ATLAS L1Calo Trigger System Efficiency

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Introduction

- L1Calo Trigger system responsible for making rapid, real-time decisions on which which events should proceed to further analysis and which events to discard
- eFEX taus and jFEX taus
  - eFEX: FInds electrons, protons, tau clusters (more important), smaller granularity
  - jFEX: Finds jets (like a spray of particles)
- For every eFEX tau, there may or may not be a jFEX tau associated with it
- Mainly interested in cases where an eFEX tau not associated with a jFEX tau
- Overall, goal of project is to improve this matching efficiency of eTAUs and jTAUs

Days 12/6 - 14/6

- Overview of material (how trigger system works, eFEX, jFEX, etc.)
- Setting up ATLAS on linux
- Resolving issues with computing account
- Attend daily chat meetings
- Look through code to just understand what is happening better
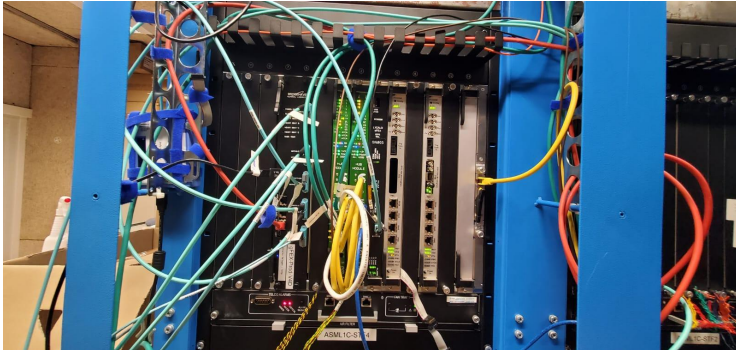
Days 15/6 - 16/6

- Worked on the header and source files for the L1TopoCtauObservable
- Wrote code for the cTaus (combined eTaus and jTaus)
  - Looked at every eTau found and determined whether or not it had matching jTau
- Matching algorithm obtained from previous run
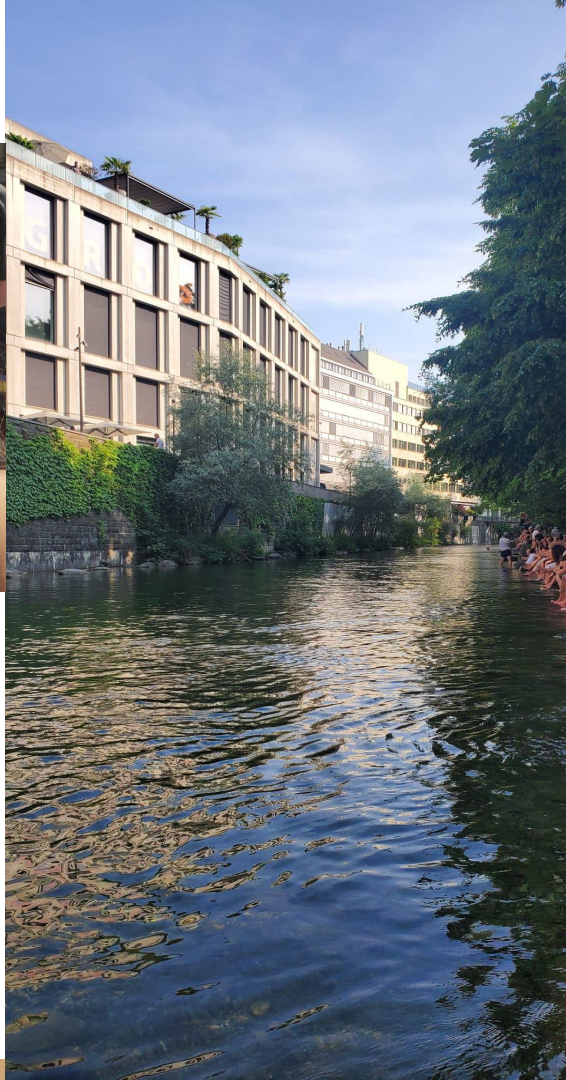 - Studied this matching algorithm in detail because may have to make improvements to this algorithm

Weekend

Days 19/6 - 22/6

- Ran the source and header files to make sure that they were working
- Generated histograms for each of the properties of cTau to see how many counts of cTaus there are for different values of a particular property of a cTau
- Focused on isMatch property of cTaus, which looks at whether or not an eTau has a matching jTau
- Determined that the matching algorithm used previously is quite efficient
- Moved on to create 2D histograms to check if any particular property influenced the matching in a weird way, something weird was going on with the jTau phi's, need to look into
- Now creating efficiency histograms to look at the ratios of matched and unmatched rather than just looking at the counts
- Want to look at relation between matching rcore as function transverse energy

Today

- Also looked at e_eta as function of transverse energy
- Found that there was lots of background noise with low energies, need to find way to account for that in the matching function
- Trying to improve matching function by incorporating near matches between e_eta and e_phi as well and the exact matched