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Latest predictions from the EbyE NLO EKRT model

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We present the latest results from the event-by-event NLO pQCD + saturation + viscous hydrodynamics (EbyE NLO EKRT) model [1,2,3,4]. The parameters in the EKRT saturation model are fixed by the charged hadron multiplicity in the 0-5 \% 2.76 TeV Pb+Pb collisions, and the $\sqrt{s}$, A and centrality dependence of the initial particle production is determined by the QCD dynamics of the model. The initial state is then evolved using viscous hydrodynamics, and the $\sqrt{s}$ and A dependence of low-p_T hadron spectra is computed.

Our results are in an excellent agreement with the low-p_T data from 2.76 and 5.02 TeV Pb+Pb collisions at the LHC and 200 GeV Au+Au collisions at RHIC [1,2]. In particular, we study the centrality dependence of hadronic multiplicities, pT spectra, flow coefficients, probability distributions of relative elliptic flow fluctuations, and various flow correlations. A simultaneous analysis of these observables at several collision energies puts much more stringent constraints on the temperature dependence of the shear viscosity than e.g. the flow coefficients at the LHC energies alone.

We present our latest results for various correlators, like symmetric cumulants and non-linear flow coefficients, together with their p_T dependence for all the above collision systems [3]. Furthermore, we show our predictions for the centrality dependence of charged hadron multiplicity and flow coefficients in the 5.44 TeV Xe+Xe collisions at the LHC [4].

[1] H. Niemi, K. J. Eskola and R. Paatelainen, Phys. Rev. C93 (2016) 2, 024907, arXiv:1505.02677 [hep-ph].

[2] H. Niemi, K. J. Eskola, R. Paatelainen and K. Tuominen, Phys. Rev. C93 (2016) 1, 014912, arXiv:1511.04296 [hep-ph].

[3] H. Niemi, K. J. Eskola and R. Paatelainen, work in progress.

[4] K. J. Eskola, H. Niemi, R. Paatelainen and K. Tuominen, arXiv:1711.09803 [hep-ph].

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