

Measurement of long-range azimuthal anisotropies in pp and p +Pb collisions with the ATLAS detector.

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(speaker known later)

ATLAS measurements of correlations between particle pairs in relative azimuthal angle ($\Delta\phi$) and pseudorapidity separation ($\Delta\eta$), in pp collisions at $\sqrt{s}=2.76, 5.02$ and 13 TeV, and in p +Pb collisions at $\sqrt{s_{NN}}=5.02$ TeV are presented. Prior measurements have shown that in pp collisions with a large multiplicity of produced particles, a long-range structure, commonly called the “ridge”, develops along $\Delta\eta$ at $\Delta\phi \sim 0$. However, due to the presence of the large away-side jet, the full $\Delta\phi$ dependence of the long-range correlation could not be studied previously. In this analysis, a template fitting procedure is implemented to determine the contributions from dijets to the correlations, using low-multiplicity events, and extract the genuine long-range correlation. The Fourier harmonics of the genuine long-range correlation for orders $n=2-4$ are extracted, and their dependence on p_T , event-multiplicity and collision energy are studied. It is shown that the second Fourier coefficient, $v_{2,2}$, dominates the long range correlation, with small but significant contributions from $v_{3,3}$ and $v_{4,4}$. The $v_{2,2}$ is shown to factorize into the product of single-particle anisotropies v_2 . A large v_2 is shown to be present even in events with a small multiplicity of produced particles, implying that the long-range correlations are not unique to rare high multiplicity events, but are present even in low multiplicity pp collisions. Comparisons to the $v_{n,n}$ and v_n obtained when applying the template fitting procedure to p +Pb collisions are also presented. These measurements can help determine if the long range correlations in pp and p +Pb collisions arise from similar mechanisms or not.

Collaboration

ATLAS

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