

International Conference on Physics and Astrophysics of Quark Gluon Plasma (ICPAQGP-2023)



Contribution ID : 64

Type : **Oral Presentation**

Medium-modifications to jet angularities in heavy ion collisions using SCET with Glaubers

Tuesday, 7 February 2023 17:15 (15)

Jet angularities are a novel class of jet substructure observables that allow one to change the sensitivity to the relative contributions of collinear and soft emissions in a jet, through a continuous parameter a ($a < 2$ for Infrared Safety). For $a \leq 0.5$, jet angularities weigh collinear radiations in the jet more strongly than the soft emissions while for a close to 1, the observable becomes sensitive to the spread of the jet. Studying the medium modifications to the substructure of a jet via a smooth jet observable like angularities, thus becomes an interesting prospect to get an insight of conditions in the quark-gluon plasma medium.

In view of this, we first compute the results for pp collisions using a field-theoretic framework of Soft Collinear Effective Theory (SCET). We find our results agree well with the recent ALICE distributions within the theoretical error bands. We then study the medium modifications by including an additional off-shell Glauber mode in the theory. The thermal modifications to the jet in this set-up are effectively incorporated through medium-modified splitting functions. Finally, we provide a comparison of these results to the vacuum case.

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Session Classification : Parallel Session IIA (Chair : Dr. Zubayer Ahammed)

Track Classification : Hard and electromagnetic probes