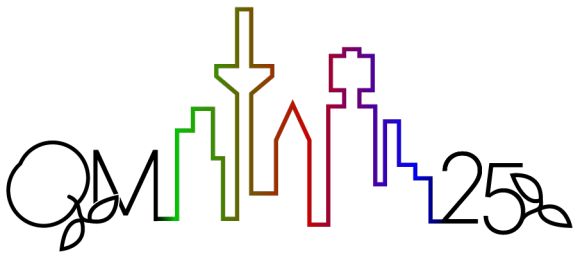

Contribution ID: **765** Type: **Poster**

Gluon to $q\bar{q}$ antenna in anisotropic QCD matter

The states of matter produced in the early stage of heavy ion collisions can be highly anisotropic. If such a feature is sufficiently pronounced, one should expect the final particle distribution inside jets to reflect it in the form of non-trivial angle correlations. In this talk, we discuss a first step in exploring such correlations by studying how a $q\bar{q}$ state branching from an initial unpolarized gluon couples to the anisotropies of an underlying static QCD medium. The medium anisotropy is captured by allowing the jet quenching parameter to take different magnitudes in two orthogonal directions in the plane transverse to the jet axis.
We find that the final particle distribution is sensitive to the medium anisotropy in the form of an azimuthal angle modulation, and more importantly, that this effect couples directly to the helicity/spin of the final states, offering a novel way to extract the details of the underlying matter which is not accessible with standard jet observables. We show how such features can be extracted from the Fourier decomposition of the particle distribution, from azimuthally dependent energy-energy correlators and from final state transverse spin polarization measures. We further discuss how to incorporate these effects into the description of other hard probes of the medium.

Category

Theory

Collaboration (if applicable)

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Session Classification: Poster session 1

Track Classification: Jets