Documentation of the project: ISR jet tagging

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Capítulo 1

Introduction

During the last semester of 2014, I did my Undergraduate Thesis Project entitled "*Design of algorithms to identify high momentum Initial State Radiation (ISR) Jets in proton – proton collision events*", under the supervision of Juan Carlos Sanabria, Ph.D.. As the name suggests, the project consisted in the proposal of an algorithm to identify ISR jets. Due to the promising results, I was employed during the first semester of 2015 under the program "Joven Investigador" of COLCIENCIAS in order to improve the initially obtained results. Throughout this time, several codes and programs were developed. To encourage the continuation of this project, this report has been written with a summary of all the technical work done so far.

In the second chapter, the simulation chain will be presented. This chapter contains the usage of the programs MadGraph 5.2 [1], Pythia 8.2

Bibliografía

[1] J. Alwall, R. Frederix, S. Frixione, V. Hirschi, F. Maltoni, O. Mattelaer, H.-S. Shao and T. Stelzer *et al.*, *"The automated computation of tree-level and next-to-leading order differential cross sections, and their matching to parton shower simulations,"* JHEP **1407**, 079 (2014) [arXiv:1405.0301 [hep-ph]].

[2] T. Sjöstrand, S. Ask, J. R. Christiansen, R. Corke, N. Desai, P. Ilten, S. Mrenna and S. Prestel *et al.*, *"An Introduction to PYTHIA 8.2,"* Comput. Phys. Commun. **191**, 159 (2015) [arXiv:1410.3012 [hep-ph]].