



## Multi-jet matching of parton showers to NLO

*Thursday, July 5, 2012 4:00 PM (15 minutes)*

LHC is now entering a precision era. No striking signals of new phenomena have yet been found, and the searches now have to focus on very small deviations from the Standard Model. This requires an unprecedented precision in our understanding of the Standard Model. Even though the experiments are extremely ingenious in finding model-independent ways of determining the background, this is not always possible and they have to rely event generators. And even if model-independent determinations are possible, they typically need precise event generators to be developed and understood.

During the last years, much effort has gone into increasing the precision of event generators by carefully matching or merging parton shower programs with exact fixed-order matrix elements. The merging of tree-level matrix elements has now become the standard for multi-jet events, but this leading order procedure lacks in precision. For many processes the matching of Next-to-Leading Order (NLO) matrix elements with parton showers has become state-of-the-art, but the standard programs can only handle the lowest possible jet-multiplicities.

In this talk I will briefly review the standard matching and merging procedures, and then present a new algorithm where multi-jet NLO matrix elements can be correctly merged with parton showers. The new algorithm has been implemented in the Pythia8 event generator and will in principle be able to handle any process where multi-jet partonic states can be produced to NLO, however, in this talk I will only present results for  $W$ +jets and Higgs+jets observables.

### Summary

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