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Hadronization effects using String and Cluster Models in Herwig 7

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Monte Carlo Event Generators contain several free parameters that cannot be inferred from first principles and need to be tuned to better model the data. With increasing precision of perturbative calculations to higher orders and hence decreasing theoretical uncertainties, it becomes crucial to study the systematics of non-perturbative phenomenological models. A recent attempt was made at tuning the combination of the angular-ordered parton shower in Herwig7 and Lund string hadronization model to LEP data with a new approach called Autotunes [1]. However, the results showed worse performance to important observables like LEP event shapes when compared to the previous tunes of the cluster hadronization model. Since the angular ordered parton shower and the string hadronization model perform well independently with Herwig7 and Pythia8, we would naively expect them to perform better together and thus investigate further by tuning the setup with the Professor approach adopted in [2]. I present the results of our tune and compare it with the Herwig7 default, Pythia 8 and Autotunes tunes.

[1] High dimensional parameter tuning for event generators, J.Belm, L.Gellersen, Eur.Phys.J.C 80 (2020) 1, 54

[2] Systematic event generator tuning for the LHC, A.Buckley et al, Eur.Phys.J.C 65 (2010) 331-357

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