MadAnalysis 5 v1.4

Normal mode part

Dependencies

- **Some mandatory dependencies are removed**:
    - Numpy
    - pyROOT
    - ROOT
→ Only gcc, python and makefile are required.
→ Easier to install MadAnalysis 5.

- **Histogramming is optional now.**

- **Two possible optional dependencies for histogramming:**
    - ROOT
    - Matplotlib

- **ROOT is still required for Delphes, DelphesMA5tune & recasting.**

Configuration file

- **More options in the configuration file : madanalysis/input/installation_options.dat**

```
# ----GENERAL----
# tmp_dir = /tmp/toto/
# download_dir = /Users/fuks/Desktop/tmp
# webaccess_veto = 0 # 0=No, 1=Yes

# -----ROOT-----
# root_veto      = 0 # 0=No, 1=Yes
# root_bin_path = /home/toto/root/bin

# -----MATPLOTLIB-----
#matplotlib_veto = 0 # 0=No, 1=Yes

# -----DELPHES-----
# delphes_veto      = 0 # 0=No, 1=Yes
# delphes_includes = /Users/fuks/Work/tools/madanalysis/bzr/v1.3beta/tools/RE_delphes/
# delphes_libs      = /Users/fuks/Work/tools/madanalysis/bzr/v1.3beta/tools/RE_delphes/

# -----DELPHESMA5TUNE-----
# delphesMA5tune_veto      = 0 # 0=No, 1=Yes
# delphesMA5tune_includes = /home/toto/delphesMA5tune/include
# delphesMA5tune_libs      = /home/toto/delphesMA5tune/lib

# -----ZLIB-----
# zlib_veto      = 0 # 0=No, 1=Yes
# zlib_includes = /usr/include
# zlib_libs = /usr/lib

# -----FASTJET-----
# fastjet_veto      = 0 # 0=No, 1=Yes
# fastjet_bin_path = /Users/fuks/Work/tools/madanalysis/bzr/v1.1.12beta/tools/fastjet/bin

# -----PDFLATEX-----
# pdflatex_veto = 0 # 0=No, 1=Yes

# -----LATEX-----
# latex_veto = 0 # 0=No, 1=Yes
```

Graphical Renderer 1/3

- **For histogramming, there are 3 possible choice:**
  - ROOT (version > 5.27)
  - MatPlotlib (version > 1.0.1)
  - None
→ MadAnalysis 5 chooses at the beginning of the session the best program
  (if ROOT and MatPlotlib are detected, ROOT is chosen by default)

```
MA5: Platform: Linux 2.6.18-404.el5 [Linux mode]
MA5: Reading user settings ...
MA5: Checking mandatory packages:
MA5:      - Python                      [OK]
MA5:      - GNU GCC g++                 [OK]
MA5:      - GNU Make                    [OK]
MA5: Checking optional packages devoted to data processing:
MA5:      - Zlib                        [OK]
MA5:      - FastJet                     [OK]
MA5:      - Root                        [OK]
MA5:      - Delphes                     [OK]
MA5:      - Delphes-MA5tune             [DISABLED]
MA5: Checking optional packages devoted to histogramming:
MA5:      - Root                        [OK]
MA5:      - Matplotlib                  [OK]
MA5:      - pdflatex                    [OK]
MA5:      - latex                       [OK]
MA5: Package used for graphical rendering: Root
```

Graphical Renderer 2/3

- **Command for changing the graphical renderer:**

```
ma5>set main.graphic_render = <program name>
```

<program name> =
root, matplotlib or none

- **When you launch an analysis, MadAnalysis 5 will save the histograms in scripts:**
  - A C++ script for ROOT
  - A Python script for Matplotlib
  - → Easy to tune your figures before publishing

This script can be found in the folder: <analysis folder>/Histos/selection_*

Displaying the histograms can be done with ROOT or Matplotlib (if you have installed them) :

```
bash> root selection_0.C
```

```
bash> python selection_0.py
```

Graphical Renderer 3/3

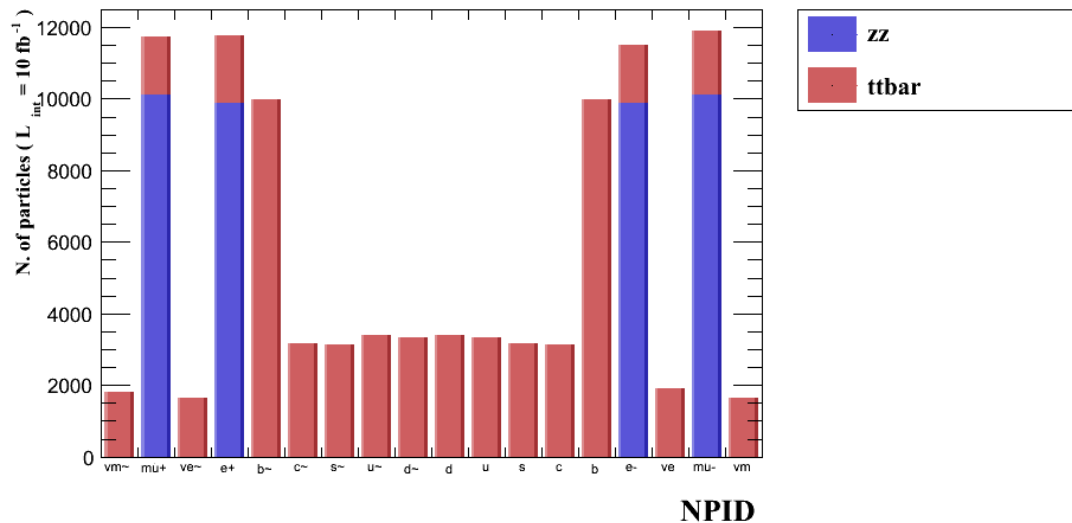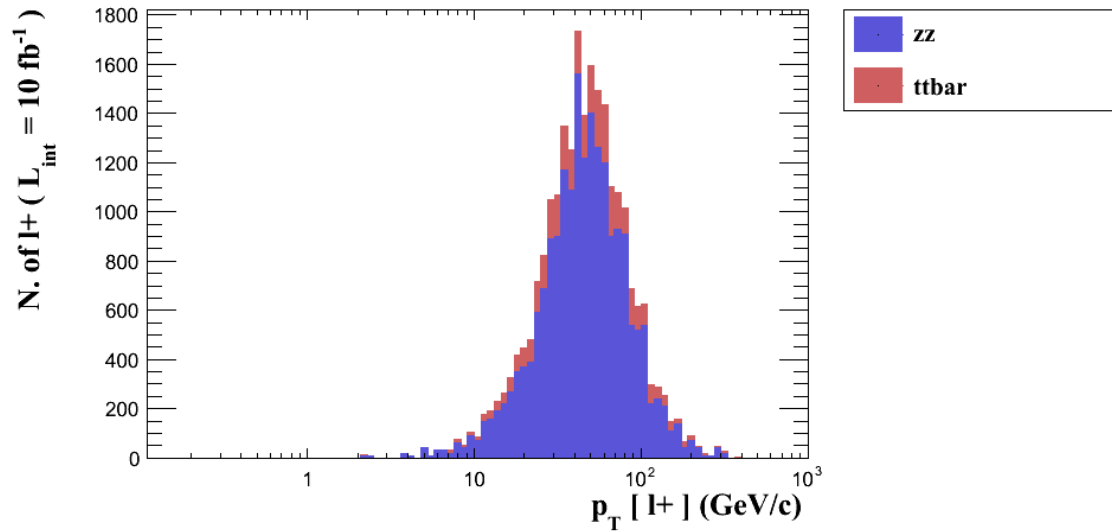**Plot display has been improved.**

Figure of merit

- **Now the user cannot anymore specify the formula of the figure of merit. He must choose one formula** among a predefined collection.

  1: S/B
  2: S/sqrt(B)
  3: S/(S+B)
  4: S/sqrt(S+B)
  5: S/sqrt(S+B+(xB)**2)

  with S and B mean respectively Signal and Background

- **Corresponding instruction in MadAnalyis 5.**

```
ma5>set main.fom.formula = <formula number>
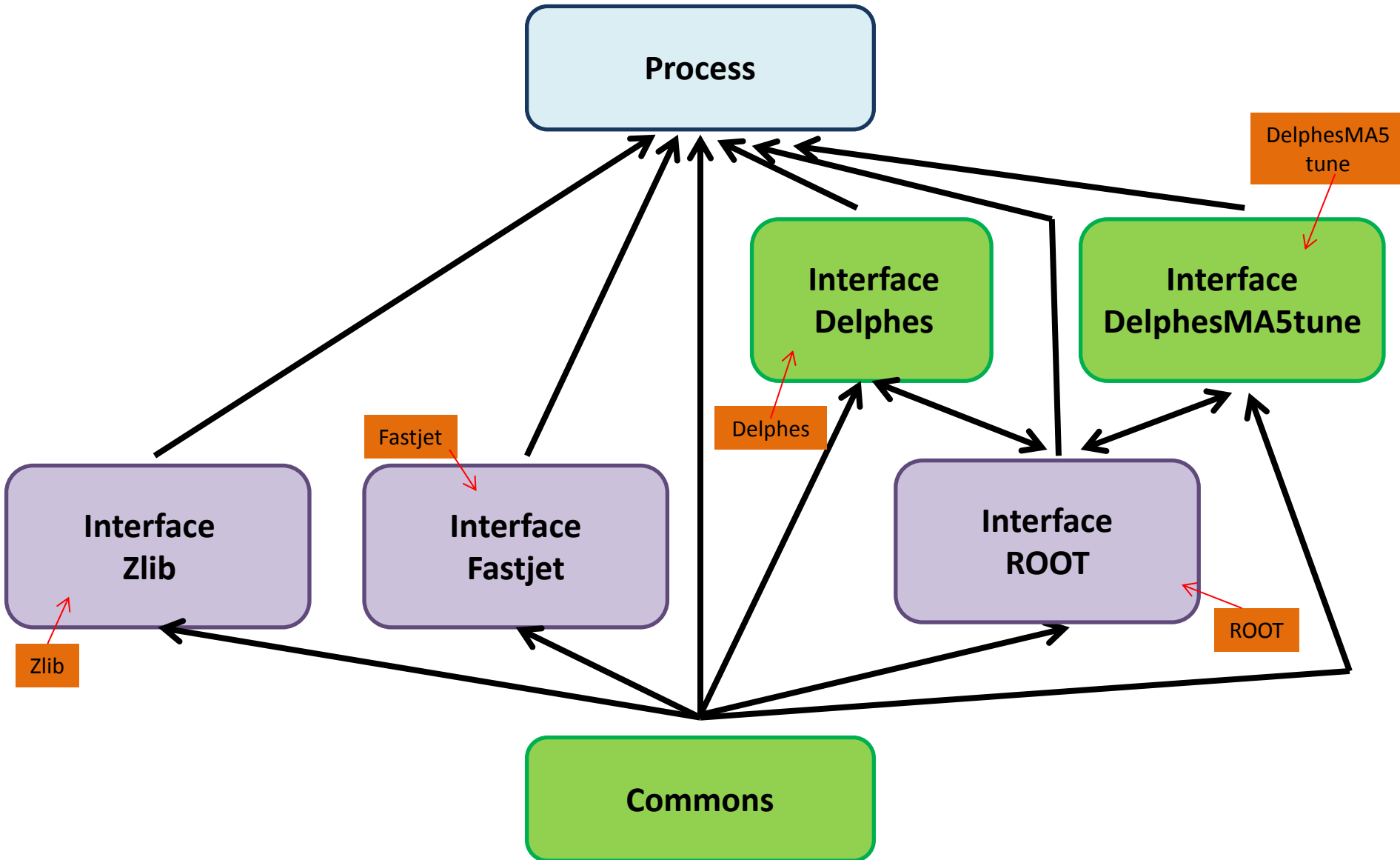```

- **Special case: the x parameter in formula number 5**

```
ma5>set main.fom.formula = 5
ma5>set main.fom.x = 0.2
```

MadAnalysis 5 v1.4

Expert mode part

SampleAnalyzer compilation scheme

Portable data types

- **ROOT is not required by default.**
- → **ROOT architecture-independent types cannot be used anymore.**

signed integer

Types	Size
MAint8	8 bits
MAint16	16 bits
MAint32	32 bits
MAint64	64 bits

unsigned integer

Types	Size
MAuint8	8 bits
MAuint16	16 bits
MAuint32	32 bits
MAuint64	64 bits

float

Types	Size
MAfloat32	32 bits
MAfloat64 = MAdouble64	64 bits

Portable data types

- **ROOT is not required by default.**
→ **ROOT TLorentzVector cannot be used anymore.**

TLorentzVector is replaced by **MALorentzVector.**
→ Almost all methods are the same.

Other vector-related classes have been defined:
- **MAMatrix**
- **MARotation3D**
- **MABoost**