Contribution ID: **24** Type: **not specified**

Phenomenological study of the angle between jet axes in heavy-ion collisions

This paper presents a phenomenological study on the angle between the Standard and Winner-Take-All (WTA) jet axes ($\Delta R_{\rm axis}^{\rm WTA-Std}$) in high-energy nuclear collisions. The p+p baseline is provided by the Pythia8 event generator. The in-medium jet propagation is simulated by the linear Boltzmann transport (LBT) model, which considers both the elastic and inelastic jet-medium interactions. Our theoretical results calculated by the \textsc{Lbt} model show that the $\Delta R_{\rm axis}^{\rm WTA-Std}$ distribution in Pb+Pb at $\sqrt{s} = 5.02$ TeV is narrower than that in p+p, which agrees well with the recent ALICE measurements. The narrowing of $\Delta R_{\rm axis}^{\rm WTA-Std}$, which seems to violate the nature of intra-jet broadening due to jet quenching, may be attributed to the influence of "selection bias". However, the physical details still need to be fully understood. Utilizing a matching-jet method to track the jet evolution in the QGP to remove the selection bias in the Monte Carlo simulations, we observe that the $\Delta R_{\rm axis}^{\rm WTA-Std}$ distribution becomes broader due to the jet-medium interactions. At the same time, by rescaling the quark/gluon-jet fractions in Pb+Pb collisions to be the same as that in p+p, we find that the fraction change may not significantly influence the modification pattern of jet $\Delta R_{\rm axis}^{\rm WTA-Std}$. On the other hand, the selected jet sample in A+A collisions has a significantly narrower initial $\Delta R_{\rm axis}^{\rm WTA-Std}$ distribution than the p+p baseline, and such a biased comparison between p+p and A+A conceals the actual intra-jet broadening effect in the experimental measurements. The investigations presented in this paper will deepen our understanding of the relationship between the actual intra-jet modifications in the QGP and the experimental observations.

Primary author: KANG, Jin-Wen (CCNU)

Co-authors: Dr WANG, Sa (China Three Gorges University); WANG, Lei; ZHANG, Ben-Wei (Central China Normal University)

Presenter: KANG, Jin-Wen (CCNU)