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Angular correlations of pions, kaons, protons and lambdas in 7 TeV pp collisions with ALICE

Tuesday 13 June 2017 17:45 (20 minutes)

Two-particle angular correlations are a robust tool which allow the explaration of the underlying physics phenomena of particle production in collisions of both protons and heavy ions by studying the distributions of angles in $\Delta\eta\Delta\phi$ space (where $\Delta\eta$ is the pseudorapidity difference and $\Delta\phi$ is the azimuthal angle difference between two particles). These correlations open up the possibility to study a number of mechanisms simultaneously. Many phenomena, including mini-jets, elliptic flow, Bose-Einstein correlations, resonance decays, conservation laws, are sources of these correlations.

In this talk, we report measurements of the correlations of identified particles and their antiparticles (for pions, kaons, protons, and lambdas) at low transverse momenta in pp collisions at sqrt(s) = 7 TeV, recently submitted for publication by the ALICE Collaboration [arXiv:1612.08975]. The analysis of identified particles in pp collisions reveals differences in particle production between baryons and mesons, which reflect the specific conservation laws for these quantum numbers. The correlation functions for mesons exhibit the expected peak dominated by effects of mini-jet fragmentation and are reproduced well by general purpose Monte Carlo generators. For baryon pairs where both particles have the same baryon number, a near-side anti-correlation structure is observed instead of a peak. Such effects have usually been connected to conservation laws in e^+e^- collisions and were thought to be under theoretical control; however, our results present a challenge to the contemporary models (PYTHIA, PHOJET). This surprising effect is further interpreted in the context of baryon production mechanisms in the fragmentation process.

List of tracks

Fluctuation in initial conditions, collective flow and correlations

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Session Classification: Charge fluctuations, correlations and balance functions