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Measurement of charge balance function at CMS

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Two-particle electric charge balance function has been measured in proton-lead and lead-lead events with the CMS detector at the LHC. Particle correlations can be used as a probe of the charge creation mechanism, and the balance function is constructed using the like- and unlike-charge particle pairs to quantify these correlations. Compared to previous measurements, the pseudorapidity range is extended up to $|\eta| < 2.4$. This larger phase space region is essential for studying the system time evolution. The width of the balance function, both in relative $|\eta|$ and relative azimuthal angle, is found to decrease with multiplicity for low transverse momentum ($p_T < 2$ GeV/c). The effect is observed for both collision systems, and it is consistent with a late hadronization scenario, where particles are produced at a later stage during the system evolution. The multiplicity dependence is weaker for the higher p_T, which signifies that the balancing charge partners are strongly correlated compared to the low-p_T region. Model comparisons cannot reproduce the multiplicity dependence of the width in $\Delta\eta$, albeit a model which incorporates collective effects can reproduce the narrowing of the width.

Session

Heavy Ions and QCD

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