

ALICE EMCAL Data Analysis

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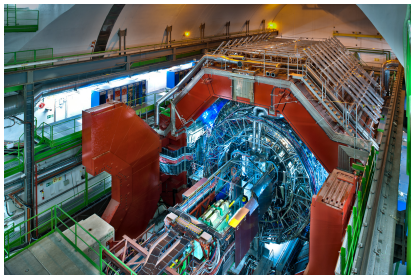
ALICE

Outline

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- 3 The Contributions/Accomplishments

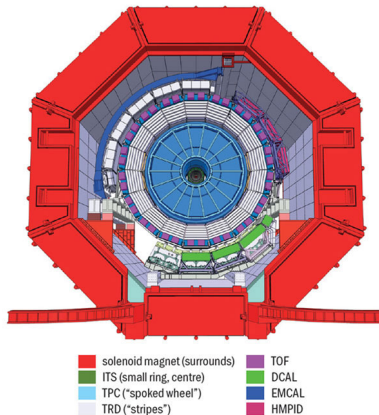
Introduction

- 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.



Skeleton of the QA

- 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

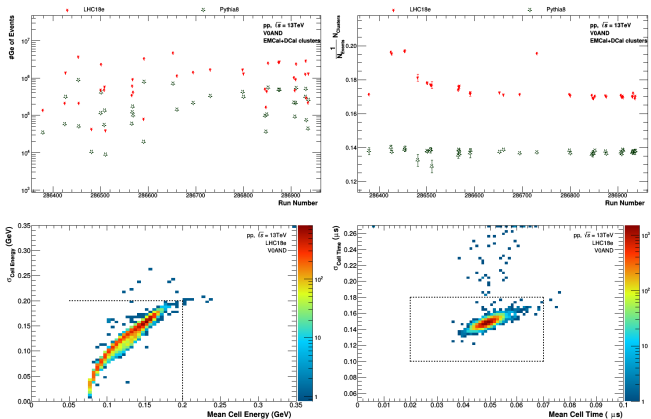


Figure 1: Top: Plots from the Runwise QA. Bottom: Plots from the Periodwise QA.

Cells

- 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>2mean && nCurrentEFrac>80) || (nCurrentEFrac>3_mean && nCurrentEFrac>20) || (nCurrentEFrac>4_mean && nCurrentEFrac>8) || (nCurrentEFrac>5_mean && nCurrentEFrac>5))`

Cell Plots

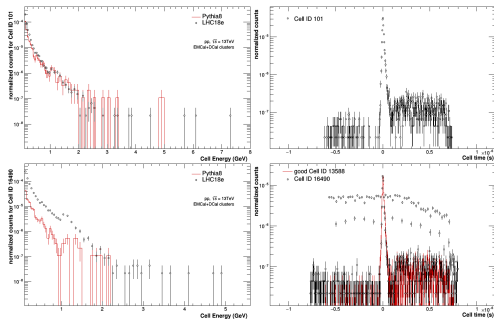
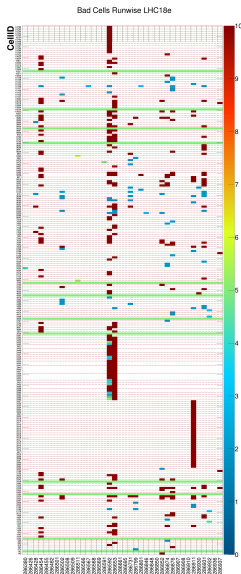


Figure 2: Top: Example of a good cell. Bottom: Example a hot cell.

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.