

FINANCÉ PAR
ANR

IPHC
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MIAD
Analysis **5**

In-live session

Fast-simulation and related topics

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Workshop @ Grenoble
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Samples:

- Sample 1: Dileptonic $t\bar{t}$ events @ 8TeV. 10,000 events
- Sample 2: Drell-Yan (muon channel) events @ 8TeV. ~20, 000 events
- Produced by MadGraph 5 + Pythia 6. Sample format = STDHEP

Preliminary study: content of the events in terms of particles ?

Running MadAnalysis 5 in hadron-level mode: `bin/ma5 -H`

How to go from the hadronic level to the reconstructed level ?



**MadAnalysis recipe
based on FastJet**

Delphes

Jet-Clustering + efficiencies on
(mis)identification

arXiv:1307.6346

```
ma5> install fastjet
```

```
ma5> install delphes
```

Running MadAnalysis 5 in hadron-level mode: **bin/ma5 -R**

Events can be saved into 2 possible formats



LHC format

LHE format

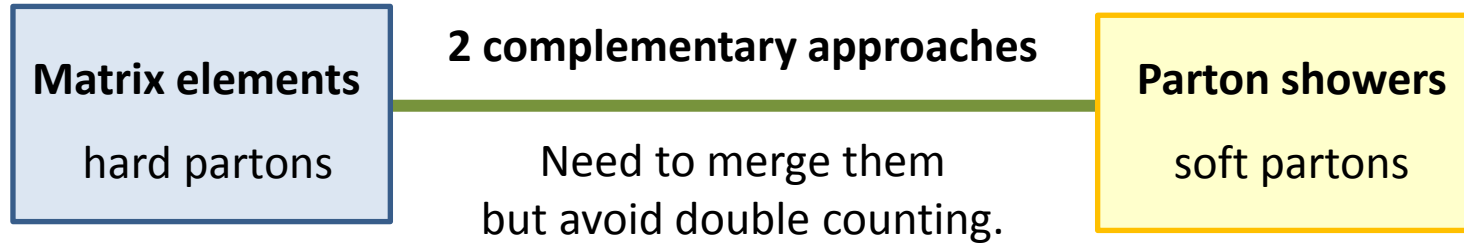
Conventions are respected.

Conventions adapted to reconstructed objects such as jets.

- Status code = -1 for initial state, 3 for hard process, 1 for final state
- PDG id = 5 for bjets, 21 for lighter jets, ± 11 for electrons, ± 13 for muons, ± 15 for hadronically-decaying taus
- Reconstructed objects and generated particles are linked by the mother-daughter relation.

**Each format has its proper restrictions.
Need a new format ?**





- **Merging matrix-elements with 0, 1, 2, 3, extra jets**
 - Study of the smoothness of the differential jet rate (DJR) distributions.
 - The scale for which an event goes from a $N \rightarrow N+1$ jet configuration.
 - Extremely sensible to the merging procedure.
 - This validates the choices for the merging parameters.
- **Running MadAnalysis 5 in hadron-level mode: `bin/ma5 -H`**

Validation plots: ME/PS merging

Jet-merging validation plots:

Example of Z production with 0, 1, 2, 3, 4 extra jets

