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Studying Hadronization by Machine Learning Techniques

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Hadronization is a non-perturbative process, which theoretical description can not be deduced from first principles. Modeling hadron formation requires several assumptions and various phenomenological approaches. Utilizing state-of-the-art Computer Vision and Deep Learning algorithms, it is eventually possible to train neural networks to learn non-linear and non-perturbative features of the physical processes.

Here, I would like to present the latest results of two deep neural networks, by investigating global and kinematical quantities, indeed jet- and event-shape variables. The widely used Lund string fragmentation model is applied as a baseline in $\sqrt{s}$=7 TeV proton-proton collisions to predict the most relevant observables at further LHC energies. Non-liear QCD scaling properties were also identified and validated by experimental data.

[1] G. Bíró, B. Tankó-Bartalis, G.G. Barnaföldi; arXiv:2111.15655

Significance

References

https://arxiv.org/abs/2111.15655
https://agenda.infn.it/event/28874/contributions/170292/
https://indico.wigner.hu/event/1393/contributions/3160/
https://indico.cern.ch/event/1097820/contributions/4623938/

Experiment context, if any

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