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System-size dependence of charged-particle production at both mid and forward pseudorapidity with ALICE

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Particle production at LHC energies arises from the interplay between hard and soft QCD processes and is sensitive to non-linear QCD evolution in the initial state. In July 2025, the LHC delivered short light-ion runs, pO, OO, and Ne–Ne collisions, providing a unique opportunity to bridge the gap between proton–proton and heavy–ion collisions. These systems allow us to study and investigate how nuclear geometry and system size influence the mechanisms of underlying particle production. In this talk, we present new measurements of charged-particle pseudorapidity densities ($dN_{ch}/d\eta$) in light-ion collisions, at both mid and forward rapidities, and compare them with earlier results from pp and Pb–Pb collisions. The results will be compared with various theoretical models based on different initial interactions, e.g., to what degree the nucleon/nuclei interact as dilute (partons) or dense (Color Glass Condensate-like) fields.

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