Contribution ID: **483** Type: **Oral Presentation**

How to infer the shape of the QGP droplet from high pt data

Wednesday 6 November 2019 10:20 (20 minutes)

The spatial anisotropy of QGP, formed in ultrarelativistic heavy-ion collisions, is commonly inferred form models of early QGP evolution. These studies (e.g. MC-Glauber, EKRT, IP-Glasma, MC-KLN), based on different methods, lead to notably different predictions, with a notable effect in the resulting predictions for both low and high pt data. On the other hand, energy loss of high-pt particles traversing QCD medium is an excellent probe of QGP properties, particularly since there is a wealth of accumulated high pt experimental data. Therefore, as a novel and complementary approach, we here propose using high pt theory and data to infer the shape of initial QGP droplet.

To achieve this, we use DREENA framework, which is fully optimized computational procedure based on our state-of-the art dynamical energy loss formalism. Our most recent results show that, when embedded in 3+1D hydro medium model, DREENA provides a very good joint agreement with both v_2 and R_{AA} data, contrary to the v_2 puzzle faced by models with simpler energy loss mechanisms. This, together with good joint agreement of our model with a wide range of R_{AA} and v_2 data (obtained with no fitting parameters used in model testing) shows that DREENA can realistically descibe high pt parton-medium interactions. By using DREENA framework, we show, through analytical arguments, numerical calculations, and comparison with experimental data, that $v_2/(1-R_{AA})$ reaches a well-defined saturation value at high pt, which is in turn proportional to the initial anisotropy. We provide first anisotropy estimates from our approach, and compare them with the predictions of early QGP evolution models. With expected future significant reduction of experimental errors, the anisotropy extracted from experimental data will strongly constrain the calculations of initial particle production in heavy-ion collisions, and thus test our understanding of QGP physics.

Authors: DJORDJEVIC, Magdalena (Institute of Physics Belgrade); STOJKU, Stefan (Institute of Physics University of Belgrade); DJORDJEVIC, Marko; HUOVINEN, Pasi (University of Wroclaw)

Presenter: DJORDJEVIC, Magdalena (Institute of Physics Belgrade)

Session Classification: Parallel Session - Jet modifications II

Track Classification: Jet modifications and medium response