For Andre

> The compatibility problem as I see it is incompatibility between madminer and madgraph.

This is an attempt to solve it. The commands below work for me, but note that you'll have to change the paths to your paths, for example `/nfs/dust/cms/user/aalkadhi` `/nfs/dust/cms/user/<username>`, etc.

- First install miniconda with the provided install script
- clone madminer
- do `conda init bash`
- `cd madminer && conda env create -f environment.yml`
- `conda activate madminer`
  - You have to activate this conda env every time you want to use it in the future
- `conda install -c anaconda jupyter pathlib`
- `conda install -c conda-forge pytest-shutil`
- `pip3 install pytest-shutil pathlib`
- Install madminer *inside the madminer environment* with `pip3 install madminer`
- Add the miniconda python/other executables to path with `export PATH=$PATH:/nfs/dust/cms/user/aalkadhi/miniconda3/envs/madminer/bin`
- Install mg5 v 2.9.4, which is the default MG5 version for madminer, with `install_mg5_2.9.4.sh` (`/nfs/dust/cms/user/aalkadhi/madminer/install_mg5_2.9.4.sh`).
- Add MG5 to path with `export PATH=$PATH:/nfs/dust/cms/user/aalkadhi/madminer/MG5_aMC_v2_9_4/bin`
- clone the madminer repo `git clone https://github.com/madminer-tool/madminer.git`
- Test that madminer works:
  i. `cd madminer/examples/tutorial_particle_physics`
     - Here you have two options, either run them as jupyter notebooks with the directions below, or run them as python executable scripts with the command `jupyter nbconvert --to script *.ipynb` . If you wish to do the former, make sure you comment lines including `ipython` in the scipts. To use jupyter notebooks, continue reading.
  ii. On naf, do `jupyter lab --no-browser --port=8999`

iii. On your PC, do `ssh -NfL 8999:localhost:8999 aalkadhi@naf-cms.desy.de`
iv. On your PC, open a broswer and go to localhost:888. If asked for a password, just copy whatever is after `token=` when you run the command in step 2 on naf, and paste it in your browser for the password.
v. got through `1_setup.ipynb` and make sure it works. (just do `python3 1_setup.py`).
vi. Change `50000 = nevents` to `5 = nevents` on both `cards/run_card_signal_large.dat` and `cards/run_card_signal_small.dat` for quick testing.
vii. Go through `2a_parton_level_analysis.ipynab`. (look at `2a_parton_level_analysis.py`)
viii. When you get to the point of setting MG5 installation path (note: on the madminer docker, it is installed `/madminer/software/MG5_aMC_v2_9_4/bin/mg5_aMC` so the default version is 2.9.4.) in 1_setup.py, set it to 2.9.4 first to see that it works by doing the following:

```
os.environ['MG_FOLDER_PATH']='/nfs/dust/cms/user/aalkadhi/madminer/MG5_aMC_v2_9_4'
#the /bin/mg5_aMC  is added by madminer
print(os.getenv('MG_FOLDER_PATH'))
mg_dir = os.getenv("MG_FOLDER_PATH")
```

11. do `python3 2a_parton_level_analysis.py`

12. Somehow, when running on naf, for me madminer is not able to copy the directories and cards into ones for madminer. For example, when doing `python3 2a_parton_level_analysis.py` you get error "FileNotFoundError: [Errno 2] No such file or directory: ./mg_processes/signal1/Cards/run_card.dat"

To solve this temporarilly do `mkdir -p  mg_processes/signal1/Cards`, and run 2a_parton_level_analysis.py again, it should work. To run the whole 2a..py file do

```
mkdir -p  mg_processes/signal1/Cards
mkdir -p  mg_processes/signal2/Cards
mkdir -p  mg_processes/signal1/Cards
```

Also, change `#!/usr/bin/env python` to `#!/usr/bin/env /nfs/dust/cms/user/aalkadhi/miniconda3/envs/madminer/bin python3`, although that doesn't change anything, so mkdir approach above.

After validating the above works for MG5 version 2.9.4, add `/nfs/dust/cms/user/aalkadhi/madminer/MG5_aMC_v2_6_7` as your MG dir in 2a_parton_level_analysis.py by doing

```
os.environ['MG_FOLDER_PATH']='/nfs/dust/cms/user/aalkadhi/madminer/MG5_aMC_v2_6_7
#the /bin/mg5_aMC  is added by madminer
print(os.getenv('MG_FOLDER_PATH'))
mg_dir = os.getenv("MG_FOLDER_PATH")
```

in `2a_parton_level_analysis.py`. Also, change the `python_executable=` in `madminer.run()` to `python_executable=python2`. Run now with `python 2a_parton_level_analysis.py`.

Optional, in the future we'll need to use pythia8, lhapdf, etc. To set those up do `source /nfs/dust/cms/user/aalkadhi/madminer/setup_mg5.sh``