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RongkunSandbox

Rongkun Wang's sandbox for storing HEP infos.

Administrative Memo

USTC Memo

Swiss plate to green plate

To get things published

Quick Memo

This is an assorted notes on many aspects I faced in HEP, continuously building up. Knowledge and purely technical guides are mixed up.

ATLAS Induction Day 2017 [↗](#)

SeriesOfFacts

Physics

- Physics of Generating events
 - ◆ Technical detail related to Powheg-BOX-V2
- Pileup: Some official twiki to introduce Pileup/Pileup reweighting. Pileup, an unavoidable phenomena that occurred when we're running with high luminosity. In order to increase the luminosity, more beam particles are squeezed into the same space, therefore increasing the chance of interaction. With this, we also have unwanted non-deep inelastic interactions that produced pileup jets. The rate of those kind of process can be described by number of vertices(which is used in run 1), or more precisely the average interaction per crossing $\langle\mu\rangle$.

Detector related Knowledges

- Muon Spectrometer(MS)

Pre-Analysis Preparation

- Trigger: Reduce data rate, reject background event, for read-out to be able to process events in time.
- DAQ: Data acquisition and preparation
- Event Data Model
- Dataset Nomenclature [↗](#)

Generator related technical things

I have modified and installed a [TopDrawer](https://gitlab.cern.ch/rowang/TopDrawer) to visualize .top files generated after generators like powheg.

```
do
```

```
td
```

```
after
```

```
source /afs/atlas.umich.edu/home/rkwang/public/sw/setup_TopDrawer.sh
```

Object Reconstruction

- ATLAS CP/Physics: ATLAS Performance/Physics Organization
- Tracking
- Electron and Gamma Reconstruction
- Muon Reconstruction

- MET Reconstruction
- Jet Reconstruction
- Isolation:
 - ◆ Iso Obj Text Snippets
 - ◆ Run2 definition: technical description
 - ◆ TTVA: track to vertex association

Physics Analysis

- Low-level effect
- xAOD related: Here I will also include some ATLAS-related technicalities.
- Event Display
- Optimization
- Statistics
- Where to find MC informations:
<https://gitlab.cern.ch/atlas-physics/pmg/infrastructure/mc15joboptions/tree/master/share>

batch kill panda jobs

Pbook show allows wildcard, but kill doesn't (isn't this silly?) So you can direct the print out from show to a string, and then do some formatting to pass them to kill(), in a loop. Modify the matching_string to your wildcard string

```
import sys
# python 2
from cStringIO import StringIO
# python3
# from io import StringIO
matching_string = "user.rowang.WVZ_v1.2.364*"
old_stdout = sys.stdout; sys.stdout = mystdout = StringIO(); show(taskname = matching_string); sy
# reviewing your output ID parent
for i in mystdout.getvalue().split("\n")[2:-1]: print i.split()[0], i.split()[4];
# actual delete!
for i in mystdout.getvalue().split("\n")[2:-1]: kill(int(i.split()[0]));
```

Rivet &

ATLAS Rivet & HepData guideline:

<https://twiki.cern.ch/twiki/bin/viewauth/AtlasProtected/HepDataRivetSubmission>

To know weightName in ATLAS:

```
checkMetaSG.py
```

EVNT to TRUTH1:

```
## truth ntuple
```

```
export ATLAS_LOCAL_ROOT_BASE=/cvmfs/atlas.cern.ch/repo/ATLASLocalRootBase
source ${ATLAS_LOCAL_ROOT_BASE}/user/atlasLocalSetup.sh
source $AtlasSetup/scripts/asetup.sh 21.2.55.0,AthDerivation,here
Reco_tf.py --inputEVNTfile $EVNT --outputDAODfile $DAOD_TRUTH1 --reductionConf TRUTH1
```

Computing

- Root: Experience that I had dealing with ROOT.
- GitLab: tutorial By Will Buttinger: Link. * How [to](#) write readme.md plain text syntax
- How to prevent disconnected by lxplus when you idle for a few minutes? See this NAT related article [to](#). 120 second works for me.
- Where to save files on lxplus? EOS! How to read eos on a non-fusemount machine: ATLASStorageAtCERN
- Condor: on occasion, the condor schedd you're allocated to becomes busy, you can change the env var, e.g.
 - ◆ `_CONDOR_SCHEDD_HOST=bigbird15.cern.ch`
 - ◆ `_CONDOR_CREDD_HOST=bigbird15.cern.ch`
- Host related issue: SetupServer
- X11 forwarding not working sometimes!
 - ◆ In `/private/etc/ssh/sshd_config`
 - ◆ `set X11Forwarding yes`
 - ◆ `X11UseLocalhost yes`
 - ◆ If you are using su account to carry out some command(for some raw ethernet package, etc), you need to add magic cookie to this sudo account:
 - ◆ First login to your account `<user>`, then su, then
 - ◆ `xauth add $(xauth -f ~<user>/.Xauthority list|tail -1)`
- OS installation:
 - ◆ eos: <https://cern.service-now.com/service-portal/article.do?n=KB0003846> [to](#)
 - ◆ cvmfs: <https://cernvm.cern.ch/portal/filesystem/quickstart> [to](#)

ATLAS Duty

View your (Operation Task Point)OTP at GLANCE. You bear the duty for your institute to earn OTP, and also to earn you a chance to give conference talks.

- ATLAS OTPlanner.

Muon Offline Data Quality (Class 2)

Shift:

- My Manual

Expert: MDT Operation Oncall

- Muon DQ Twiki [to](#)

NSW-sTGC related

Workflow

1. Connect all the frontend boards correctly.
2. Load your json/miniDaq config files to FELIX GUI, tune the parameter(according to connection, which felix server, etc).
3. Save the json file and OpcServer xml file on a place felix server can access.
4. Set up felix server and run felixcore and OpcServer.
5. Open partition, click Initialize->Config->Run, to take data, and then Stop to stop taking data.
6. Analyze the binary data ended with .data. (decode into TTree see below).

Hand-on manuals

B180 felix1: Step-by-step hands-on twiki from Roy . (obsolete)

191 sTGC: operation for sTGC

Technicalities

Related concepts and manual:

- FELIX is like a big data router, and running it doesn't rely on any other thing. See this **FELIX manual** for setting up and running FELIX. List of Felix server:
 - ◆ um-felix1.cern.ch
 - ◆ um-felix2.cern.ch
- The **FELIX GUI** is a stand-alone application that can generate board configuration, opc configuration, visualize and modify parameters in a better way than json. You can run it in principle on any machine. Or choose not to use it.
- The partition is the very same thing used to control ATLAS data taking. The config segment relies on FELIX and OpcServer to send HDLC frame, software ReadOut Driver(swROD) relies on FELIX for data readout. See **the manual here** as how to run partition with three segments swROD(ROx), TTC, Config. And also how to decode the data into a TTree. List of working swROD server:
 - ◆ um-felix1-swrod.cern.ch
 - ◆ um-felix2-swrod.cern.ch
 - ◆ um-felix2-swrod-supermicro.cern.ch
- TTC server:
 - ◆ um-felix1-spc.cern.ch
 - ◆ um-felix2-spc.cern.ch
- Here is a very nice summary from our neighbor MicroMegas (MM).
- How to use UaExpert on our FELIX machines: ``setupUaExpert; uaexpert``
- Server related issues are summarized here: SetupServer. See also Computing section.
- Open points:
 - ◆ Scalability: it scales well to one wedge/12+12 boards. one thing we learned is GBTx phase need to be saved and tuned after ROC is configured.
 - ◆ Stability: how long can the system run? Cooling issue: observed crashes, power off to cool down.
 - ◆ swROD production machine cannot run partition. - still debugging

Baseline and Trimmer Scan

```
cd /afs/cern.ch/work/n/nswdaq/public/sTGC_quick_and_dirty_baselines
source setup.sh
NSWConfiguration/dev/stgc_threshold_calib.sh
```

The output will be saved in <http://cern.ch/stgc-trimmer/>

See also <https://twiki.cern.ch/twiki/bin/viewauth/Atlas/BB5DaqMM> for full instruction

VMM ID to VMM capture mapping in swROD. Notice the mapping is symmetric. See also [ATLNSWDAQ-74](#)

0<-->2 1<-->3 2<-->0 3<-->1 4<-->5 5<-->4 6<-->6 7<-->7

Analysis

WVZ Analysis

MyOwnWVZDraftTwiki

HSG2 (HZZ)

- Higgs Production XS
- Higgs Properties Theory Systematics
- Higgs Derivation xAOD
- Data: HZZ11112015to17Data
- Sample Intro:
 - ◆ HZZ1111Run2MCSamplesMC15c_Moriond,
 - ◆ HZZ1111Run2MCSamplesMC16
- H4I Cutflow: Twiki 2016; note 2016 on cds, twiki full Run2
- Gitlab Software Area [↗](#)
- 2017 HZZ Workshop Indico

H4I

- Fiducial/Differential
 - ◆ Fiducial: xs in each channel, and sum, combined. Also Total xs.
 - ◆ Differential: njets, pt, unfolding with bin-by-bin.
- Coupling
 - ◆ STXS Intro [↗](#): Truth bin: stage0 with ggF(+bbH)/VBF/VH(+ggZH)/ttH(+tH) and reduced stage1 STXS production mode(10 categories). Reco bin: 11 categories.
 - ◇ In the first round of run 2 analysis. We also had 9 reco categories.
 - ◇ Conf Note 2018: 2 additional categories are added in reco level for: split ttH and added 0jet high pt4l for VHLep
 - ◆ STXS POI and corresponding fiducial definition: Twiki. Acceptance calculation
- Documents
 - ◆ HZZ Theory Uncertainties supporting note cds [↗](#)
 - ◆ 2017 Moriond event selection: supporting note cds [↗](#)
 - ◆ 2017 fid/diff: paper cds [↗](#)
 - ◆ 2017 EPS coupling glance HIGG-2016-22 [↗](#): Supporting note svn [↗](#), cds [↗](#), paper cds [↗](#)
 - ◆ 2018 LHCP CONF coupling + fid/diff ANA-HIGG-2018-01 [↗](#): GitLabOld [↗](#) GitLabNew [↗](#) for 2018 LHCP CONF. Supporting note cds, Conf note cds [↗](#).

Unfolding of Inclusive M4l

Aiming to unfold m4l distribution inclusive of number of jets. We're also interested in unfolding 2D distribution of m4l.

- Twiki
- 2018 Paper draft cds [↗](#): supporting note in svn, in cds [↗](#)
- Accuracy of simulation:
 - ◆ qqZZ Sherpa 2.2.2 NLO for 0,1-jets, LO for 2,3-jets. (QCD)
 - ◇ Reweighted to NLO EW as func of m4l
 - ◆ ZZ+2j HOEWK (VBF-like process) are produced by Sherpa 2.1.1.
 - ◆ ggZZ Sherpa 2.2.2 Generation is performed at leading order+NLO (corresponding to NNLO QCD)

◇ Reweighted over m4l to NLO with MCFM samples generated at LO and reweighted to LO with m4l where NLO/LO k-factor is given by theorists.

- ◆ ggH and VH: Powheg NNLOPS + Pythia8
- ◆ ttH: MadGraph5_aMC@NLO + Herwig++

Standard Model

VBS ZZ

Twiki

minitree location: /afs/cern.ch/work/b/bili/public/VBS/MiniTree/

Exotics

H-->ZdZd-->4l

Search for a light BSM model in Higgs decay channel. Run 2 we merge pseudo-scalar result into our paper.

- Analysis Twiki
- JHEP 06 (2018) 166: 2018 paper with 36.1 fb data

-- RongkunWang - 2019-05-03

This topic: Sandbox > RongkunSandbox

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