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Utilizing high- p_{\perp} theory and data to constrain the initial stages

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Traditionally, low- p_{\perp} sector is used to infer the features of initial stages of QGP evolution before QGP thermalization. On the other hand, recently acquired wealth of high- p_{\perp} experimental data paves the way to utilize the hard probes energy loss in exploring the initial stages. We here study [1] how four different commonly considered initial-stage scenarios –which have the same temperature profile after thermalization, but differ in the temperature profile before thermalization –affect predictions of high- p_{\perp} R_{AA} and v_2 stemming from our DREENA framework, which is based on our state-of-the-art dynamical energy loss model. Contrary to common expectations, we obtain that high- p_{\perp} v_2 is insensitive to the initial stages of medium evolution, being unable to discriminate between different conditions. On the other hand, R_{AA} is sensitive to these stages, however, within the current errorbars, the sensitivity is insufficient to distinguish between different initial stages. Moreover, we also reconsider the validity of widely-used procedure of fitting the energy loss parameters, individually for each initial-stage case, to reproduce the experimentally observed R_{AA} . We here find that previously reported sensitivity of v_2 to different initial states is mainly an artifact of the R_{AA} fitting procedure, which may lead to misinterpreting the underlying physics. On the other hand, if a global property, in particular the same average temperature, is imposed to test temperature profiles, high sensitivity of high- p_{\perp} v_2 is regained. We however show that this sensitivity would not be a consequence of different initial, but rather final, stages. Consequently, the simultaneous study of high- p_{\perp} R_{AA} and v_2 , with consistent energy loss parameters throughout the study and rigorously controlled temperature profiles, is necessary for imposing accurate constraints on the initial stages.

Is this abstract from experiment?

No

Is the speaker for that presentation defined?

Yes

Name of experiment and experimental site

N/A

Internet talk

Yes

Details

Dr Bojana Ilic (born Blagojevic)
Institute of Physics Belgrade, 11 000 Belgrade, Serbia
<http://www.ipb.ac.rs/en/>

Primary author: Dr ILIC (BLAGOJEVIC), Bojana (Institute of Physics Belgrade)

Co-authors: ZIGIC, Dusan (Institute of Physics Belgrade); DJORDJEVIC, Magdalena (Institute of Physics Belgrade); DJORDJEVIC, Marko

Presenter: Dr ILIC (BLAGOJEVIC), Bojana (Institute of Physics Belgrade)

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