



Contribution ID: 251

Type: Poster

Azimuthal correlations of D^0 mesons with charged particles in pp collisions at $\sqrt{s} = 13.6$ TeV with the ALICE detector

The analysis of azimuthal-correlation distribution between D^0 mesons and charged particles is very important for studying charm-quark production, occurring in the early stages of high-energy collisions via hard scattering. Following their production, charm quarks undergo a fragmentation process which results in a spray of charged hadrons after hadronization, typically collinear to the charm quark. This process can be characterized by studying the near-side peak of the aforementioned azimuthal-correlation distributions. The measurement of the peak yield and width offers insights into the amount of particles produced from the charm fragmentation and their radial displacement with respect to the charm quark, respectively.

In this study, we present p_T -differential measurements of the azimuthal-correlation distribution between D^0 mesons and charged particles in pp collisions at $\sqrt{s} = 13.6$ TeV using the ALICE detector. Furthermore, comparisons with previous studies at $\sqrt{s} = 5.02$ TeV, $\sqrt{s} = 7$ TeV, and $\sqrt{s} = 13$ TeV suggest that the PYTHIA8 and POWHEG+PYTHIA8 models provide the best description of the data. The new measurement on Run 3 data will allow more precise and differential results, with extended transverse momentum reach, to further constraint the models and better characterize the charm fragmentation process.

Category

Experiment

Collaboration (if applicable)

ALICE

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Session Classification: Poster session 2

Track Classification: Heavy flavor & quarkonia