Madgraph5: Tutorial

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Install MadGraph 5

- Pre-release on the indico (version 0.5.0)
- https://agenda.phys.ucl.ac.be/conferenceDisplay.py?confId=944

2) Install Python

- http://www.python.org/download/
- For Windows/MAc: follow instructions
- For Linux (from source)
  - ./setup.py
  - make install
  - make

Starting with MG5

- $> ./bin/mg5
- mg5> tutorial
- follow the tutorial
- Don't forget the "help" command

First Trial

- create the diagrams for squark pair production (squarks up only) initiated from gluon
- Compute the cross-section at LHC (optional)
- Advice: type help

Solutions:

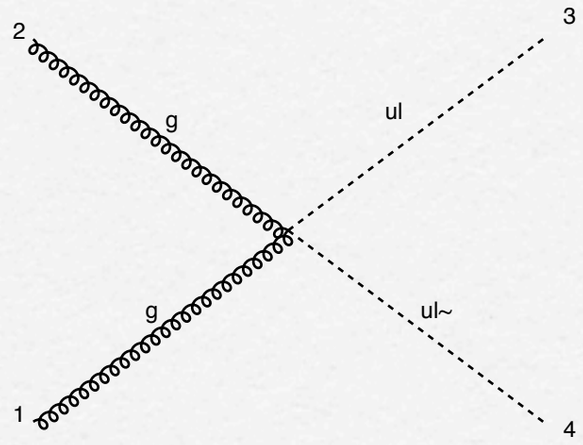


diagram 1

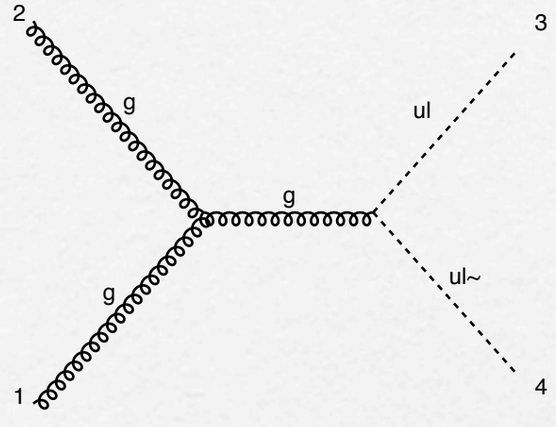


diagram 2

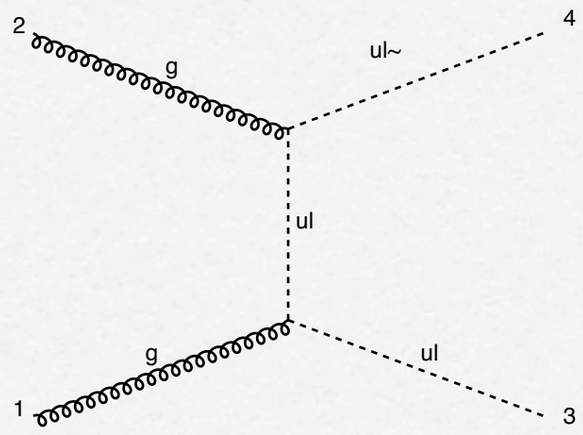


diagram 3

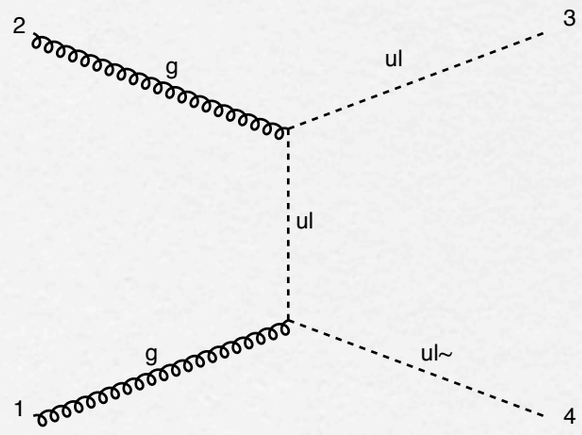


diagram 4

Solution

- mg5> import model mssm
- mg5> define sq = ur ur~ ul ul~
- mg5> generate g g > sq sq
- mg5> draw /tmp
- mg5> ! shell /tmp/diagrams_0_gg_ululx.eps

Solution Part 2

- $> cd PROC_MSSM_0
- $> ./bin/generate_events
- $> firefox index.html
- result: 0.31611 pb

Second Trial

Generate standalone output for those three diagrams (top quark pair production)

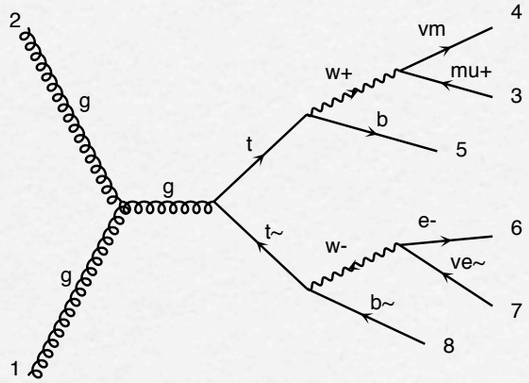


diagram 1

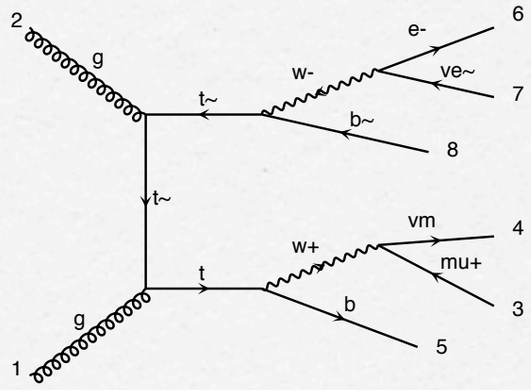
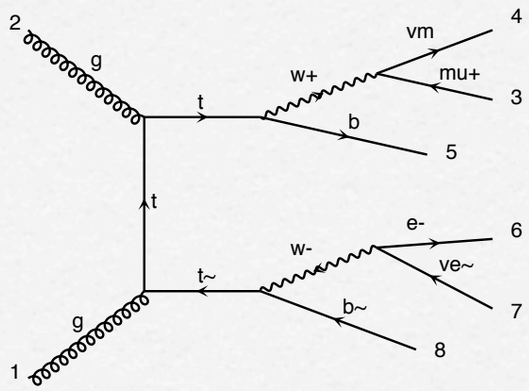


diagram 2



Advice:

help generate

help output

Solution

- import model sm
- generate p p > t t~, \
  (t > w+ b, w+ > mu+ vm), \
  (t~ > w- b~ , w- > e- ve~)
- output standalone

Trial 3 for model builder

- verify the gauge invariance of
  g g> t t~h
- Advice: type help to see list of possible command.

Solution

- check gauge g g > t t~ h

```
mg5>check gauge g g > t t~ h
INFO: Checking gauge process: g g > t t~ h
ALOHA: aloha creates FFS1 routines
ALOHA: aloha creates FFV1 routines
ALOHA: aloha creates VVV1 routines
1 processes checked in 0.515 s
gauge results:
Process          matrix            BRS                 ratio               Result
g g > t t~ h     1.8214734436e-05 1.5337757713e-36 8.4205222792e-32 Passed
Summary: 1/1 passed, 0/1 failed
mg5>
```

USE The Web

- http://madgraph.phys.ucl.ac.be/
- select MG5 (beta)
- generate your favorite process
  - Note differences for space/ couplings

Bug/request/...

- Bug/feature/code status/download:
  - https://launchpad.net/madgraph5
- Wiki:
  - https://server06.fynu.ucl.ac.be/projects/madgraph/wiki/
- Thanks To you!!!