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Quenching minijets in a concurrent jet+hydro evolution and its consequences for extracting transport coefficients of QGP

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Intermediate pT jets (minijets) are created by initial hard scatterings in heavy-ion collision experiments. They can constitute a significant portion of the particle multiplicity but do not lend themselves to hydrodynamic treatment as their transverse momenta are larger than the typical saturation scale of the bulk matter.Their orientation is independent of the underlying event and they can significantly reduce flow in the collective motion of the bulk medium. They also introduce an additional source of fluctuations.

We study minijets in a new jet+hydro concurrent framework where jet quenching leads to energy and momentum injection in the QGP. Minijets are sampled using PYTHIA and hydro is initialized using the IPGlasma framework. Both of these are concurrently evolved using MUSIC with the minijet quenching being governed by the Hybrid Model. Both the jet and thermal hadrons do hadronic cascade through UrQMD after the freeze-out.

We find that this effort requires substantial recalibration of the transport coefficients in hydrodynamic simulations to explain the data. As extraction of transport properties is one of the major goals of the heavy-ion program, we posit that this significant contribution needs to be accounted for. We will also discuss the effect of these minijets on observables like pT-spectra, flow vn and correlations between different vn_s. We also look at the relation between initial state spatial anisotropy and the final state momentum anisotropy in the presence of minijets.

Category

Theory

Collaboration (if applicable)

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