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Volume fluctuations in multi-particle flow correlation measurement

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Volume fluctuations are background for the event-by-event multiplicity fluctuation analysis, and its effects have been extensively studied for net-proton fluctuations in search of the QGP critical point. In this poster, we show that the two major volume fluctuations effects, centrality bin width and centrality resolution effects, can be probed using flow fluctuation measurements. Using a Glauber model with particle production, we show that the recently observed sign-change of the $c_2\{4\}$ in ultra-central collisions by ATLAS is directly sensitive to the amount of centrality smearing. Therefore the pattern of $c_2\{4\}$ sign-change can be used to quantify the centrality resolution effect. Furthermore, we find that the volume fluctuation effects naturally evolves with rapidity, and therefore the sign-change pattern of $c_2\{4\}$ also expected to evolve with rapidity. We explore new approaches based on flow measurements to constrain the volume fluctuation.

Content type

Theory

Collaboration

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