Contribution ID: **323** Type: **Poster**

Using multi-particle correlations to estimate fluctuations in jet and rare probe azimuthal anisotropies

Tuesday 5 September 2023 17:30 (2h 10m)

Rare probes such as jets and heavy flavor hadrons provide unique opportunities to study the short-distance scale properties of the QGP created in heavy ion collisions. For example, recent measurements at the LHC and RHIC indicate that jet energy loss is correlated with the distance traveled through the QGP medium, and as a result, the initial geometry of the QGP. While estimates of differential azimuthal anisotropies, which we label v_n', have been experimentally measured for various rare probes, the fluctuations in v_n' have not been systematically studied.

We present a statistical formalism for the study of v_n' and its correlations with the integrated azimuthal anisotropies (reference flow), v_n, by constructing correlators of azimuthal angles from multiple rare probe objects. We then construct multivariate cumulants and moments using these correlators, which can measure fluctuations to arbitrary order in v_n'. The experimental methods and procedures for computing these quantities are also discussed.

To demonstrate how the measurements of the moments and cumulants can constrain the event by event distribution of v_n', we propose a bivariate copula model to parametrize v_n' and v_n, and their correlations. We are able to constrain parameters in the marginal distributions for v_n' by sampling the distribution and evaluating joint moments of v_n' and v_n.

Category

Theory

Collaboration (if applicable)

Primary authors: HOLTERMANN, Abraham (University of Illinois at Urbana Champaign); SICKLES, Anne Marie (Univ. Illinois at Urbana Champaign (US)); Prof. NORONHA-HOSTLER, Jacquelyn (University of Illinois Urbana Champaign); WANG, Xiaoning (Univ. Illinois at Urbana Champaign (US))

Presenter: HOLTERMANN, Abraham (University of Illinois at Urbana Champaign)

Session Classification: Poster Session

Track Classification: Jets