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Evolution of elliptic and triangular flow as a function of beam energy in a hybrid model

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Elliptic flow has been one of the key observables for establishing the finding of the quark-gluon plasma (QGP) at the highest energies of Relativistic Heavy Ion Collider (RHIC) and the Large Hadron Collider (LHC). As a sign of collectively behaving matter, one would expect the elliptic flow to decrease at lower beam energies, where the QGP is not produced. However, in the recent RHIC beam energy scan, it has been found that the inclusive charged hadron elliptic flow remains nearly constant in magnitude in the energies between 7.7 and 39 GeV per nucleon-nucleon collision.

We study the collision energy dependence of the elliptic and triangular flow utilizing a Boltzmann+hydrodynamics hybrid model described in [1,2]. Such a hybrid model provides a natural framework for the transition from high collision energies, where the hydrodynamical description is essential, to smaller energies, where the hadron transport dominates. This approach is thus suitable to investigate the relative importance of these two mechanisms for the production of the collective flow at different values of beam energy. Extending the examined range down to 5 GeV per nucleon-nucleon collision allows also making predictions for the CBM experiment at FAIR.

References:
[1] H. Petersen, J. Steinheimer, G. Burau, M. Bleicher and H. Stocker, Phys. Rev. C78, 044901 (2008).
[2] J. Auvinen and H. Petersen, arXiv:1306.0106.

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