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3.4.4 Studying Particle Flow with Fireworks

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This page is under construction. An archive of an older version is found in [https://twiki.cern.ch/twiki/bin/view/CMSPublic/ParticleFlowFireWorks?rev=27][in this page]].

Overview

This page explains how to set up an experimental version of Fireworks, to study the particle flow reconstruction. This version of Fireworks can be used to create a display of the particles created by the particle flow algorithm:

- PFCandidates
- PFJets

In addition to this, you can also use a modified version of Fireworks which is designed to help you understand how the particle flow algorithm identifies and reconstructs particles, using the following inputs:

- ECAL and HCAL rechits
- PFClusters
- Tracks, with their extrapolated position in the calorimeters
- PFBlocks

Installation recipes and Examples

You can find the latest recipes to install FireWorks here. You can also find the instructions on how to run FireWorks there.

How-to

A Quick Example

You can quickly run a sample dataset. In this workbook we'll be using CMSSW_10_2_X data. Follow the instructions for installation here. Do not forget to install the header files. For Mac OS Mojave, you'd have to download the package, install the header files and then run the hdiutil attach command.

```
open /Library/Developer/CommandLineTools/Packages/macOS_SDK_headers_for_macOS_10.14.pkg
hdiutil attach fireworks-9.4-1.highsierra.sparseimage
cd /Volumes/Fireworks/
./cmsShow data.root
```

At the top of the window, you can change navigate the different event by changing the event number. There is also a filter field that allows you to select for example events with muons whose transverse momentum is greater than 20 GeV. You can click on the filter button and type in the event filter expression as "$Muons.pt()>20". If you apply "$Tracks.pt()>1$", you will see that only 9 out of the 15 events are left.

At the left side of the window you should see a summary of the object collections that are shown on the event display. You can check and uncheck the tick boxes to control which collections get displayed. You can also click on the "Add collection" in order to display more collections not currently shown.

The different viewing windows show the rho-z, rho-phi, and eta-phi projections. Once you are happy with the configurations, you have the option to save the images by clicking on the information button.

How to load a config file at runtime

In the main interface go to *File* and select *Load Configuration* OR, press **Ctrl** and **l** simultaneously. In the new window navigate to, and then open the desired config file (e.g. *pflow.fwc* or *pflow_algo.fwc*).

How to study PF Blocks

In order to study the PF Block objects clearly it's best if you don't display them at the same time as the PF Clusters and/or PF Tracks. Use the collection controller on the left hand side of the main Fireworks window in order to change a collections visibility. This is done by either ticking or un-ticking the box at the side of the relevant collection. In this case, you should un-tick the boxes by the side of "PF Tracks", "PF Cluster - ECAL" and "PF Cluster - HCAL" when displaying PF Block objects.

The visibility options are changed because drawing conflicts occur if the aforementioned objects are displayed together i.e. objects will overlap and it will become difficult to select/view any one in particular.

Wish-list & bug reports

This section is used to list bugs that are currently known as well as features that we are currently working towards getting implemented.

Known Bugs

- Some of the track objects aren't extrapolated far enough to reach the endcaps
- Ecal Rechit display in PF Rho Phi view isn't updated correctly after a filter is applied
- If PFBlock's are displayed with PFTrack and/or PFCluster objects then object overlap may occur. This will make it difficult to select between these objects. See the How-to for information on studying PFBlocks.

Bug Fixes

This is a list of known bugs that can be fixed if you use the second installation recipe and compile the source code acquired from cvs.

The Wish-list (feature requests)

-- ColinBernet - 08-Feb-2011

Review status

Reviewer/Editor and Date (copy from screen)	Comments
Uzziel Perez - 22 June 2019	Minor updates to installation recipes
AntonioMorelosPineda - 17 Apr 2013	Upgrade to workbook style
AljaMrakTadel -11 Jul 2011	Created.

Detailed comments 17-Apr-2013 ▶ Hide ▼
Upgrade to workbook style, A.Morelos,17-Apr-2013

Responsible: AljaMrakTadel
Last reviewed by: AntonioMorelosPineda - 17 Apr 2013

This topic: CMSPublic > ParticleFlowFireWorks
Topic revision: r34 - 2019-10-22 - CiliciaUzzielPerez