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Investigation of phenomenological models combinations implemented in PYTHIA6 :Tuning results

We investigate different phenomenological models implemented in PYTHIA6 using data from ATLAS experiment to find best fit. These models include Multiple Parton Interactions model, different scenarios of Matter Overlap and Color Reconnection models as well as Lambda_QCD selection in alpha_s. We used three different parton density functions (PDFs) to study their effects on the selected models.
We show that each combination of models describes data differently, though overall results do not vary greatly except for selection of fixed Lambda value chosen according to the selected PDF. We have found that it is not possible to describe data well with fixed Lambda value approach. All selected model combinations with varying lambda value approach, when appropriately tuned, can describe data reasonably well almost independent of PDFs used.
This study provides better understandings of different model combinations and helps to select better model combinations for tuning purposes.

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