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A Detailed Study and Synthesis of Flow Observables in the IP-Glasma+MUSIC+UrQMD Framework

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In this work we use our state of the art IP-Glasma+MUSIC+UrQMD framework to systematically study a wide range of hadronic flow observables at 2.76 TeV and to make predictions at 5.02 TeV \cite{1609.02958}. In addition to the single particle spectra and anisotropic flow coefficients v_n, we study event-plane correlations, non-linear response coefficients χ_n, and flow factorization breaking ratios r_n, which were presented for the first time in the IP-Glasma framework. Furthermore, we investigate event shape engineering as well higher flow harmonics such as v_5, v_6, and v_7, which were recently measured at 5.02 TeV by the ATLAS collaboration. Taken together, these observables provide a wealth of insight into the collective behavior of the QGP and initial state fluctuations. These quantities shed light on flow correlations in different p_T ranges, flow at fixed system size but different initial geometries, as well as the non-linear hydrodynamic response to the initial state energy anisotropy. By synthesizing this information we can gain further insight into the transport properties of the QGP as well as the fluctuation spectrum of the initial state. Finally, we examine the effect of pre-equilibrium longitudinal flow, which has previously been neglected in phenomenological studies, such as the hadron and direct photon spectra and v_n.

\begin{thebibliography}{}

\bibitem{1609.02958}

Scott McDonald, Chun Shen, Francois Fillion-Gourdeau, Sangyong Jeon and Charles Gale.
\newblock Hydrodynamic Predictions for Pb+Pb Collisions at 5.02 A TeV, 2016;
\newblock arXiv:1609.02958.

\end{thebibliography}

Preferred Track

Collective Dynamics

Collaboration

Not applicable

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