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Collective effects in string models: machine learning perspective

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This work focuses on exploring the potential of machine learning methods in relativistic nuclear physics to differentiate between various physical theories, and consequently, gain a deeper understanding of the underlying physical processes in ultra-high-energy nuclear collisions. Recent findings from modeling p+p and AA interactions within the color string fusion framework suggest that it may be possible to describe the experimental azimuthal asymmetry event-by-event in a unified way across different colliding systems. This description becomes possible by considering two mechanisms of string interactions: 1) changes in the strength of the color field in the area where strings overlap in the transverse plane, and 2) Lorentz boosts applied to particles resulting from string motion due to mutual attraction. We demonstrate that it is possible to train machine learning algorithms using pT-φ distributions from event-by-event data in order to distinguish between different sources of collective behaviour.

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