WPCF 2024 - 17th Workshop on Particle Correlations and Femtoscopy



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Scaling Analysis of Proton Cumulants and the QCD Critical Point

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We perform a finite-size scaling analysis of net-proton number cumulants in Au+Au collisions at center-of-mass energies between 2.4 GeV and 54.4 GeV to search for evidence of a critical point in the QCD phase diagram. We show that for 7.7 GeV and above, the data as a function of rapidity bin width exhibits scale invariance, satisfying the conditions for a finite-size scaling analysis. We use model simulations to verify the applicability of this approach, then apply it to data and find evidence for a critical point near the baryon chemical potential of μ B \approx 625 MeV. This is the first analysis of experimental data to locate the critical point in a range consistent with recent theoretical predictions.

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