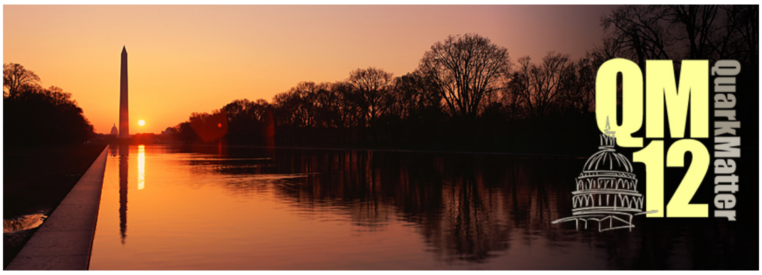

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Model-independent separation of flow and nonflow in relativistic heavy-ion collisions

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Anisotropic flow, which arises from correlations to the common collision geometry, is sensitive to the early stage of the expansion of the medium created in relativistic heavy-ion collisions. Azimuthal anisotropy is measured by final state particle correlations and is thus contaminated by correlations unrelated to the common geometry (nonflow). The contamination of nonflow hampers further advancement in our study of relativistic heavy-ion collisions, in at least two areas: it prevents a more precise determination of the viscosity to entropy density ratio eta/s of the QGP medium from flow measurements, and it limits the power of jet-like correlations in probing partonic energy loss mechanisms where flow presents a background to be subtracted. Recently it has been shown that the measured two-particle correlation Fourier coefficients approximately factorize, and it was argued that this indicates the dominance of flow. In this talk we show by PYTHA simulations of p+p collisions that factorization approximately holds also for jet-like correlations and therefore is only a necessary but not sufficient condition for flow [1]. We suggest that nonflow factorization can in turn be used to disentangle flow and nonflow as a function of particle transverse momentum by performing a two-component factorization fit to Fourier coefficients [1]. However, such disentanglement is model dependent, so are all other experimental nonflow studies thus far. To revamp this, we present in this talk a novel, model-independent method to decompose \Delta\eta-dependent and independent correlations using two- and four-partice cumulants between \eta bins, exploiting the symmetry of flow about midrapidity in symmetric heavy-ion collisions [2]. The \Delta\eta-independent correlations are dominated by anisotropic flow while the \Delta\eta-dependent correlations can be identified as nonflow. We illustrate our method using the AMPT and HIJING event generators. We discuss our decomposed flow and nonflow from the models. We further discuss the applicability of our method in separating flow and nonflow in real data at RHIC and LHC.

[1] Daniel Kikola, Li Yi, ShinIchi Esumi, Fuqiang Wang and Wei Xie. arXiv:1110.4809 [nucl-ex]
[2] Lingshan Xu, Li Yi, Daniel Kikola, Joshua Konzer, Fuqiang Wang and Wei Xie. arXiv:1204.2815 [nucl-ex]

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