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Multiplicity and transverse momentum dependence of electric charge balance functions

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We report comprehensive results on the balance function as a function of the pseudorapidity and azimuthal angle difference, $\Delta\eta$ and $\Delta\varphi$ respectively, between two charged particles. Results on the multiplicity and transverse momentum (p_T) dependence measured with ALICE in pp, p-Pb, and Pb-Pb collisions at 7 TeV, 5.02 TeV, 2.76 TeV are presented. The balance function in both $\Delta\eta$ and $\Delta\varphi$ becomes narrower with increasing multiplicity in all three systems for particles with 0.2 < pT < 2.0 GeV/c. The experimental findings favor models that either incorporate some collective behavior (e.g. AMPT) or mimic this using different mechanisms (e.g. PYTHIA8 with color reconnection). For higher values of transverse momenta the balance function becomes even narrower but exhibits no quantitative difference between the three systems. The results add constraints to models that describe collective effects down to small systems (for low values of p_T), and particle production mechanisms such as coalescence and fragmentation processes (for inter- mediate and high values of p_T).

On behalf of collaboration:

ALICE

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