Study of Free Parameters of Phenomenological Models Implemented in PYTHIA

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Pythia8, an event generator widely used in the community, requires careful parameter selection and tuning to ensure accurate simulations. This study focuses on the selection of free parameters for specific models implemented in Pythia8, using selected data from the Large Hadron Collider (LHC) as a basis for tuning.

By analyzing experimental data from the LHC, including observables such as particle spectra and multiplicity distributions, the parameter values of the selected models are adjusted iteratively. Advanced statistical techniques, such as optimization algorithms and fitting procedures, are employed to find the optimal parameter set that best reproduces the measured data. The goal is to achieve a higher degree of agreement between the simulated events and the experimental results.

The process of parameter selection and tuning is essential in improving the accuracy and reliability of Pythia8 simulations. By fine-tuning the free parameters, the models can better capture the intricate details of the observed data, leading to more accurate predictions and interpretations of high-energy collisions at the LHC.

The results of this study will contribute to the ongoing efforts in refining the performance of Pythia8 and enhancing our understanding of particle interactions at the LHC.