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Info

- This TWiki is for analysis of RPC detector noise data

People

- Universita Roma Tor Vergata
 - ◆ Giulio Aielli - project coordination for detector and FE electronics ageing
 - ◆ Alessandro Rocchi - data analysis
- Sapienza University of Rome (Roma 1)
 - ◆ Claudio Luci - project coordination for operational aspects
- USTC
 - ◆ Marco Sessa - analysis coordination and data analysis
 - ◆ Wenxiao Wang - data analysis
 - ◆ Rustem Ospanov - analysis framework development and support

Project description

- Analyse RPC detector noise data to study ageing of RPC panels and FE electronics as a function of time and integrated luminosity
- Identify and mask noisy RPC strips to improve operational performance and reduce trigger rates

ToDo items

- Implement code to use +/- 100 ns window to compute noise to remove spikes at start/end of inclusive time window
- Normalise 2d noise rate to Hz (same procedure as 1d rates)
- Plot noise rates of individual strips and panels versus integrated luminosity and also run number
- Measure noise rates using collision data using +/- 100 ns window but removing +/- 25 ns central window to veto collision muons
- Publish on website a text file with strip/panel noise rates for each collision run

RPC noise runs

For USTC people, these datasets can be found here: `/home/msessa/storage`

- ATR-16571 [↗](#) - JIRA ticket for RPC noise trigger
- e-log for trigger test on July 6, 2017 [↗](#)
- RPC noise data run on Friday, July 7 2017 -> TOROID OFF
 - ◆ e-log 347404 [↗](#) - first run with wrong deadtime setting
 - ◆ e-log 347434 [↗](#) - took 90 million events
 - ◇ run query for 329220 [↗](#)
- RPC noise data run on Friday, March 23 2018 -> SOLENOID and TOROID OFF
 - ◆ e-log 371899 [↗](#) - 260 milion events
 - ◇ run query for 346559 [↗](#)
- RPC noise data run on Wednesday, June 6 2018 (BME Vth and HV scan) -> TOROID OFF
 - ◆ e-log-382092 [↗](#) - 490 milion events
 - ◇ run query for 352132 [↗](#)
- RPC noise data run on Monday, September 10 2018 -> TOROID ON
 - ◆ e-log-395597 [↗](#) - 265 milion events
 - ◇ run query for 360459 [↗](#)
- RPC noise data run on Monday, September 10 2018, BME/BOE OFF for primary/secondary readout correlation study (NO HITS FROM SECONDARY READOUT FOUND) -> TOROID ON
 - ◆ e-log-395610 [↗](#) - 700 milion events
 - ◇ run query for 360468 [↗](#)
- RPC noise data run on Wednesday, September 19 2018 -> TOROID OFF
 - ◆ e-log-396497 [↗](#) - 260 milion events
 - ◇ run query for 361149 [↗](#)
- RPC noise data run on Wednesday, September 26 2018, BME/BOE OFF for primary/secondary readout correlation study -> TOROID ON
 - ◆ e-log-397503 [↗](#) - 670 milion events
 - ◇ run query for 361972 [↗](#)

```
$ eos ls /eos/atlas/atlastier0/rucio/data17_comm/calibration_RPCNoise
```

Code examples

- [MuonSimHitToPrdTest/share/runRPCdecodingDumpOnNtuple.py](#)
- Software suggestions:
 - ◆ [RpcRdoToPrepDataTool.cxx](#)
 - ◆ Just run Reco_tf.py and see what happens

Code instructions

- Input RAW data

```
At CERN:
$ ssh lxplus
$ eos ls /eos/atlas/atlastier0/rucio/data17_comm/calibration_RPCNoise
$ rucio list-dataset-replicas data18_comm.00360459.calibration_RPCNoise.daq.RAW

At USTC:
$ ssh -XY 202.38.140.118
$ ls -al /home/msessa/storage/data18_comm.00360459.calibration_RPCNoise.daq.RAW
```

- <https://gitlab.cern.ch/ustc/PhysicsRPCProd> - package to extract ntuples from RAW data
 - ◆ https://gitlab.cern.ch/ustc/PhysicsRPCProd/blob/master/share/readRAW_PhysicsAnpRPC.py - job options to read RAW data and produce ntuples

```
$ mkdir -p ~/testarea/RPCRel21
$ cd ~/testarea/RPCRel21
$ mkdir source build
$ cd source
$ git clone https://:@gitlab.cern.ch:8443/ustc/PhysicsRPCProd.git
$ ln -s PhysicsRPCProd/macros/setup/setup_atlas_analysis_release_rel21.sh setup_atlas_anal
$ source setup_atlas_analysis_release.sh
$ acm compile

$ mkdir ../run
$ cd ../run
$ athena ../source/PhysicsRPCProd/share/readRAW_PhysicsAnpRPC.py -c 'inputFile="data18_comm
```

- <https://gitlab.cern.ch/ustc/PhysicsAnpRPC> - package to read ntuples and produce histograms
 - ◆ Location of noise ntuples at USTC

```
$ ls -al /home/msessa/storage/ntuples/noise_run_360459
```

- Instructions for making histograms

```
$ mkdir -p ~/testarea/RPCBase21
$ cd ~/testarea/RPCBase21
$ mkdir source build
$ cd source
$ git clone https://:@gitlab.cern.ch:8443/ustc/PhysicsAnpRPC.git
$ git clone https://:@gitlab.cern.ch:8443/ustc/PhysicsNtuple.git
$ ln -s PhysicsAnpRPC/macros/setup/setup_atlas_analysis_release_rel21.sh setup_atlas_analy

$ source setup_atlas_analysis_release.sh
$ acm add_pkg PhysicsNtuple/PhysicsAnpData
$ acm add_pkg PhysicsNtuple/PhysicsAnpBase
$ acm add_pkg PhysicsAnpRPC
$ acm compile

$ mkdir ../run
$ cd ../run
$ scp ui05.lcg.ustc.edu.cn:/home/msessa/storage/ntuples/noise_run_360459/job_0293_hit.root
$ python macros/runNoiseStudy.py job_0293_hit.root -o hist.root &> log &
```

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PhysicsRPCNoise < Main < TWiki

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