ALICE EMCAL Data Analysis

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Outline

1. Introduction

2. The QA Test

3. The Contributions/Accomplishments
I worked on ALICE (A Large Ion Collider Experiment).

EMCAL (Electromagnetic Calorimeter) data analysis.

I ran QA (Quality Assurance) test on LHC18 data with a focus on EMCAL or DCAL (Di-Jet Calorimeter).
EMCAL/DCAL

- Electromagnetic Calorimeter: Main purpose is measure the energy of photons.
- Di-jet Calorimeter: Is to assist the EMCAL in measuring jets.
The data is separated into different periods and these periods have a certain number of runs.

Running the QA consist of two parts the Runwise QA and the Periodwise QA.

Runwise QA gives plots on a run by run basis.

Periodwise QA gives a more whole picture of the data.
Purpose of the QA Test

- Running these QA test my main focus was finding "odd behaviors".
- Out of the hundreds of graphs generated by the QA I inspect about 30 plots.
- Look at the trend behavior making sure that the Monte Carlo follows the data.
Examples

Figure 1: Top: Plots from the Runwise QA. Bottom: Plots from the Periodwise QA.
As the QA test is running the macros look for hot, cold, or dead cells.

- We have conditions to determine if the cells qualify as hot, cold, or dead.
- It sorts the cells and gives plots of the cells which the macro can’t sort.

We have a dead cell candidate:

- if((nCurrentEfrac<mean/3 && mean>=80) || (nCurrentEfrac<mean/5 && mean>=40 && mean<80) || (nCurrentEfrac<mean/8 && mean>=10 && mean<40) || (nCurrentEfrac<mean/10 && mean<10))

A warm/hot cell candidate:

- if((nCurrentEfrac>2*mean && nCurrentEfrac>80) || (nCurrentEfrac>3*mean && nCurrentEfrac>20) || (nCurrentEfrac>4*mean && nCurrentEfrac>8) || (nCurrentEfrac>5*mean && nCurrentEfrac>5))
Cell Plots

Figure 2: Top: Example of a good cell. Bottom: Example a hot cell.
Bad Channel Maps
Contributions and accomplishments

- Became faster in doing QA test and naming the test for each period.
- I got better at reading error logs.
- Generating Bad Channel Maps of the EMCAL/DCAL.
- Create log file with the number of bad channels in each period.
- Came up with run block list.
What is left

- Run an analysis on the data that was tested.
- Run QA test with other configurations.
- Upload bad channel maps, and a run block list.
- Write a script that saves all important plots into a different folder and then make a document with all those plots.
What have I learned

- How to make macros in LaTeX.
- I got familiar with ROOT.
- Practice coding because I suck.
- Data analysis is fun/interesting but I am more of a hands on person testing hardware and collecting data for experiments.