MG5aMC tutorial; requirements

- Laptop PC (with internet connection)
- Terminal (for shell operation)
- Basic knowledge of shell commands;
  e.g. pwd, mkdir, cd, cp, mv, rm, tar, less, more, …
- python 2.6 or 2.7
- gfortran/gcc 4.5 or higher
- matplotlib (or ROOT) [for MadAnalysis5]

MG5aMC; start-up

- Download MG5_aMC_vX.Y.Z.tar.gz at the MadGraph5_aMC@NLO launchpad: https://launchpad.net/mg5amcnlo
- At your working directory in the terminal, untar:
  $ tar zxvf MG5_aMC_vX.Y.Z.tar.gz
- Go into the MG5aMC directory:
  $ cd MG5_aMC_vX_Y_Z/
- Start MG5aMC:
  $ ./bin/mg5_aMC

MG5aMC; install other tools

- For plots:
  MG5_aMC> install MadAnalysis5
- For parton-shower and hadronization:
  MG5_aMC> install pythia8
- For NLO calculations:
  MG5_aMC> install looptools

MG5aMC; main 4 steps

- MG5_aMC> import model MODEL (e.g. 2HDM)
- MG5_aMC> generate PROCESS (e.g. p p > t t~)
- MG5_aMC> output (myprocess)
- MG5_aMC> launch

MG5aMC; tips

- Use auto-completion by "tab (tab)".
- MG5_aMC> help
- MG5_aMC> help COMMAND (e.g. generate)
- MG5_aMC> tutorial

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Downloads

Latest version is 2.6.x

MG5_aMC_v2.6.7.tar.gz

MG5aMC_3.0.1_beta.ta

released on 2017-08-15

All downloads

Announcements

e the right of this page)

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MadGraph5_aMC@NLO

Overview Code Bugs Blueprints Translations **Answers**

Ask a question

Please enter a short description (at least 4 words) in the language of your choice, that describes your problem. We will use it to look for similar questions that may already exist.

Change your preferred languages to modify the list of languages available for writing the question.

Language:

English (en) *

The language in which this question is written. The languages marked with a star (*) are the languages spoken by at least one answer contact in the community.

Summary:

A one-line summary of the issue or problem.

Continue or Cancel

One can directly communicate with the developers via Launchpad (ask questions, report bugs, etc).

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https://launchpad.net/mg5amcnlo

EX-1; change parameters

- Semi-leptonic decays in top-pair production:
  MG5_aMC> generate p p > t t~, t > b l- vl~, t~ > b~ j j
- How can we change?
  - top mass
  - top width
  - W mass
  - beam energy
  - pT cut on leptons

param_card.dat

run_card.dat

EX-2; process generation (coupling order)

- What is the difference?

1. > generate p p > t t~

2. > generate p p > t t~ QCD=0

3. > generate p p > t t~ QED=0

4. > generate p p > t t~ QED=99

Check the Feynman diagrams:
> display diagrams

- Compare the cross sections.

EX-3; process generation (syntax)

- What is the difference?

1. > generate p p > e+ e-
2. > generate p p > z > e+ e-
3. > generate p p > z, z > e+ e-
4. > generate p p > e+ e- $ z
5. > generate p p > e+ e- $$ z
6. > generate p p > e+ e- / z

Edit myprocess/Cards/madanalysis5_parton_card.dat to refine bins of plots.

Run MA5 later;
$ cd myprocess/
$ ./bin/madevent
myprocess> madanalysis5_parton

- Compare the distributions of the lepton-pair invariant mass.

Run MA5 standalone;
$ MG5_aMC_vX_Y_Z/HEPTools/madanalysis5/madanalysis5/bin/ma5

EX-4; cross sections (param scan; root-S)

- Reproduce the red curve.

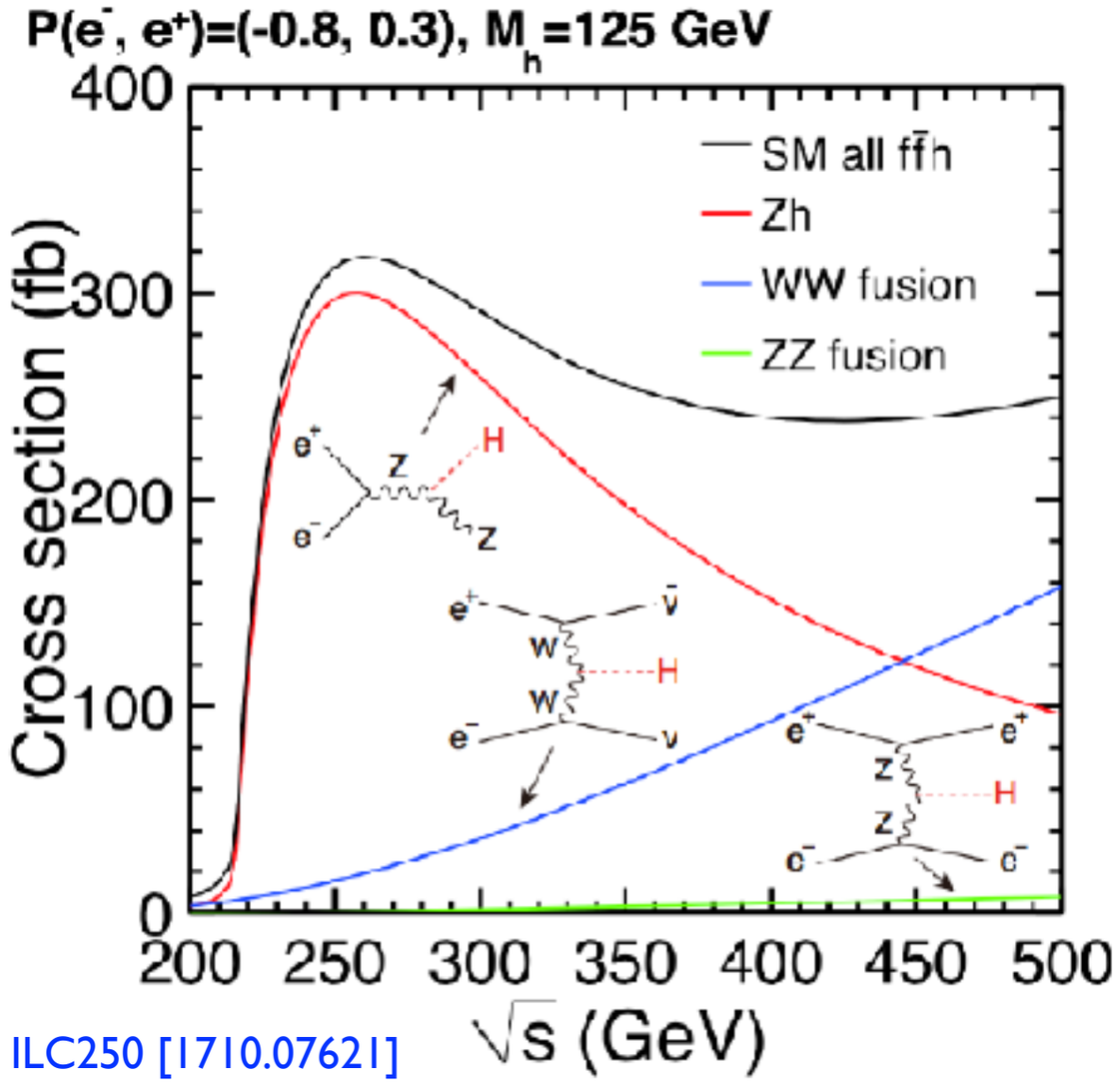

Fig.3 in ILC250 [1710.07621]

Edit myprocess/Cards/run_card.dat,
> launch -n rs200
Edit myprocess/Cards/run_card.dat,
> launch -n rs250
…

Write a MG5 script file.

EX-5; cross sections (param scan; masses)

- Reproduce the black curves.

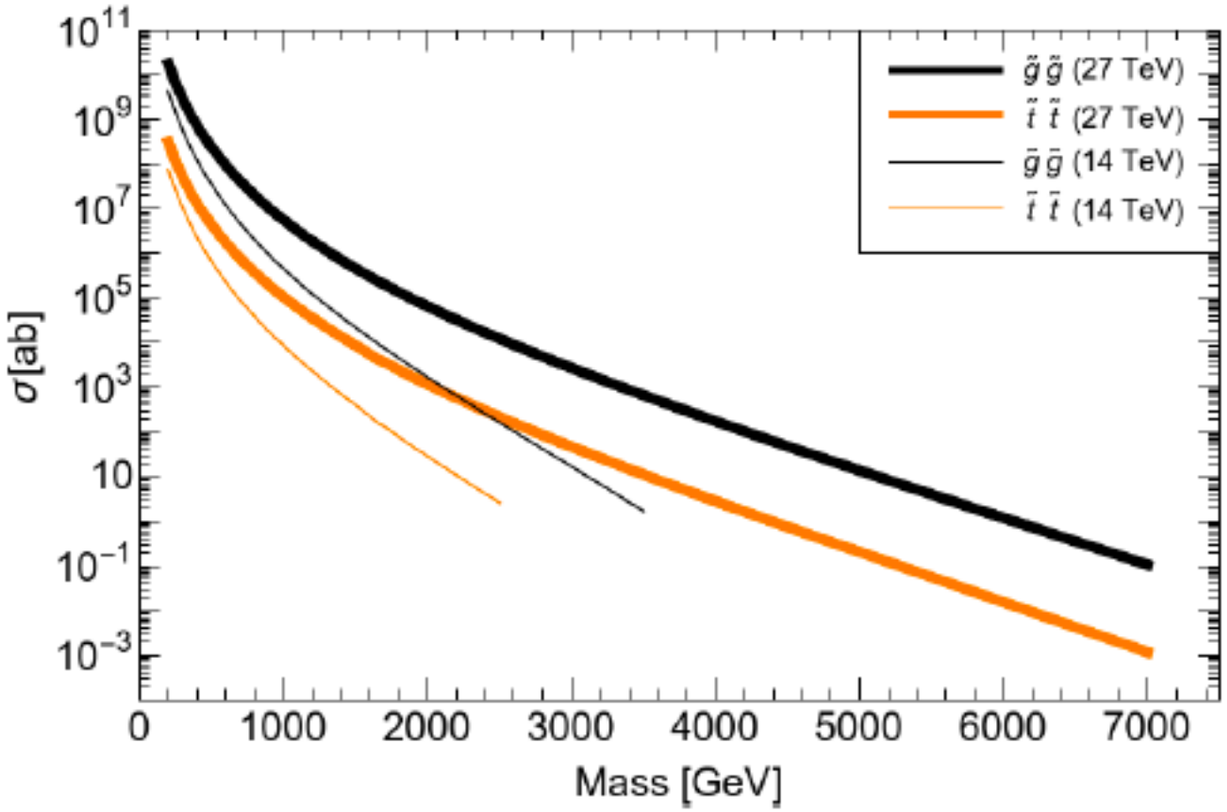

Fig.2.1(left) in HL-LHC/HE-LHC [1812.07831]

Edit myprocess/Cards/param_card.dat,
> launch -n m1000
Edit myprocess/Cards/param_card.dat,
> launch -n m2000
…

Use a scan command in param_card.dat.