



UNIVERSITY OF NEBRASKA
LINCOLN



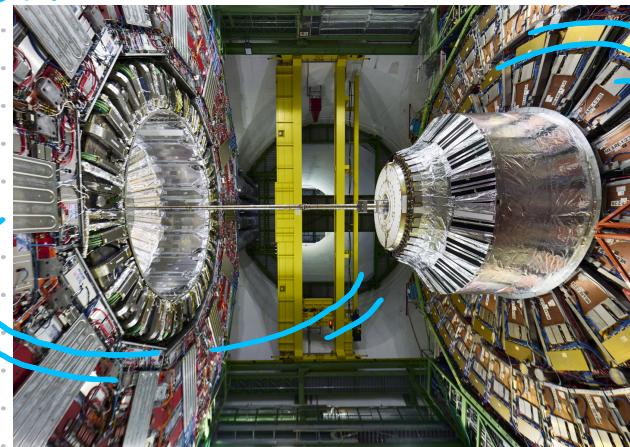
A NEW ERA

NANOADD

FOR 2015 CMS OPEN DATA

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MENTORS - NICK SMITH, OKSANA SHADURA



CMS
EXPERIMENT

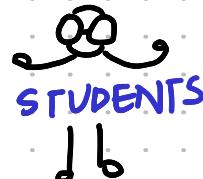
SIMULATIONS

PRIMARY DATA

CMS OPENDATA



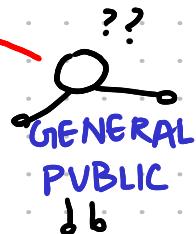
THEORISTS



STUDENTS



NON
CERN
SCIENTISTS

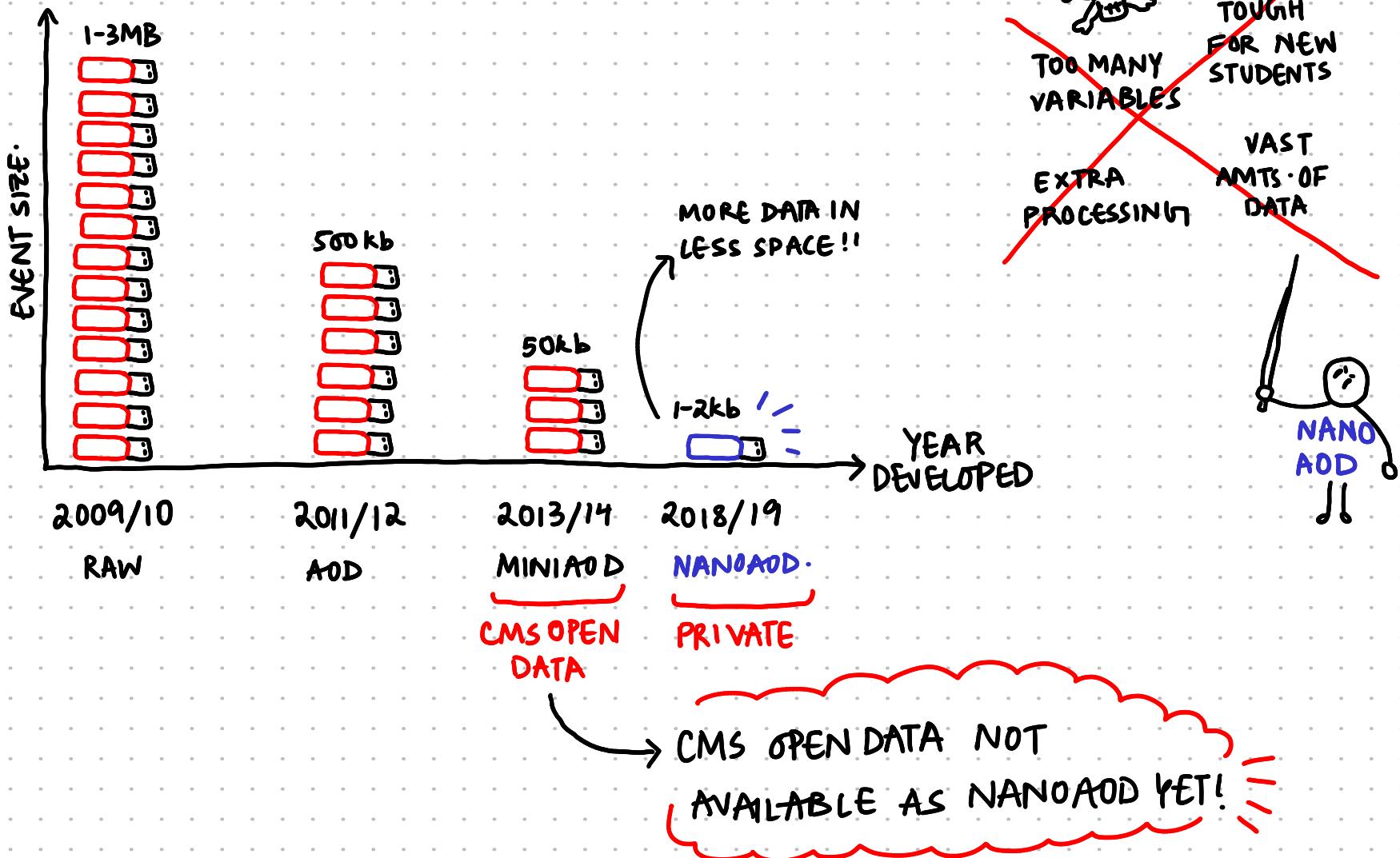


GENERAL
PUBLIC



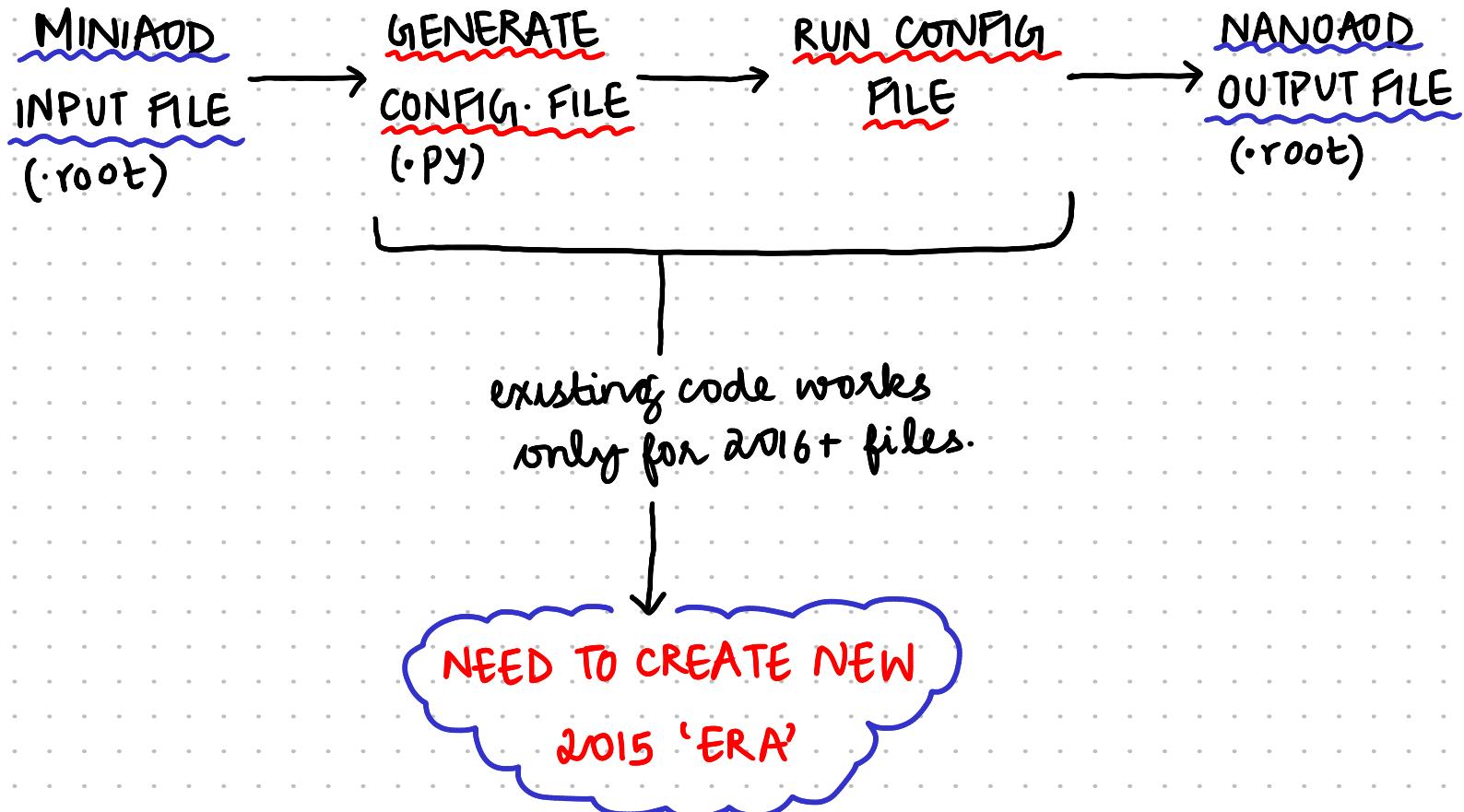


WHY DO WE NEED NANO-AOD?





SOLUTION - CONVERT OPENDATA TO NANO AOD.





CREATING THE 2015 ERA

CUSTOMISES CONFIG
FILE FOR DIFFERENT
SCENARIOS

USED TO MODIFY
SETTINGS W/
SIMPLIFIED SYNTAX

CHANGES HOW
CONFIG FILE RUNS

WHY DO WE
USE ERAS?

```
era1.toModify(module, setting=blah)  
era2.toModify(module, setting=blah)
```

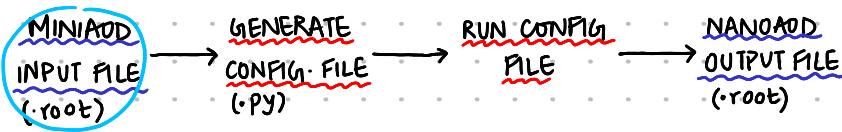
```
(era1|era2).toModify(module, setting=blah)
```

```
_new_sequence = sequence.copy()  
_new_sequence.remove(module1)  
_new_sequence.remove(module2)  
era.toReplaceWith(sequence, _new_sequence)
```

```
era.toReplaceWith(sequence, sequence.copyAndExclude([module1, module2]))
```



CREATING THE 2015 ERA



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

FILES USED

2016 MINIAOD FILE
(DRELL-YAN SIMULATION)

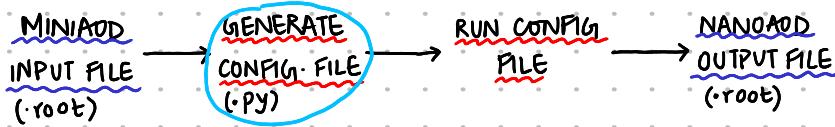
root://xcache//store/mc/RunIISummer16MiniAODv3/
DYJetsToLL_M-50_TuneCUETP8M1_13TeV-madgraphMLM-pythia8/
MINIAODSIM/PUMoriond17_94X_mcRun2_asymptotic_v3_ext2-v2/
100000/2016.root

verify
behaviour
of 2015
converted file

ensure
new era does
not interfere
w/ 2016 era.



CREATING THE 2015 ERA



CMS env. with
CMSSW 10.6.30

```
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$ cmsDriver.py --python_filename nanoaod15_cfg_new.py --eventcontent NANOAODSIM --customise Configuration/DataProcessing/Utils.addMonitoring --datatier NANOAODSIM --fileout file:nanoaod15_new.root --conditions 102X_mcRun2_asymptotic_v8 --step NANO --filein file:2015.root --era Run2_25ns,run2_nanoAOD_106X2015 --no_exec --mc -n -1
```

CMS
@ VNL

CMSDRIVER
COMMAND.

generates
CONFIG file.

process
the first
n events.

name
of input
file

set
OUTPUT
file name

era to be
used.

set CONFIG
file name

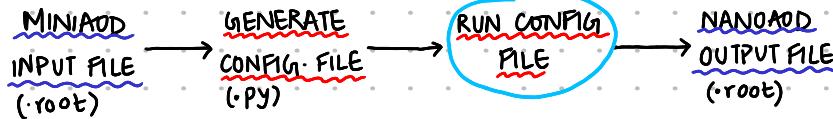
2015
ERA!!

```
sneha@sneha-desktop: ~
-bash-4.2$ cmsDriver.py --python_filename nanoaod16_cfg_new.py --eventcontent NANOAODSIM --customise Configuration/DataProcessing/Utils.addMonitoring --datatier NANOAODSIM --fileout file:nanoaod16_new.root --conditions 102X_mcRun2_asymptotic_v8 --step NANO --filein file:2016.root --era Run2_2016,run2_nanoAOD_94X2016 --no_exec --mc -n -1
```

2016 ERA



CREATING THE 2015 ERA



process events
to generate
NANOAOD output

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

events processed
using .py
files in

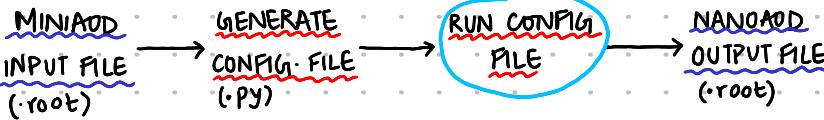
PHYSICSTOOLS

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
NanoAODEMEventContent_cff.py  muons_cff.pyc
NanoAODEMEventContent_cff.pyc nanoDQM_cff.py
__init__.py            nanoDQM_cff.pyc
__init__.pyc           nanoDQM_cfi.py
boostedTaus_cff.py     nanoDQM_tools_cff.py
boostedTaus_cff.pyc   nanoDQM_tools_cff.pyc
common_cff.py          nano_cff.py
common_cff.pyc         nano_cff.pyc
custom_jme_cff.py     nano_eras_cff.py
custom_jme_cff.pyc   nano_eras_cff.pyc
electrons_cff.py      nanogenDQM_cff.py
electrons_cff.pyc    nanogenDQM_cff.pyc
extraflags_cff.py     nanogen_cff.py
extraflags_cff.pyc
```



CREATING THE 2015 ERA

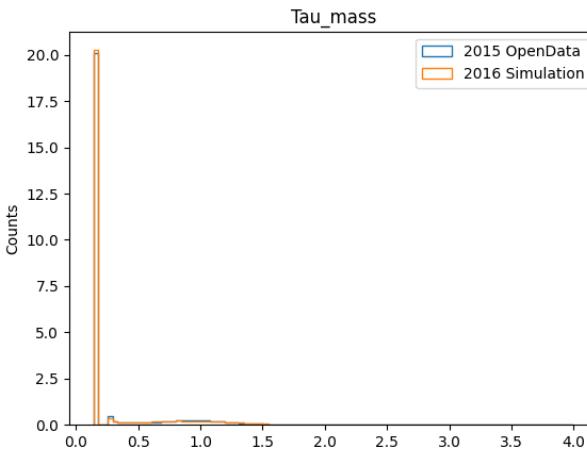
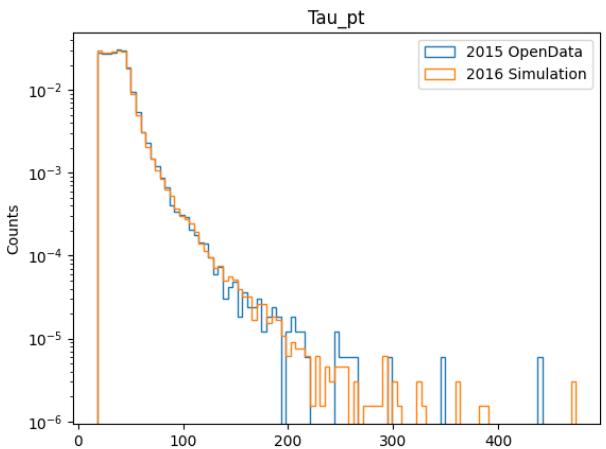


File	Object	Previous Definition	Replaced With
jets_cff.py	fatJetTable.variables.tau1	NjettinessAK8PuppiTau1	NjettinessAK8:tau1
jets_cff.py	fatJetTable.variables.tau2	NjettinessAK8PuppiTau2	NjettinessAK8:tau2
jets_cff.py	fatJetTable.variables.tau3	NjettinessAK8PuppiTau3	NjettinessAK8:tau3
jets_cff.py	msoftdrop	-	removed
jets_cff.py	subjetIdx1	-	removed
jets_cff.py	subjetIdx2	-	removed
jets_cff.py	subjetTable	-	removed
jets_cff.py	genSubjetAK8Table	-	removed
jets_cff.py	subjetMCTable	-	removed
nano_cff.py	triggerObjectTables	-	removed
nano_cff.py	isoTrackTables	-	removed
nano_cff.py	isoTrackSequence	-	removed
taus_cff.py	rawAntiEle	againstElectronMVA6Raw	removed

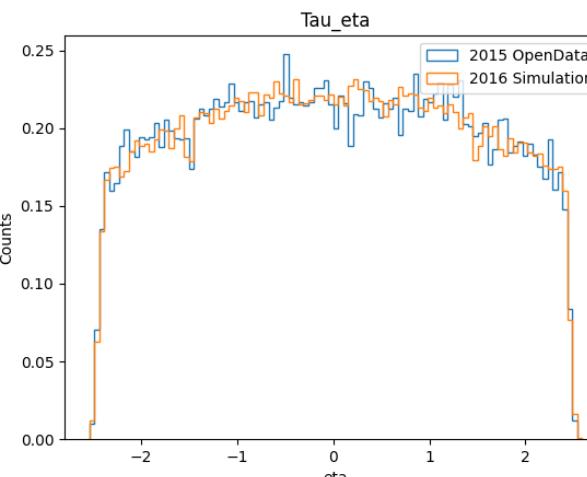
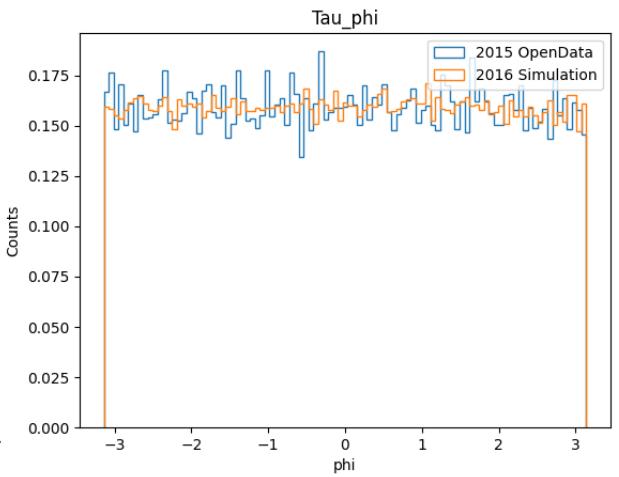
some changes
we made.



FUN STUFF (we have output!!)



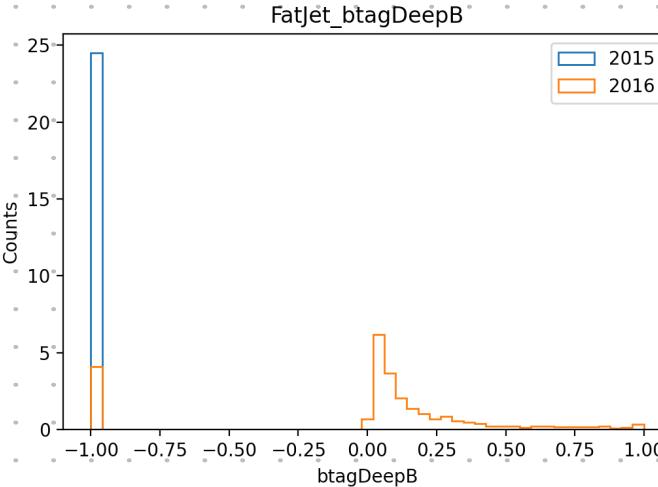
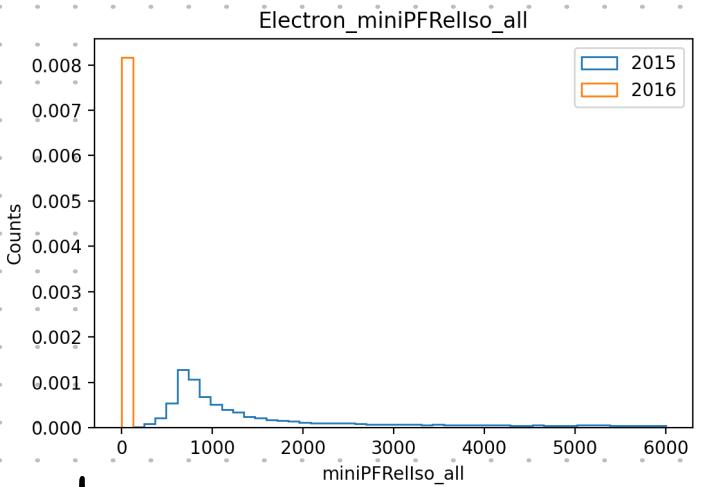
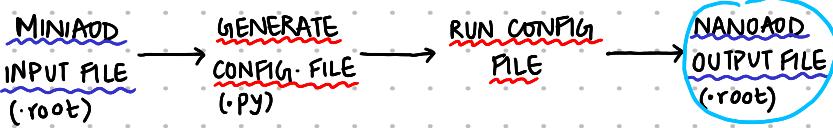
comparing output w/
COFFEEA CASA



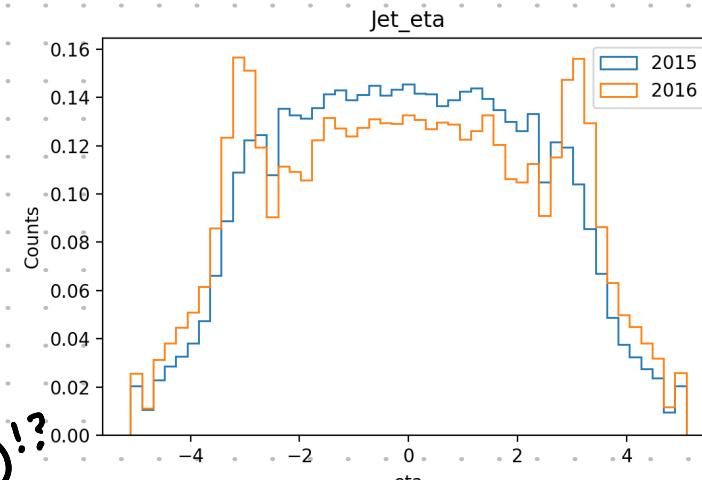
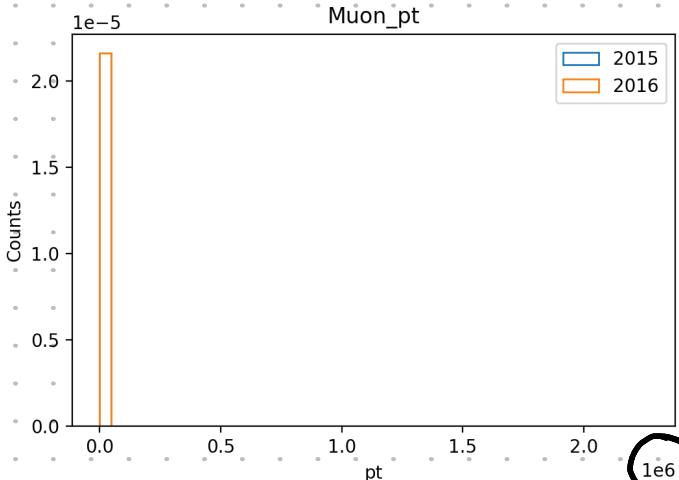
most plots look similar.
this is GOOD!



SOME PLOTS ARE FUNNY



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>



CONVERTING REAL (NON SIMULATION) DATA.

CMS DRIVER
COMMAND FOR
REAL DATA.

TRIED A BUNCH OF CONDITIONS

```
-bash-4.2$ cmsDriver.py --python_filename doublemuon_cfg.py --eventcontent NANO
OD --customise Configuration/DataProcessing/Utils.adMonitoring --datatier NANO
OD --fileout file:doublemuon_nanoaod.root -conditions 106X_dataRun2_v36 --step
NANO --filein file:doublemuon_miniaod.root --era Run2_25ns,run2_nanoAOD_106X2015
--no_exec --data -n -1
```

DOUBLE MUON INPUT FILE
root://eospublic.cern.ch//eos/opendata/cms/Run2015D/DoubleMuon/
MINIAOD/16Dec2015-v1/10000/047AEE1E-62A8-E511-B163-0025905A60EE.root

KEEPS GIVING ERRORS.

```
sneha@sneha-desktop: ~
Begin processing the 1st record. Run 260576, Event 767582393, LumiSection 375 o
n stream 0 at 19-Aug-2022 08:21:36.104 CDT
-----Begin Fatal Exception 19-Aug-2022 08:22:08 CDT-----
An exception of category 'ProductNotFound' occurred while
[0] Processing Event run: 260576 lumi: 375 event: 767582393 stream: 0
[1] Running path 'nanoAOD_step'
[2] Calling method for module PPSFilteredProtonProducer/'filteredProtons'
Exception Message:
Principal::getByToken: Found zero products matching all criteria
Looking for type: std::vector<reco::ForwardProton>
Looking for module label: ctppsProtons
Looking for productInstanceName: singleRP

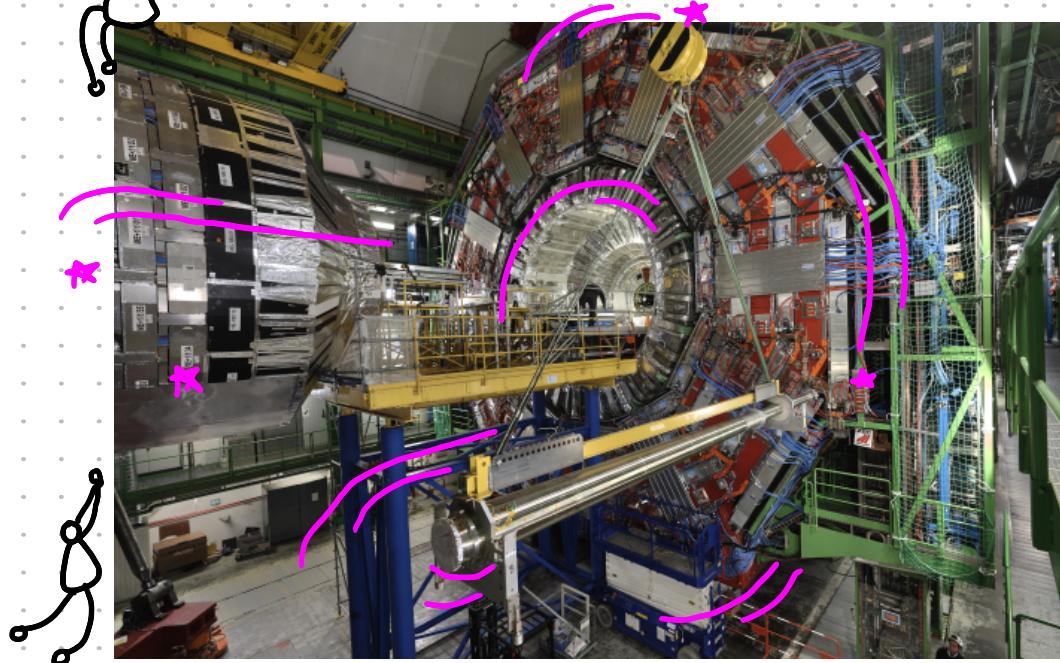
Additional Info:
[a] If you wish to continue processing events after a ProductNotFound exc
eption,
add "SkipEvent = cms.untracked.vstring('ProductNotFound')" to the "options" PSe
t in the configuration.

----- End Fatal Exception -----
19-Aug-2022 08:22:08 CDT Closed file file:doublemuon_miniaod.root
TimeReport> Time report complete in 105.521 seconds
```



QUESTIONS? COMMENTS? :

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Carl Lundstedt, David Lange