INTT Weekly Meeting

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Recent Tasks

- Helping debug new Fun4All workflow:
  - Found a trivial bug in a production macro
  - New workflow now has 60% of hits compared to old workflow
  - Need to check if extra hits were superfluous
    - run 20445 could've been older with a different binary format
    - will check against more recent runs
  - The chip/channel distributions are shown on the following slides
- INTT Alignment
  - Upcoming addition to the coresoftware library
  - Still WIP but key elements have already been implemented and tested

Code

- New class `InttCombinedRawDataConverter` for the `libintt.so` library is already merged to the sPHENIX coresoftware repository
- New production macro and shell script in my subdirectory of the INTT repository (README)
- These are mostly for a back-and-forth between Chris and I but I prefer to link codes out of principle, or if anyone is curious about how a new workflow might work
- All my existing codes are unchanged and this shouldn't affect any existing workflow; these were strictly additive changes

Findings of Fun4All Analysis

Current Workflow:

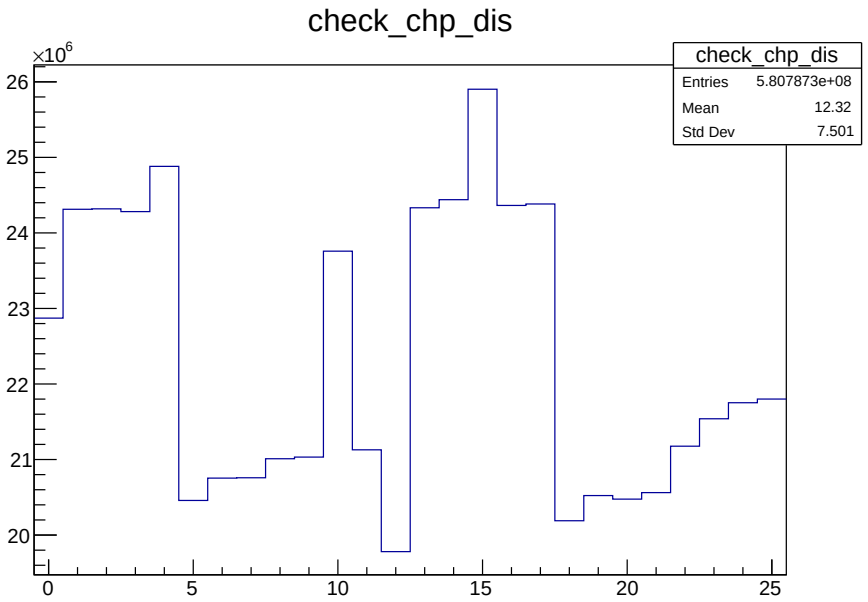

Figure: Reference distribution of decoded chip indexes ($\sim 5.8 \times 10^8$ entries)

Prospective workflow (WIP):

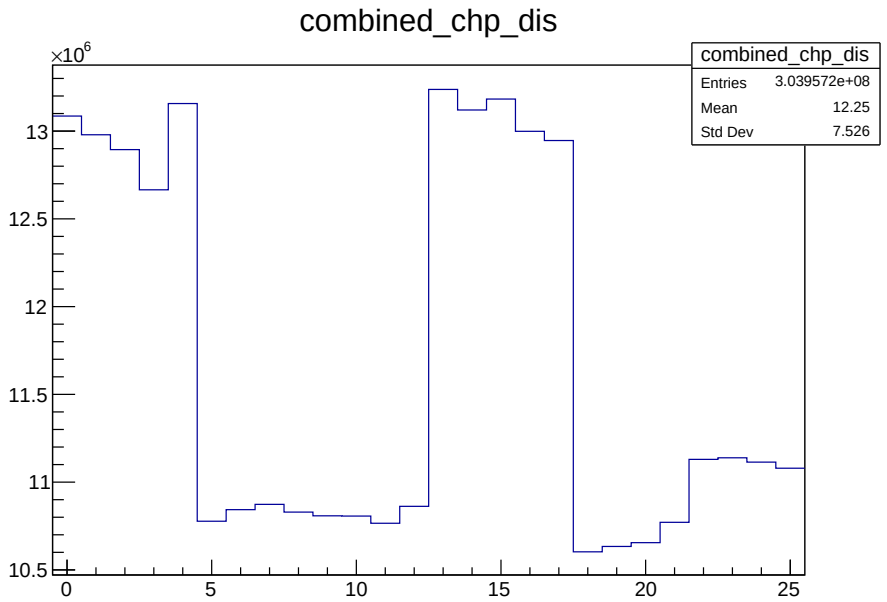

Figure: Debug distribution of decoded chip indexes ($\sim 3.0 \times 10^8$ entries)

Findings of Fun4All Analysis (Cont'd)

The variations in the chip distribution seem to suggest both methods work:

- Indexes 0 through 4 and indices 13 through 17 are higher in counts
  - These are the indexes of the shorter, 2×5 Type-B sensors on the ends of a ladder
  - (The chip subdivisions are about 20mm)
- Indexes 5 through 12 and indices 18 through 25 are lower in counts
  - These are the indexes of longer, 2×8 Type-A sensors in the middle of a ladder
  - (The chip subdivisions are about 16mm)

This discrepancy most likely reflects:

- Differences in the exact size/length of the chips used for the Type-A vs Type-B sensors

Findings of Fun4All Analysis (Cont'd)

Current workflow:

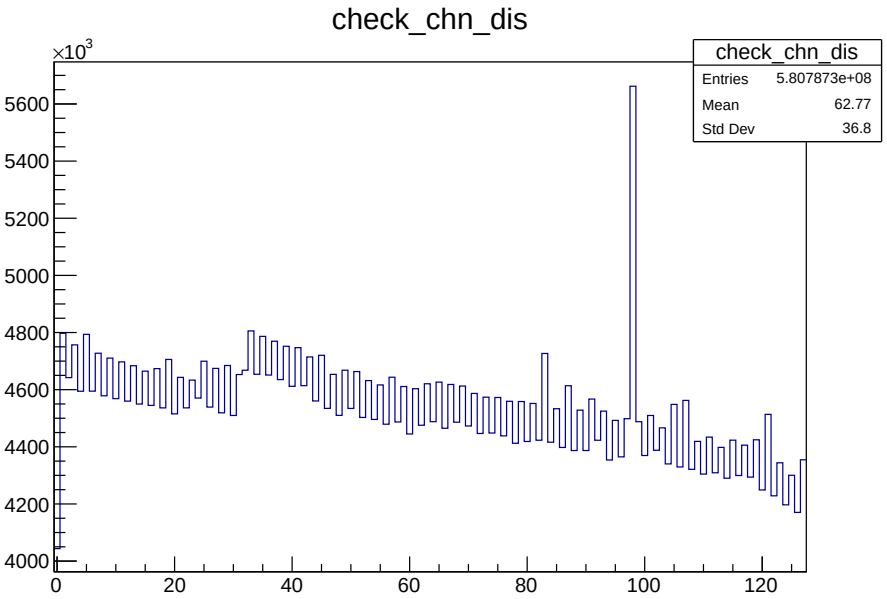

Figure: Reference distribution of decoded channel indexes ($\sim 5.8 \times 10^8$ entries)

Prospective workflow (WIP):

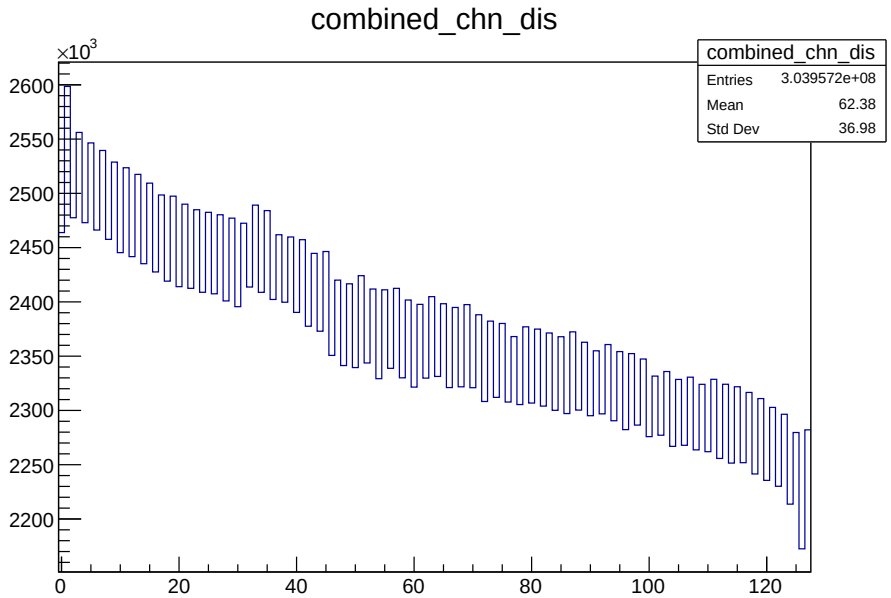

Figure: Debug distribution of decoded channel indexes ($\sim 3.0 \times 10^8$ entries)

Findings of Fun4All Analysis (Cont'd)

- In Chris's workflow, the spike around channel index 100 is gone (cleaner overall)
- We see the same decreasing trend in multiplicity as channel index increases
  - I am not sure why this is
- And also the "fishbone" behavior

Alignment Development

- Encountered difficulty providing transforms that could be read in to the tracking workflow
- Tried several things that could help with naïve problems but not worked
- I'm not sure that it's something on my end
- Used some of the codes to append to the INTT library
- Eventually we will have a method to get the positions of hits assuming survey geometry
- I will link my codes when I finish the implementations and commit/merge changes

Alignment Development (Cont'd)

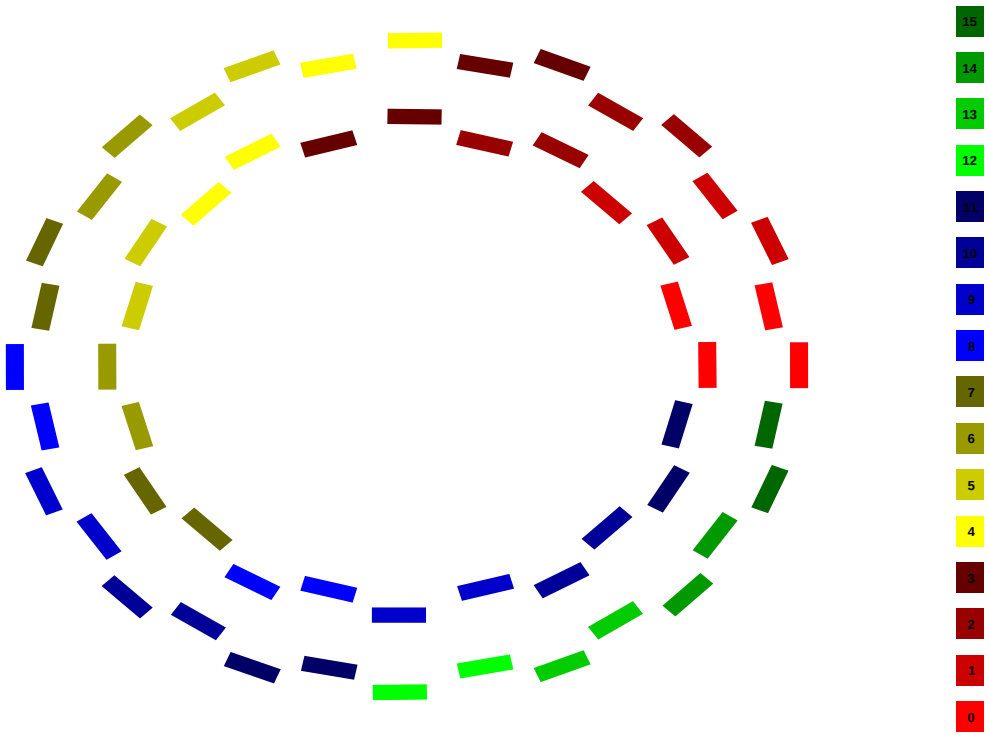

Figure: Output of a WIP macro that uses the current version of the new function to produce the positions and orientations of sensors using survey data. The ladder positions are correct (Indexes are based on offline/tracking convention)

Next Tasks

- Continue developing alignment methods/working with tracking group
- Help with $dE/d\eta$ analysis after QM2023