Table of Contents

Instruction for Generating Private MC for pp Collision at 5.02

Private MC productions and Driver command

Setup the cmssw CMSSW_7_5_8_patch3 version and check out the following packages from git repository.

```
cmsrel CMSSW_7_5_8_patch3
cd src
git-cms-addpkg Configuration/Generator
git-cms-addpkg GeneratorInterface
cmsenv
scram b clean // If you compiled before, we recommend to clean up first
scram b -j24
```

The .cfi file in which generator informations included is copied from Pythia8_X3872ToJpsiRho_nonprompt_Xpt5p0_Pthat5_TuneCUEP8M1_5020GeV.py

This .cff file was modified for X3872 and should be located under the proper directory, "Configuration/Generator/python"

The user decay file added *in this cfi.py:

```
 user_decay_file = cms.vstring('GeneratorInterface/ExternalDecays/data/PYTHIA6_X3872_Jpsimumu_rho
 list_forced_decays = cms.vstring('myX3872'),
```

Decay file for X3872 is: `PYTHIA6_X3872_Jpsimumu_rho0pipi.dec`

```
#This is the decay file for X3872->J/psi pi+ pi-

Alias      MyJ/psi  J/psi
ChargeConj MyJ/psi  MyJ/psi
#
Decay MyJ/psi
  1.000         mu+       mu-            PHOTOS VLL;
Enddecay
#
#
Alias Myrho0 rho0
ChargeConj Myrho0 Myrho0
#
Decay Myrho0
1.000    pi+ pi-                         VSS;
Enddecay
#
#
Alias      myX3872  chi_c1
ChargeConj myX3872  myX3872
Particle myX3872 3.872 0.003
#
Decay myX3872
  1.000         MyJ/psi      Myrho0          PHSP;
Enddecay
End
```

After having related changing execute the scram command :

```
scram b -j24
```

Step 1 : GEN-SIM step

Proper cmsDriver options:

```
cmsDriver.py Configuration/Generator/python/Pythia8_X3872ToJpsiRho_nonprompt_Xpt5p0_Pthat5_TuneCU
```

it will generate config file.

```
Pythia8_X3872ToJpsiRho_nonprompt_Xpt5p0_Pthat5_TuneCUEP8M1_5020GeV_pp_GEN_SIM.py
```

Running CMSSW code locally

Before submitting jobs to the Grid, it is necessary to run the code on interactive mode over a few events to discard problems not related with CRAB. it is also provide us to check the filter efficiency.

when you run the your cfg.py with 15000 events you will see the a part of log file which shows filter efficiency as follows :

```
cmsRun Pythia8_X3872ToJpsiRho_nonprompt_Xpt5p0_Pthat5_TuneCUEP8M1_5020GeV_pp_GEN_SIM.py

GenXsecAnalyzer: ------------------------------------

Before Filtrer: total cross section = 3.979e+07 +- 1.675e+05 pb

Filter efficiency (taking into account weights) = (18) / (15000) = 1.200e-03 +- 2.827e-04

Filter efficiency (event-level) = (18) / (15000) = 1.200e-03 +- 2.827e-04

After filter: final cross section = 4.775e+04 +- 1.125e+04 pb
```

So the filter efficiency is only 0.12%. In this case we need to change the **ptHatMin** from **5** to **15** and **MinPt** for **BX3872Daufilter** and **BJpsiDaufilter** from **5** to **0** in cfg.py

```
PhaseSpace:pTHatMin = 15. , ##changed from 5 to 15

process.BX3872Daufilter = cms.EDFilter("PythiaMomDauFilter",
MomMinPt = cms.untracked.double(0.0), ## changed from 5 to 0
process.BJpsiDaufilter = cms.EDFilter("PythiaMomDauFilter",

MomMinPt = cms.untracked.double(0.0), ## changed from 5 to 0
```

After changing the values the result shows better efficiency as follows:

```
GenXsecAnalyzer: ------------------------------------ Before Filtrer: total cross section

Filter efficiency (taking into account weights) = (32) / (10000) = 3.200e-03 +- 5.648e-04

Filter efficiency (event-level) = (32) / (10000) = 3.200e-03 +- 5.648e-04

After filter: final cross section = 5.921e+03 +- 1.045e+03 pb
```

-hmm..0.32%, improved than 0.12%

*-32/10000*1000000=3200 events, Te resulted events should be larger then 10k.*

-then submit 1000 jobs with 10000 input events per job.

-then 32k events will be acheived

Generating private MC with 10M events for step1_GENSIM :

We need to provide a CMSSW parameter-set configuration file to generate MC events. The configuration file is the output of GEN-SIM step which is pointed out above

```
Pythia8_X3872ToJpsiRho_nonprompt_Xpt5p0_Pthat5_TuneCUEP8M1_5020GeV_pp_GEN_SIM.py
```

In order to have the correct environment setup, we should source the environment setting has to be the following at most sites;

```
source /cvmfs/cms.cern.ch/crab3/crab.sh
```

Crab configuration file for GENSIM Step:

The sample of crab configuration file is

```
crabConfig_Pythia8_X3872ToJPsiRho0_nonprompt_Xpt5p0_Pthat5_TuneCUEP8M1_5020GeV_ppMC_generation.py


from CRABClient.UserUtilities import config, getUsernameFromSiteDB
config = config()

config.General.requestName = 'Pythia8PP_XToJpsiPiPi_Xpt5p0_Pthat5_5020GeV_v2_10M_event'
config.General.workArea = 'X3872work_10M_event'
config.General.transferOutputs = True
config.General.transferLogs = True

config.JobType.pluginName = 'PrivateMC'
config.JobType.psetName = 'Pythia8_X3872ToJpsiRho_nonprompt_Xpt5p0_Pthat5_TuneCUEP8M1_5020GeV_pp_

config.Data.outputPrimaryDataset = 'Pythia8_XToJpsiPiPi_5020GeV_PP_v2_20KPerJ_event'
config.Data.splitting = 'EventBased'
config.Data.unitsPerJob = 20000
NJOBS = 500  # This is not a configuration parameter, but an auxiliary variable that we use in th
config.Data.totalUnits = config.Data.unitsPerJob * NJOBS
config.Data.outLFNDirBase = '/store/user/cdozen'
config.Data.publication = True
config.Data.outputDatasetTag = 'Pythia8PP_XToJpsiPiPi_Xpt5p0_Pthat5_5020GeV_v2_20KPerJ_event'

config.Site.storageSite = 'T2_CH_CERN'
```

The following crab command must be executed for the task submission

```
crab submit -c crabConfig_Pythia8_X3872ToJPsiRho0_nonprompt_Xpt5p0_Pthat5_TuneCUEP8M1_5020GeV_ppM
```

The status of the GENSIM state is done successfully.

step1: GENSIM	
cfi.py	Pythia8_X3872ToJpsiRho_nonprompt_Xpt5p0_Pthat5_TuneCUEP8M1_5020GeV.py
Output Dataset Name	Output Dataset
Total Number of Event	28043
Status	Done
Efficency	32% out of 10M input event
dbs instance	prod/phys03

The corresponding output Dataset name in DAS query:

Pythia8_XToJpsiPiPi_5020GeV_PP_v2_20KPerJ_event/cdozen-Pythia8PP_XToJpsiPiPi_Xpt5p0_Pthat5_5020GeV_v

Step 2 : DIGI step

Proper cmsDriver options:

```
cmsDriver.py step2_NoPU_Pythia8_X3872ToJpsiRho_nonprompt_Xpt5p0_Pthat5_TuneCUEP8M1_5020GeV_pp --c
```

it will create following the cfg.py file for DIGI step:

```
step2_Pythia8_X3872ToJpsiRho_nonprompt_Xpt5p0_Pthat5_TuneCUEP8M1_5020GeV_pp_DIGI_L1_DIGI2RAW_HLT_
```

Running CMSSW code locally

Just for testing run the cfg.py on interactive mode over some events.As input files use the output of GENSIM step.(Click here to see the output of GENSIM)

```
cmsRun step2_NoPU_Pythia8_X3872ToJpsiRho_nonprompt_Xpt5p0_Pthat5_TuneCUEP8M1_5020GeV_pp_DIGI_L1_D
```

Crab configuration file for DIGI Step

The crab configuration file for whole event in input dataset shown below:

```
crabConfig_step2_no_PU.py

from CRABClient.UserUtilities import config, getUsernameFromSiteDB
config = config()

config.General.requestName = 'Pythia8PP_XToJpsiPiPi_Xpt5p0_Pthat5_5020GeV_DIGI_N0_PU'
config.General.workArea = 'X3872work_noPU_event'
config.General.transferOutputs = True
config.JobType.pluginName = 'Analysis'
config.JobType.psetName = 'step2_NoPU_Pythia8_X3872ToJpsiRho_nonprompt_Xpt5p0_Pthat5_TuneCUEP8M1_

config.Data.inputDataset = '/Pythia8_XToJpsiPiPi_5020GeV_PP_v2_20KPerJ_event/cdozen-Pythia8PP_XTo
config.Data.splitting = 'FileBased'
config.Data.unitsPerJob = 100
config.Data.totalUnits = -1
config.Data.outLFNDirBase = '/store/user/cdozen'
config.Data.publication = True
config.Data.inputDBS = 'phys03'
config.Data.publishDBS = 'phys03'
config.Data.outputDatasetTag = 'Pythia8PP_XToJpsiPiPi_Xpt5p0_Pthat5_5020GeV_DIGI_NO_PU'

config.Site.storageSite = 'T2_CH_CERN'

crabConfig submit -c crabConfig_step2_no_PU.py
```

The status of the DIGI state is done successfully.

step2: DIGI	
Input Dataset Name	Input Data set
Status	Done
output Dataset Name	Output Dataset
Total Number of Event	28043
dbs instance	prod/phys03

Crab configuration file for GENSIM Step:

Step 3 : RECO step

Proper cmsDriver options:

```
cmsDriver.py step3_NoPU_Pythia8_X3872ToJpsiRho_nonprompt_Xpt5p0_Pthat5_TuneCUEP8M1_5020GeV_pp --c
```

run the cfg.py on interactive mode as shown in step1 and step2.

Crab configuration file for RECO Step

Use the step2 output as an input here.

crabConfig_step3_no_PU.py

```
from CRABClient.UserUtilities import config, getUsernameFromSiteDB
config = config()

config.General.requestName = 'MC_Pythia8PP_XToJpsiPiPi_Xpt5p0_Pthat5_5020GeV_AOD_N0_PU'
config.General.workArea = 'X3872work_noPU_event'
config.General.transferOutputs = True

config.JobType.pluginName = 'Analysis'
config.JobType.psetName = 'step3_NoPU_Pythia8_X3872ToJpsiRho_nonprompt_Xpt5p0_Pthat5_TuneCUEP8M1_

config.Data.inputDataset = '/Pythia8_XToJpsiPiPi_5020GeV_PP_v2_20KPerJ_event/cdozen-Pythia8PP_XTo
config.Data.splitting = 'FileBased'
config.Data.unitsPerJob = 1
config.Data.totalUnits = -1
config.Data.outLFNDirBase = '/store/user/cdozen'
config.Data.publication = True
config.Data.inputDBS = 'phys03'
config.Data.publishDBS = 'phys03'
config.Data.outputDatasetTag = 'MC_Pythia8PP_XToJpsiPiPi_Xpt5p0_Pthat5_5020GeV_AOD_NO_PU'

config.Site.storageSite = 'T2_CH_CERN'
```

RECO step is done successfully.

step3: RECO	
Input Dataset Name	Input Dataset
Status	Done
output Dataset Name	Output Dataset
dbs instance	prod/phys03

-- CandanDozen - 2016-06-09

This topic: Sandbox > X3872PrivateMCGenerationwithppCollision
Topic revision: r5 - 2019-08-05 - CandanDozen