutral pions in pp collisions in a wide transverse momentum range is important to understand parton dynamics by probing parton density functions and fragmentation function in new energy domains. The π⁰ and η transverse momentum spectra are necessary to estimate the decay photon background for direct photon measurements and also provide a reference for heavy-ion collisions. The π⁰ is measured in a wide p_T range using PHOS detector at ALICE. The status of analysis for data taken during 2010 with pp collisions at √s = 7 TeV is presented. Recent reconstruction of data improves energy and timing calibration, and doubles the statistics with respect to dataset used for the first result of π⁰ production in pp collision at √s = 7 TeV[1]. The neutral pions can be measured with PHOS up to p_T < 25 GeV/c with minimum bias trigger.

ALICE Detector

PHOS (PHOton Spectrometer) is a electromagnetic calorimeter designed to measure the energy and hit coordinates of photons and electrons.

• Base element PbWO₄ crystals
  - R_Moliere = 2.0 cm
  - p = 8.28 g/cm³
  - Size = 2.2x2.2x18 cm³

Data Quality Assessment

The data quality assessment is used to select good runs for physics analysis. The physical quantities like average cluster energy, number of clusters per event, π⁰ peak position etc. are not changed for different runs in the same period. They can be used to study the performance of different modules.

Neutral Pion measurement

Raw π⁰ yield is extracted from two photon invariant mass analysis. In the invariant mass spectra of two photons π⁰ is visible as peak at its rest mass, above the combinatorial background. This background is estimated with mixed event technique, and is normalized to the same event background.

Summary

• The integrated luminosity in present analysis is 7.6 nb⁻¹ whereas in previous analysis it was 4.0 nb⁻¹.
• We expect better statistical significance and improved systematic uncertainties with recent dataset.

References: