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Typ: Talk

## A New Observable of Radial Flow: Probing Isotropic Expansion of QCD Matter

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Understanding the space–time evolution of strongly interacting matter created in heavy-ion collisions requires precise probes of its collective expansion. While anisotropic flow has long been established as a key signature of the quark–gluon plasma (QGP), the isotropic component, radial flow, has until now been inferred only indirectly through spectral slopes and blast-wave fits.

A recently introduced observable,  $v_0(pT)$ , provides the first direct measurement of radial-flow fluctuations and thus opens a new way to study the isotropic expansion of the system. Results from ALICE and ATLAS demonstrate that  $v_0(pT)$  exhibits all hallmarks of collectivity—long-range correlations, factorization, and near-universal scaling with centrality. Moreover, identified-particle measurements reveal mass ordering at low  $pT$  and baryon–meson separation at intermediate  $pT$ , linking radial flow to hadronization mechanisms.

Crucially,  $v_0(pT)$  is sensitive to the bulk viscosity and the equation of state of QCD matter, making it a powerful new probe of transport properties. This talk will review the conceptual development of the observable, present the first experimental results, and discuss future opportunities at RHIC, the LHC, and next-generation facilities.

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**Sitzung Einordnung:** Lectures