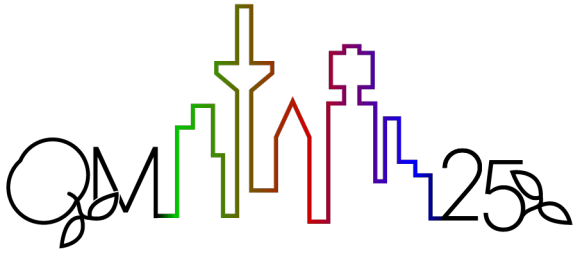

Contribution ID: **474** Type: **Oral**

EPJ Featured Talk: First direct measurement of radial flow in heavy-ion collisions with ALICE

Tuesday 8 April 2025 17:30 (20 minutes)

The observation of long-range correlations is a crucial indicator of collectivity in heavy-ion collisions and has been instrumental in establishing the formation of quark-gluon plasma (QGP) at RHIC and LHC. In this study, the first direct measurement of radial flow is presented using a new observable, $v_0(p_{\mathrm{T}})$, formulated to capture the long-range correlations in the transverse momentum p_{T} spectrum. Unlike anisotropic flow coefficients $v_{\mathrm{n}}(p_{\mathrm{T}})$, which are influenced by both shear and bulk viscosity, $v_0(p_{\mathrm{T}})$ is sensitive solely to the bulk properties of the QGP medium, making it a valuable probe for studying bulk viscosity and the hydrodynamic evolution of the system formed in heavy-ion collisions.

The measurement of $v_0(p_{\mathrm{T}})$ is reported across various centrality classes for inclusive charged particles and identified particles, such as pions, kaons, and protons, in Pb-Pb collisions at $\sqrt{s_{\mathrm{NN}}}$ = 5.02 TeV with the ALICE detector. To minimize short-range non-flow correlations, a rapidity gap technique similar to that used in anisotropic flow measurements is employed. At low p_{T}, characteristic mass ordering, typically associated with collective flow in $v_{\mathrm{n}}(p_{\mathrm{T}})$, is observed. At higher p_{T}, where hydrodynamic descriptions fail, a baryon-meson splitting indicative of quark coalescence is observed. Measurements are compared with the hydrodynamic model MUSIC under varied initial conditions, as well as non-hydrodynamic models like HIJING and EPOS.

Category

Experiment

Collaboration (if applicable)

ALICE

Authors: COLLABORATION, ALICE; SAHA, Swati (National Institute of Science Education and Research (NISER) (IN))

Presenter: SAHA, Swati (National Institute of Science Education and Research (NISER) (IN))

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