Pseudorapidity distributions of charged hadrons in lead-lead collisions at $\sqrt{s_{_{NN}}} = 5.36\,\text{TeV}$

Supplemental Material: Centrality intervals and corresponding $\langle N_{\text{part}} \rangle$ values

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Abstract

The pseudorapidity (η) distributions of charged hadrons are measured using data collected at the highest ever nucleon-nucleon center-of-mass energy of $\sqrt{s_{_{NN}}} = 5.36\,\text{TeV}$ for collisions of lead-lead ions. The data were recorded by the CMS experiment at the LHC in 2022 and correspond to an integrated luminosity of $0.30 \pm 0.03\,\mu\text{b}^{-1}$. Using the CMS silicon pixel detector, the yields of primary charged hadrons produced in the range $|\eta| < 2.6$ are reported. The evolution of the midrapidity particle density as a function of collision centrality is also reported. In the 5% most central collisions, the charged-hadron η density in the range $|\eta| < 0.5$ is found to be 2032 ± 91 (syst), with negligible statistical uncertainty. This result is consistent with an extrapolation from nucleus-nucleus collision data at lower center-of-mass energies. Comparisons are made to various Monte Carlo event generators and to previous measurements of lead-lead and xenon-xenon collisions at similar collision energies. These new data detail the dependence of particle production on the collision energy, initial collision geometry, and the size of the colliding nuclei.

Keywords: CMS, physics, hadrons, multiplicity, spectra

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Table 1: Centrality intervals and corresponding $\langle N_{\text{part}} \rangle$ values for 5.36 TeV PbPb collisions. The uncertainties in the N_{part} values are determined by propagating the uncertainties in the parameters of the Glauber model.

Centrality interval [%]	$\langle N_{\text{part}} \rangle$
0–5	382.3 ± 1.6
5–10	331.3 ± 1.3
10–15	283.3 ± 1.4
15–20	241.0 ± 1.4
20–25	204.1 ± 1.5
25–30	171.7 ± 1.5
30–35	143.2 ± 1.5
35–40	118.2 ± 1.4
40–45	96.3 ± 1.3
45–50	77.4 ± 1.3
50–55	61.1 ± 1.2
55–60	47.2 ± 1.2
60–65	35.7 ± 0.9
65–70	26.3 ± 0.8
70–75	18.8 ± 0.6
75–80	13.1 ± 0.4