A NEW NANOAOD ERA FOR 2015 CMS OPEN DATA

SNEHA VIRESHWAR DIXIT
sdixit2@washcoll.edu

MENTORS - NICK SMITH, OKSANA SHADURA.

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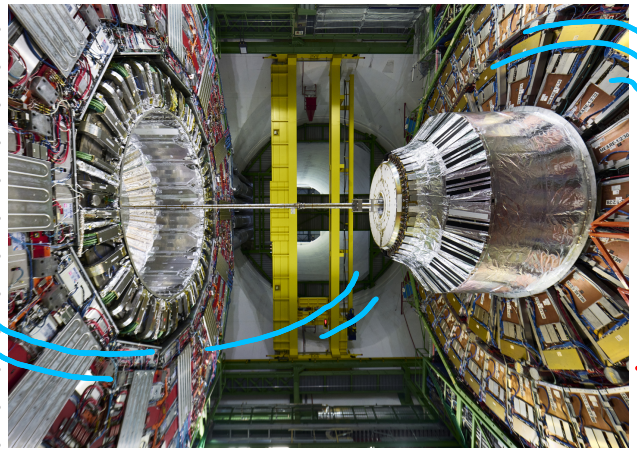


CMS EXPERIMENT

SIMULATIONS

PRIMARY DATA

CMS OPENDATA

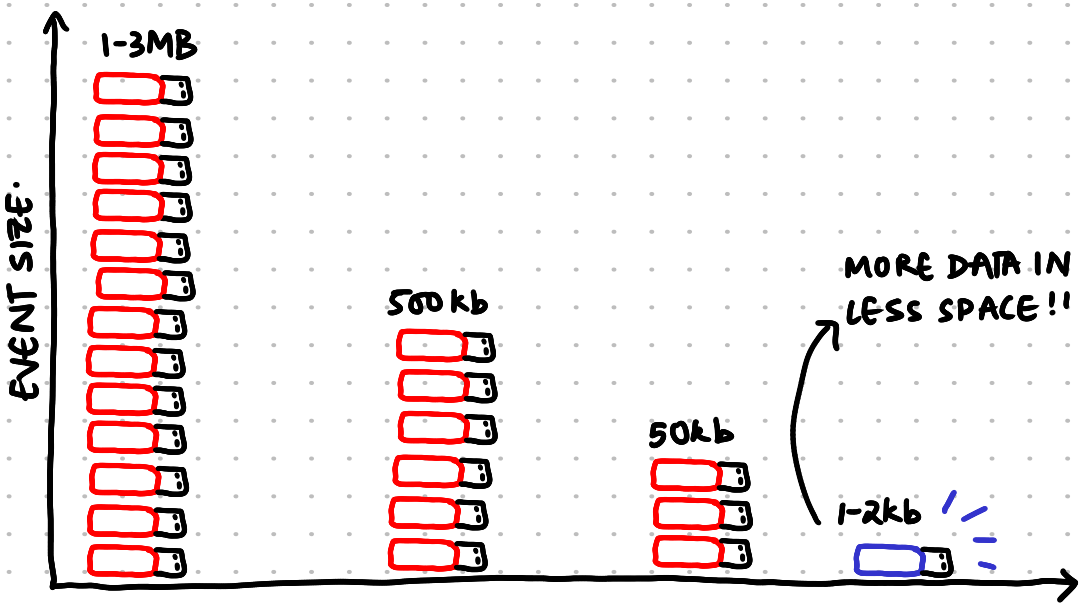
THEORISTS

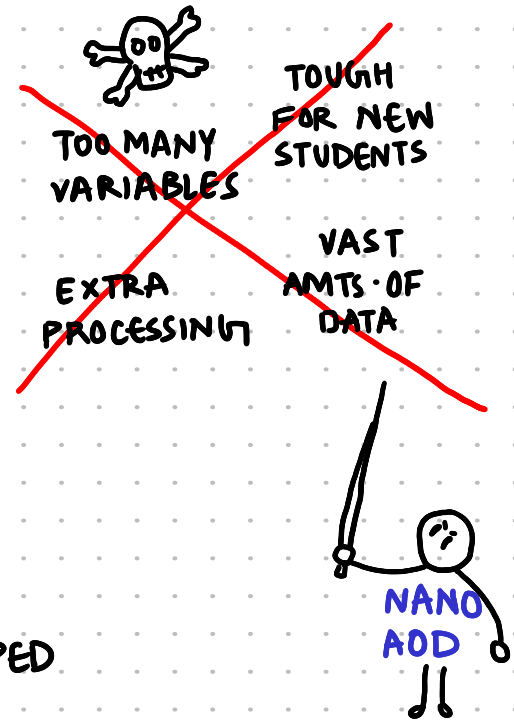
STUDENTS

NON CERN SCIENTISTS

GENERAL PUBLIC

WHY DO WE NEED NANO-AOD?

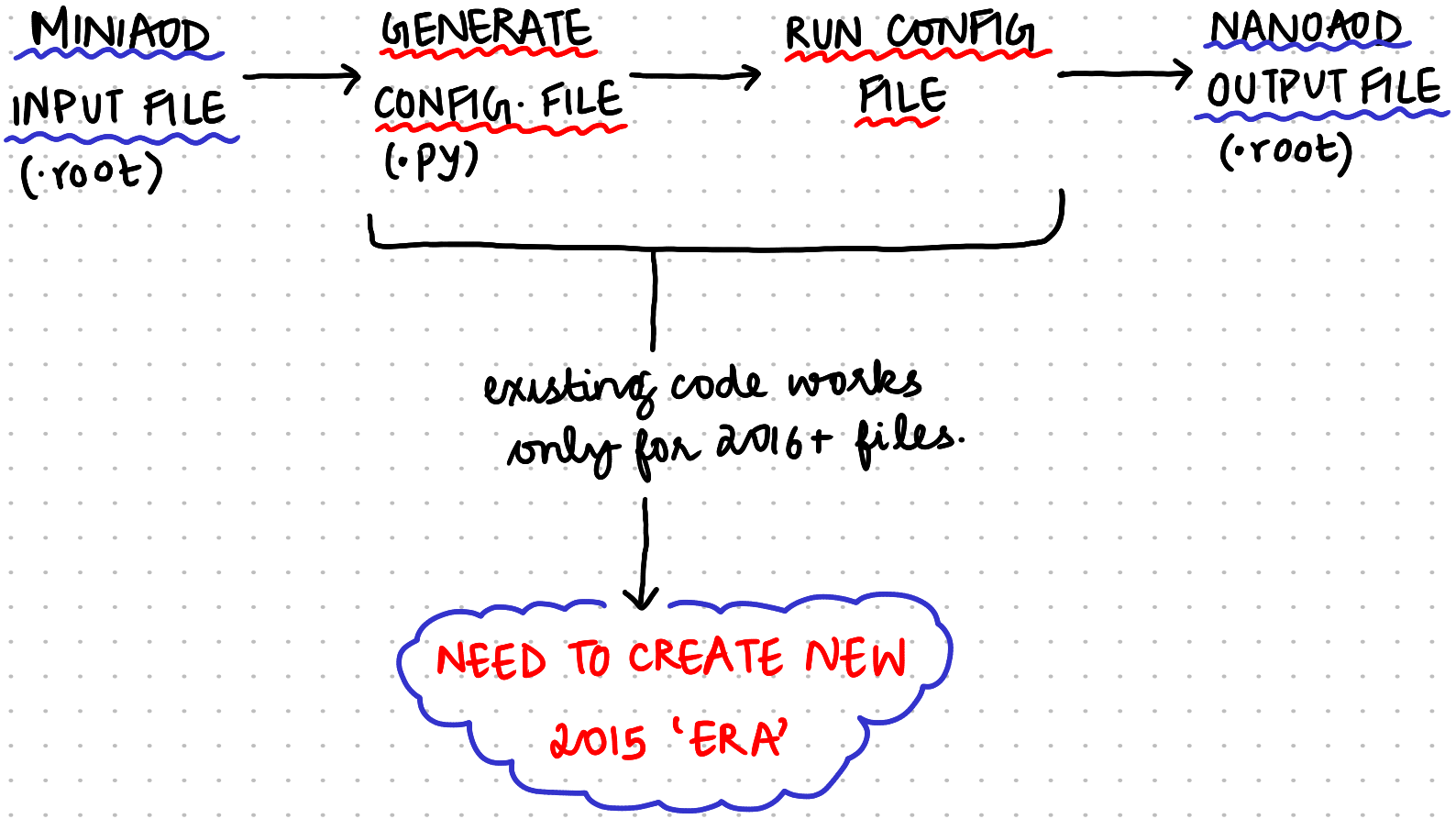




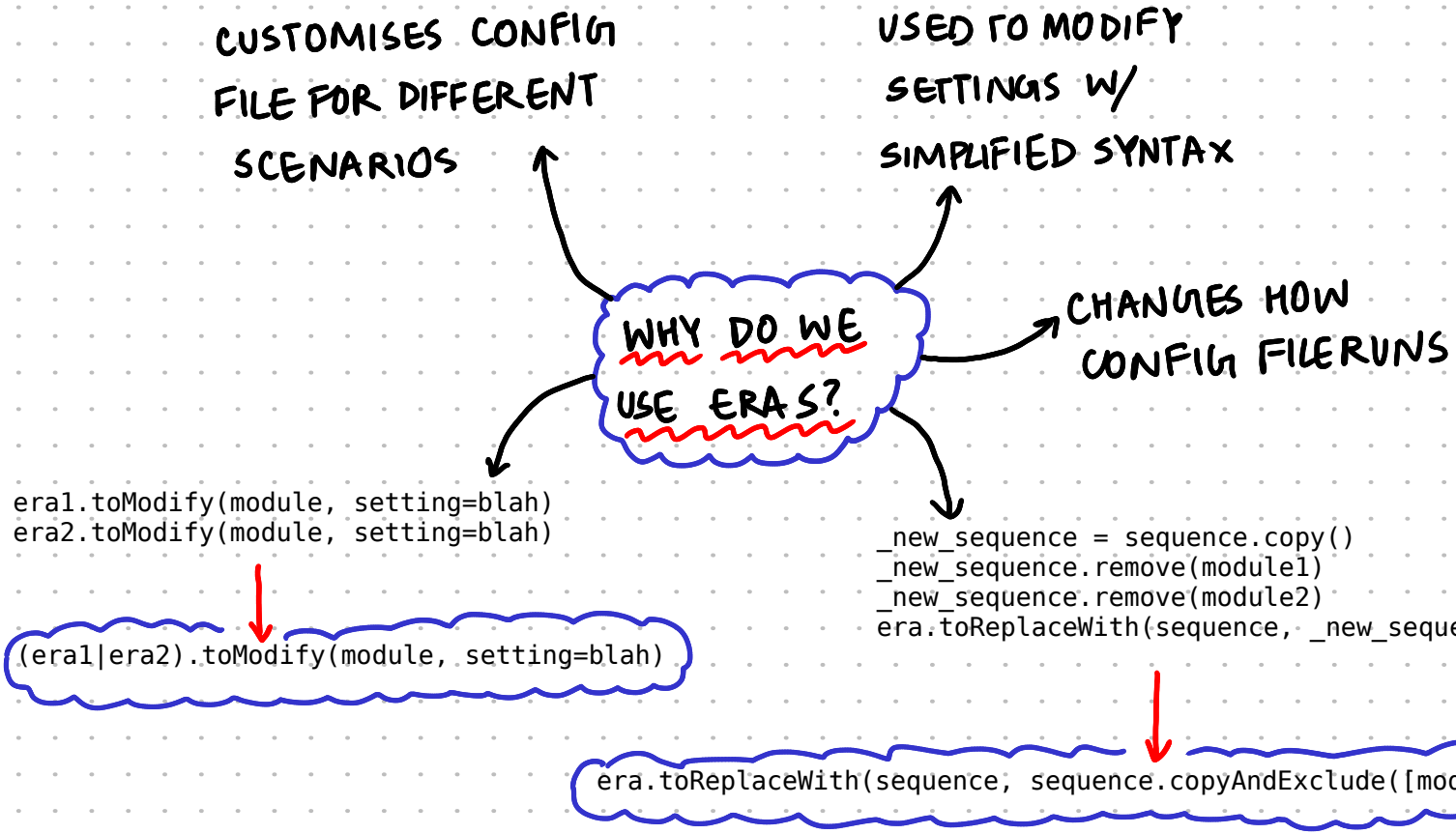
CMS OPEN DATA NOT AVAILABLE AS NANOAOD YET!

Graph data from : https://zenodo.org/record/3598830#.YrIlD2DMLlw

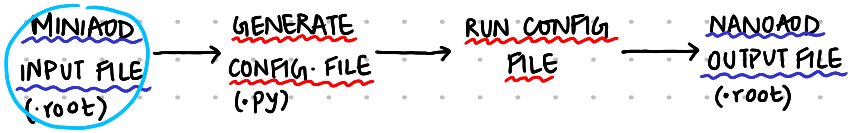
SOLUTION – CONVERT OPENDATA TO NANOAOD.



CREATING THE 2015 ERA



CREATING THE 2015 ERA



FILES USED

2015 MINIAOD FILE (DRELL-YAN SIMULATION)

root://eospublic.cern.ch//eos/opendata/cms/mc/
RunIIFall15MiniAODv2/
DYJetsToLL_M-50_TuneCUETP8M1_13TeV-madgraphMLM-pythia8/
MINIAODSIM/PU25nsData2015v1_76X_mcRun2_asymptotic_v12_ext1-v1/
10000/004544CB-6DD8-E511-97E4-0026189438F6.root

verify behaviour of 2015 converted file

2016 MINIAOD FILE (DRELL-YAN SIMULATION)

root://xcache//store/mc/RunIISummer16MiniAODv3/
DYJetsToLL_M-50_TuneCUETP8M1_13TeV-madgraphMLM-pythia8/
MINIAODSIM/PUMoriond17_94X_mcRun2_asymptotic_v3_ext2-v2/
100000/2016.root

ensure new era does not interfere w/ 2016 era.

CREATING THE 2015 ERA

MINIAOD INPUT FILE (.root) → GENERATE CONFIG. FILE (.py) → RUN CONFIG FILE → NANOAOD OUTPUT FILE (.root)

CMS env. with CMSSW 10.6.30

CMS @ VNL

```
sneha@sneha-desktop: ~
    *    /store/user areas are now under /mnt/t2ceph/cms/store/user/  *
    *** IMPORTANT NOTICE ************************************************


-bash-4.2$ source /cvmfs/cms.cern.ch/cmsset_default.sh
-bash-4.2$ cd CMSSW_10_6_30/src/
-bash-4.2$ cmsenv
-bash-4.2$
-bash-4.2$
-bash-4.2$
-bash-4.2$
-bash-4.2$
-bash-4.2$
-bash-4.2$
-bash-4.2$
-bash-4.2$
-bash-4.2$
-bash-4.2$
-bash-4.2$ cmsDriver.py --python_filename nanoaod15_cfg_new.py --eventcontent NA
NOAODSIM --customise Configuration/DataProcessing/Utils.addMonitoring --datatier
 NANOAODSIM --fileout file:nanoaod15_new.root --conditions 102X_mcRun2_asymptoti
c_v8 --step NANO --filein file:2015.root -era Run2_25ns,run2_nanoAOD_106X2015 -
-no_exec --mc -n -1
```

CMSDRIVER COMMAND.

generates CONFIG file.

set CONFIG file name

2015 ERA!!

process the first n events.

name of input file

set OUTPUT file name

era to be used.

2016 ERA

```
sneha@sneha-desktop: ~
-bash-4.2$ cmsDriver.py --python_filename nanoaod16_cfg_new.py --eventcontent NA
NOAODSIM --customise Configuration/DataProcessing/Utils.addMonitoring --datatier
 NANOAODSIM --fileout file:nanoaod16_new.root --conditions 102X_mcRun2_asymptoti
c_v8 --step NANO --filein file:2016.root -era Run2_2016,run2_nanoAOD_94X2016 -
no_exec --mc -n -1
```

CREATING THE 2015 ERA

MINIAOD INPUT FILE (.root) → GENERATE CONFIG FILE (.py) → RUN CONFIG FILE → NANOAOD OUTPUT FILE (.root)

process events to generate NANOAOD output

```
sneha@sneha-desktop: ~
-bash-4.2$ cd
-bash-4.2$ cd CMSSW_10_6_30/src/
-bash-4.2$ cmsRun nanoaod15_cfg_new.py
```

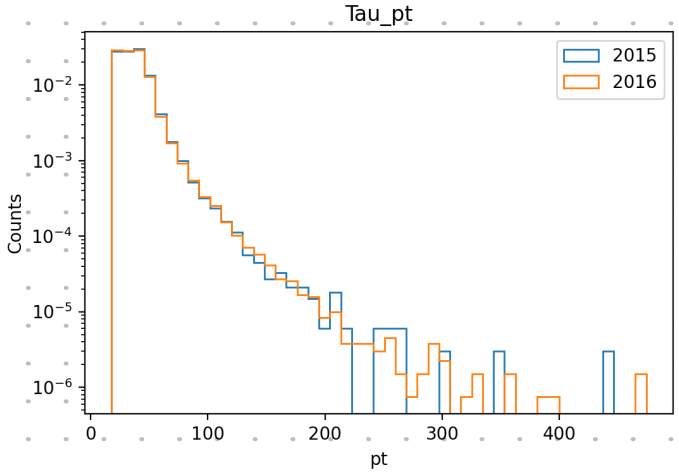
events processed using .py files in PHYSICSTOOLS

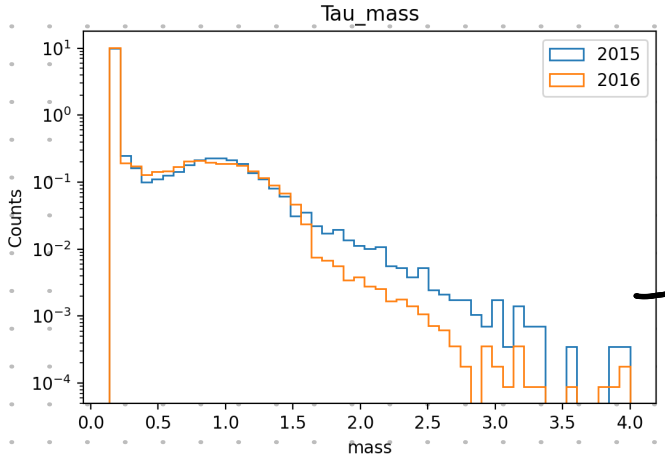
need to modify to work without errors

```
sneha@sneha-desktop: ~
-bash-4.2$ cd CMSSW_10_6_30/src/
-bash-4.2$ ls
2015.root       nanoaod15.root        nanoaod15_new.root    nanoaod16_new.root
2016.root       nanoaod15_cfg.py      nanoaod16.root
Configuration   nanoaod15_cfg.py~     nanoaod16_cfg.py
PhysicsTools    nanoaod15_cfg_new.py  nanoaod16_cfg_new.py
-bash-4.2$ cd PhysicsTools/NanoAOD/python
-bash-4.2$ ls
#common_cff.py#                  mets_cff.pyc
#photons_cff.py#                 muons_cff.py
NanoAODEDMEventContent_cff.py    muons_cff.pyc
NanoAODEDMEventContent_cff.pyc   nanoDQM_cff.py
__init__.py                      nanoDQM_cff.pyc
__init__.pyc                     nanoDQM_cfi.py
boostedTaus_cff.py               nanoDQM_cfi.pyc
boostedTaus_cff.pyc              nanoDQM_tools_cff.py
common_cff.py                    nanoDQM_tools_cff.pyc
common_cff.pyc                   nano_cff.py
custom_jme_cff.py                nano_cff.pyc
custom_jme_cff.pyc               nano_eras_cff.py
electrons_cff.py                 nano_eras_cff.pyc
electrons_cff.pyc                nanogenDQM_cff.py
extraflags_cff.py                nanogenDQM_cff.pyc
extraflags_cff.pyc               nanogen_cff.py
```

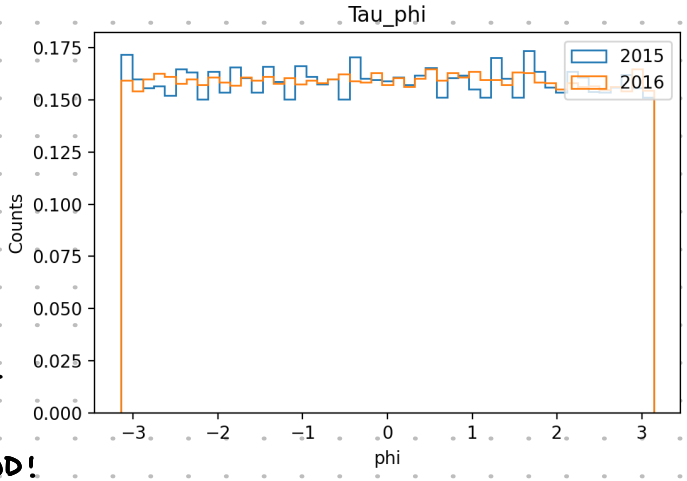
FUN STUFF (we have output!!)

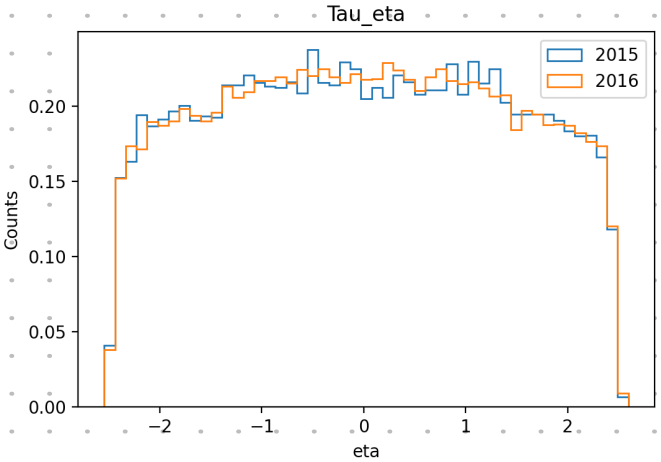
MINIAOD INPUT FILE (.root) → GENERATE CONFIG. FILE (.py) → RUN CONFIG FILE → NANOAOD OUTPUT FILE (.root)





comparing output w/ COFFEA CASA

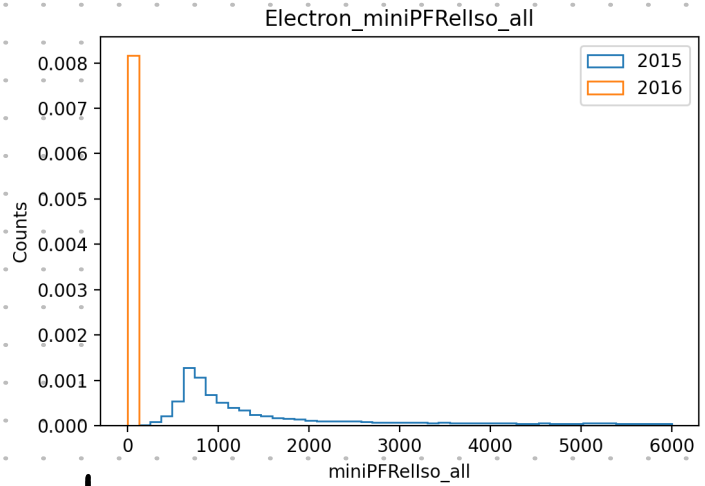


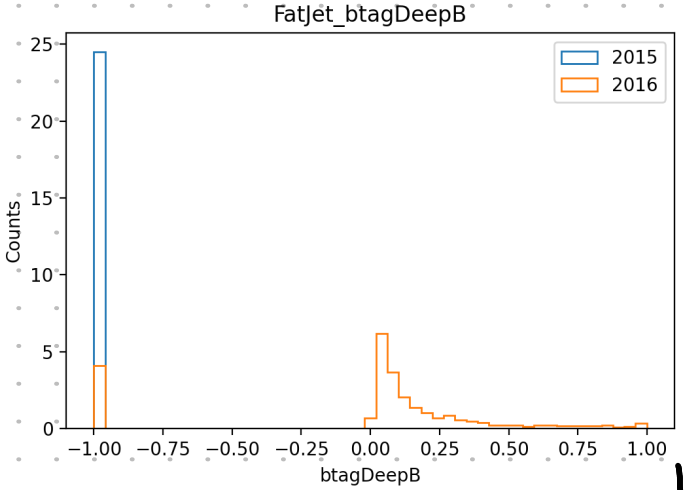


most plots look similar. this is GOOD!

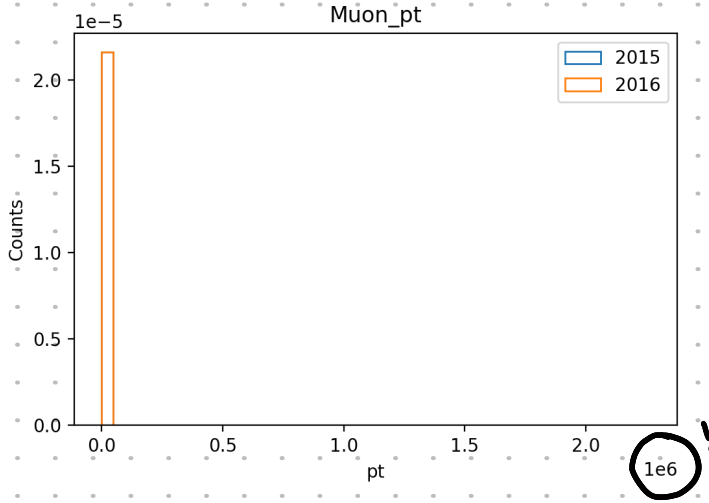
SOME PLOTS ARE FUNNY

MINIAOD INPUT FILE (.root) → GENERATE CONFIG. FILE (.py) → RUN CONFIG FILE → NANOAOD OUTPUT FILE (.root)

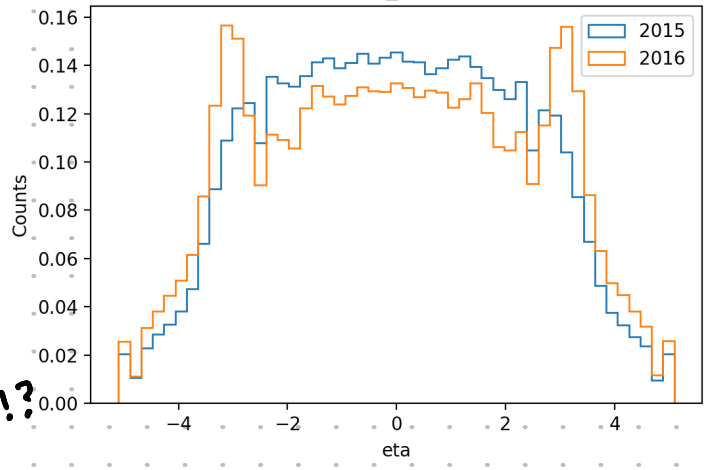




variables have clustered around default values



!?



THINGS LOOK PRETTY GOOD SO FAR!

need to consult object experts for further progress

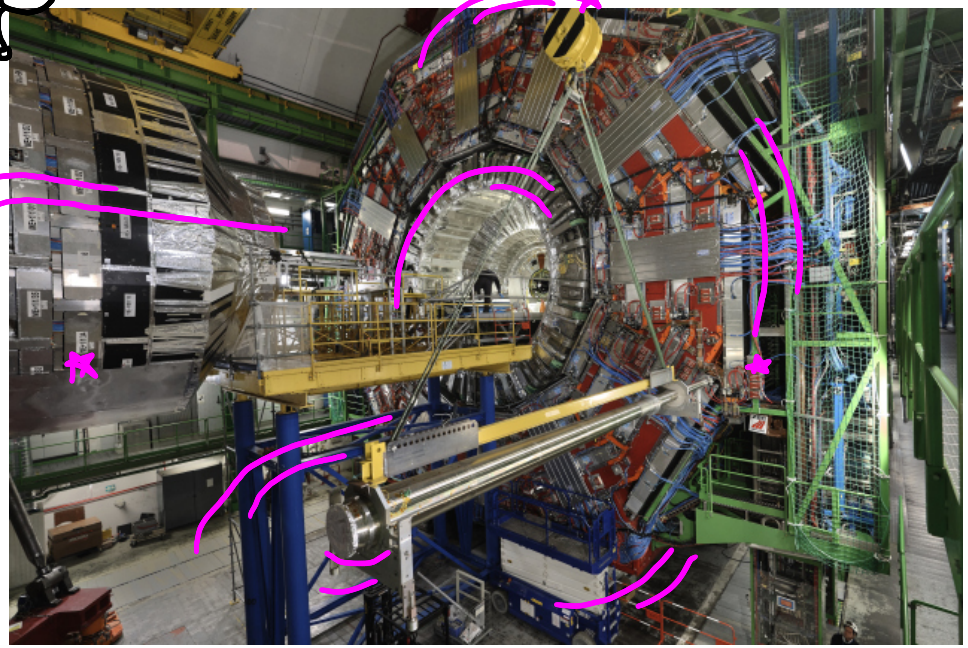
maybe release config file as-is?

PULL REQUEST on CMSSW 10_6_X

https://github.com/cms-sw/cmssw/pull/39040

QUESTIONS? COMMENTS?

EMAIL — sdixit2@washcoll.edu



SPECIAL THANKS TO:

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Carl Lundstedt, David Lange