Contribution ID: **124** Type: **Oral**

Sub-nucleon geometry and multiparticle cumulants including c2{4} in p+p collisions

Wednesday 26 April 2023 14:40 (25 minutes)

Using the string melting version of a multi-phase transport (AMPT) model without or with the sub-nucleon geometry for the proton to study multiparticle cumulants in p+p collisions at 13 TeV [1]. We have found that both versions of the model can produce c2{4}<0 for high-multiplicity events, which is thought to be the signal of the collective flow. The relation between c2{4} and the parton scattering cross section is non-monotonic, where only a finite range of parton cross sections can lead to negative c2{4} for high-multiplicity p+p events. In addition, the AMPT version with the proton sub-nucleon geometry describes the multiplicity dependence of c2{4} much better than the version without. This demonstrates the importance of incorporating the sub-nucleon geometry and the potential of using multiparticle cumulants to probe the detailed sub-nucleon geometry in studies of small collision systems.

[1] X.L.Zhao, Z.W.Lin, L.Zheng and G.LMa, arXiv:2112.01232.

Theory / experiment

Theory

Group or collaboration name

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Session Classification: Parallel Session B

Track Classification: QGP in small systems