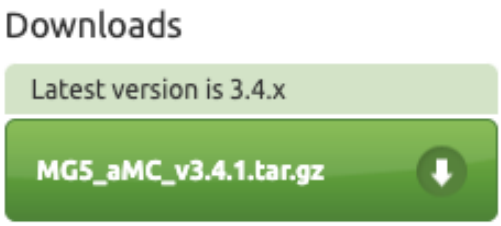
Dear All,

Let me first briefly introduce **the download and preparation for MadGraph***.
I recommend that you will finish this before the tutorial session. (not mandatory, though).

You can use MadGraph to see the cross section and kinematical distributions (transverse momentum, etc) of your interesting scattering process very easily.

* We need to use a terminal in Mac computer (or Windows terminal for windows).
Please try to open the terminal first.
We frequently use the following Linux commands in the terminal. Not many, let's enjoy checking and using them:
"pwd, cd, cp, cp -r, mkdir, rm, rm -r, ls, open ."

MadGraph download and how to use:
1-1) go to:
https://launchpad.net/mg5amcnlo
Download it from here:



1-2)
Put MadGraph in a directory (in my case /Users/kimiko-y/TOOL/CAU_Tutorial):
cf.
The "cd" command in the terminal can take me to home directory:

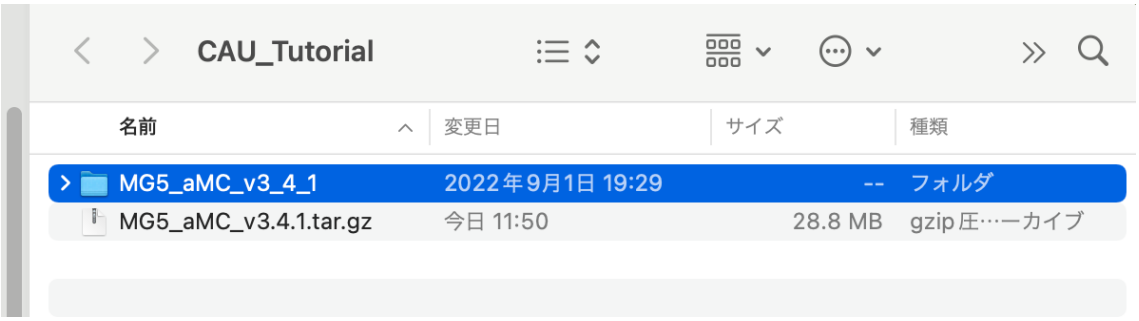
```
(base) yamashitakimikos-MacBook-Pro:~ kimiko-y$ cd
(base) yamashitakimikos-MacBook-Pro:~ kimiko-y$ pwd
/Users/kimiko-y
(base) yamashitakimikos-MacBook-Pro:~ kimiko-y$
```

Then you can make a directory by:

"mkdir CAU_Tutorial"

Then "open ."

Put MadGraph directory there and double click (for Mac) for untar and unzip:



1-3) go to MG5_aMC_v3_4_1

by "cd MG5_aMC_v3_4_1"

cf. you can drop that directory to the terminal, then automatically, the directly pass is written down.

"Tab" is easy to find out the name of the directory

1-4)

type:

./bin/mg5_aMC

Then

```
(base) yamashitakimikos-MacBook-Pro:MG5_aMC_v3_4_1 kimiko-y$ pwd
/Users/kimiko-y/TOOL/CAU_Tutorial/MG5_aMC_v3_4_1
(base) yamashitakimikos-MacBook-Pro:MG5_aMC_v3_4_1 kimiko-y$ ./bin/mg5_aMC
************************************************************
*                                                          *
*                    W E L C O M E to                      *
*              M A D G R A P H 5 _ a M C @ N L O           *
*                                                          *
*                                                          *
*                *                       *                 *
*                  *        * *        *                   *
*                    * * * * 5 * * * *                     *
*                  *        * *        *                   *
*                *                       *                 *
*                                                          *
*         VERSION 3.4.1                2022-09-01          *
*                                                          *
```

1-5)

try to type

"p p > t t~”

then

"output TESTPPTT”

then

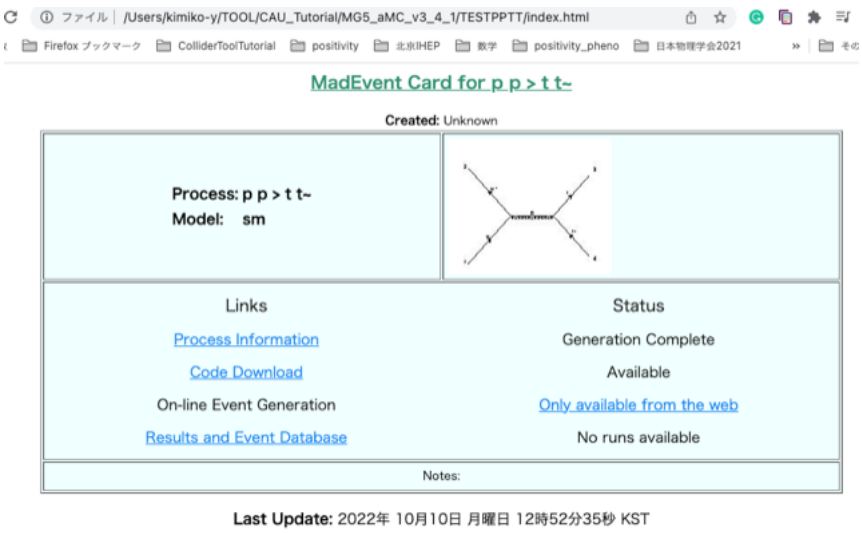
"launch -f”

then

“open index.html"

(if browser does not automatically open)

You can see:



If you failed in the above:

MadGraph5_aMC@NLO needs

Python version 2.7 or 3.7 (or higher) ;

gfortran/gcc 4.6 or higher is required for NLO calculations/simulations.

For Mac:

a) One way is to: first install Homebrew: https://brew.sh/

"Xcode Command Line Tools" (we need this also)

is also installed as part of this homebrew installation

b) check whether you alredy have gfortran by: gfortran -v

If you don't have, you can try to install by : brew install gcc

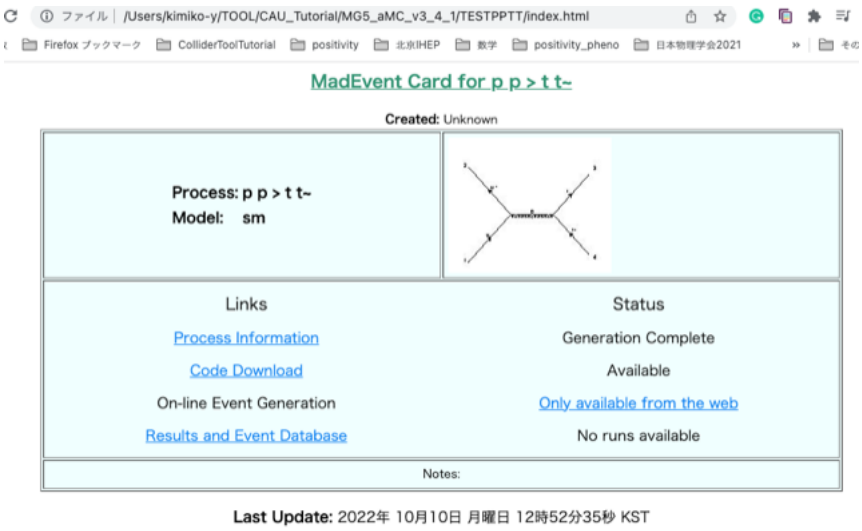
For Windows:

a) having run:

"sudo apt-get install python gcc gfortran gmake wget perl vi”

I may miss some directions.

Please let me know if you stuck before seeing the successful picture in the item 1-5):



Thank you very much.

Best regards,

Kimiko