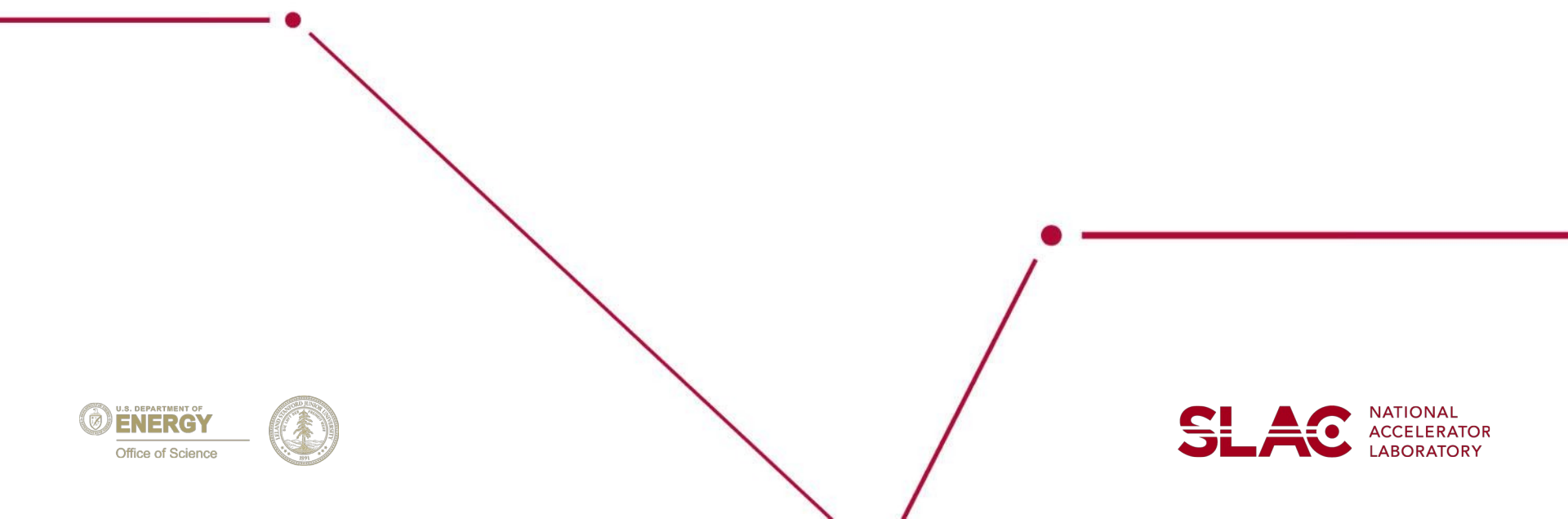# What is going on with 2021 Alignment?

Cameron Bravo (SLAC)

Introduction

- Taking a look at various track parameters from reconstructed data over full 2021 run period

  - New plotting tool to compare 1D distributions for each run

- Focusing here on FEE skims of all runs

  - Thanks to Nathan for making the FEE skims

  - Using simple track selection to study changes run-by-run

  - Using detector aligned for beginning of ran and one for the end of the run

- Current goal is to prepare for a final push in aligning 2021

  - Identify runs with conditions that we want to disqualify them for

  - Identify the number of alignment states we want and determine run numbers for data to be used to do the alignment of each state

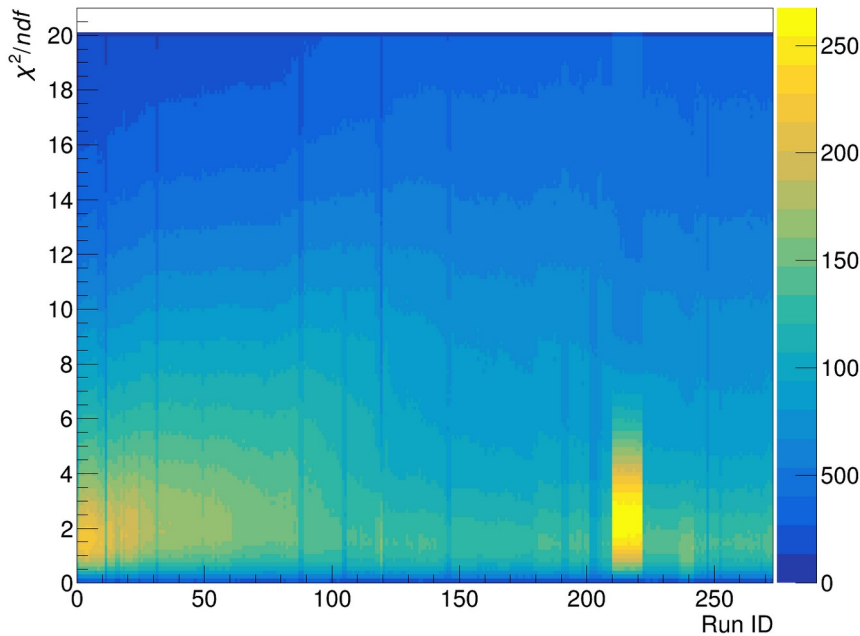 - Prepare data to be used for alignment from the selected run numbers

Simple Track Selection
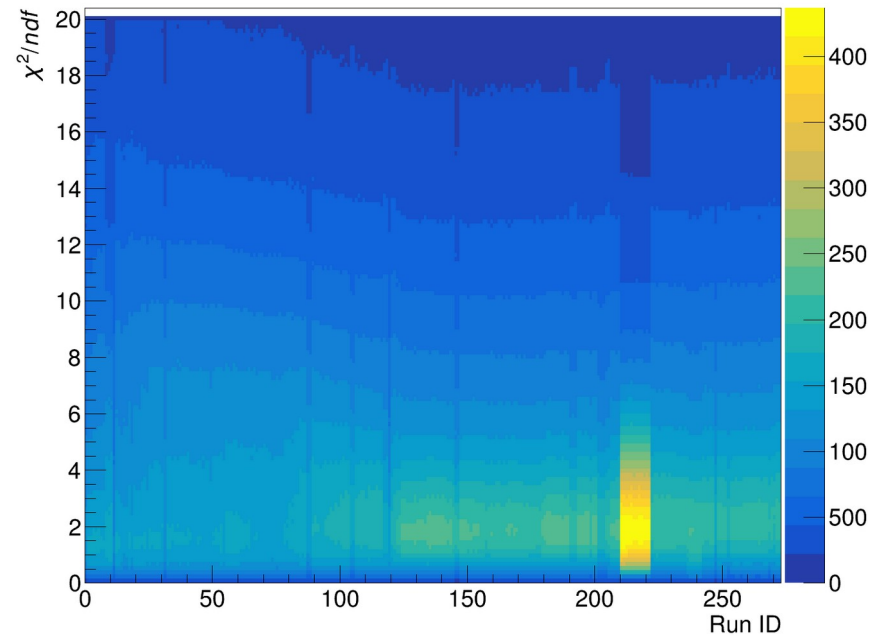
anaParts_trkSelector_cutflow
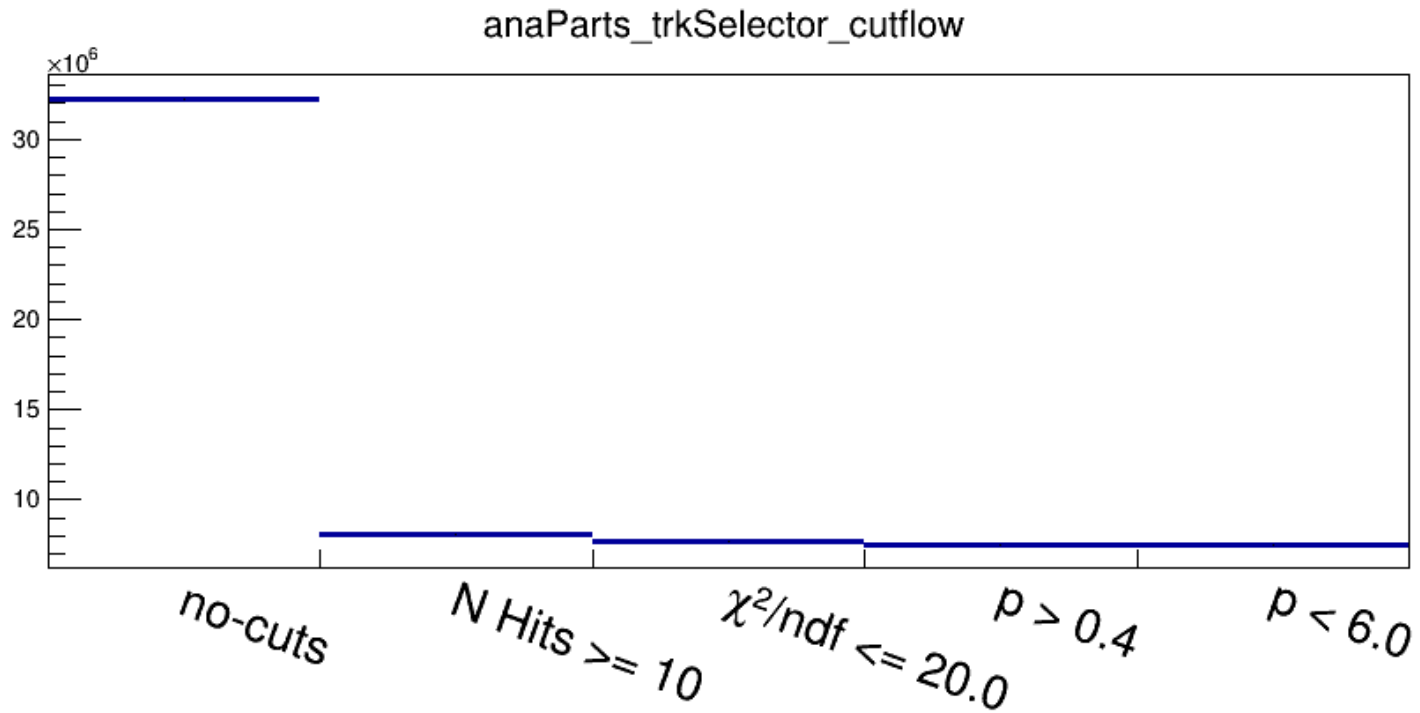
- Very simple track selection used

- This is just from one of the runs, cuts are the same for all the runs
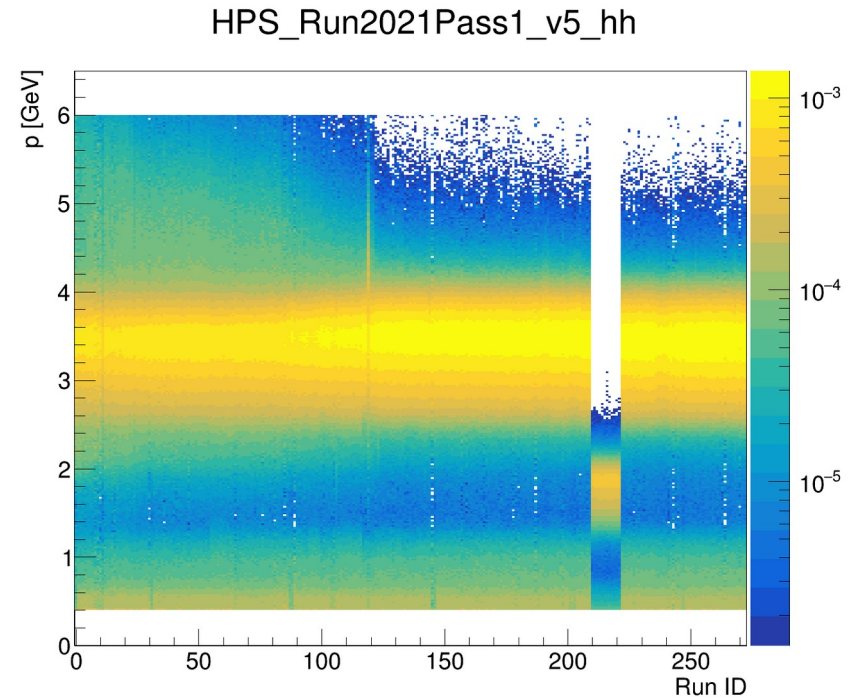
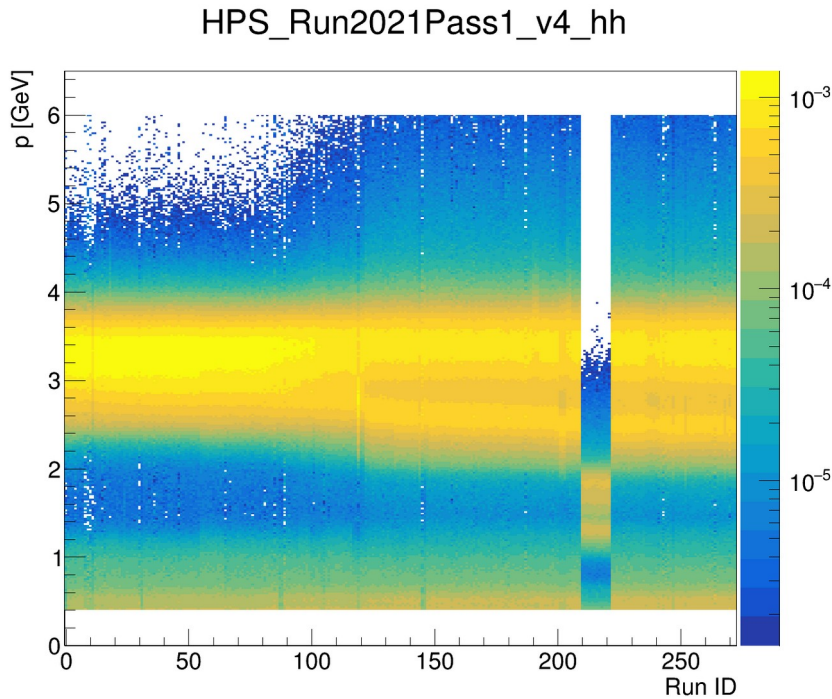# Simple Track Selection

HPS_Run2021Pass1_v4_hh

HPS_Run2021Pass1_v5_hh

- Run ID is number starting from zero which orders the runs in time that are used in this analysis

- v4 is the run aligned using early data and v5 uses later data

  - You can tell looking at this plot

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Simple Track Selection

HPS_Run2021Pass1_v4_hh

HPS_Run2021Pass1_v5_hh

- Can clearly see bifurcation develop in first alignment as time goes on

  - Some changes are more gradual, one point there is a huge change though

- Alignment from later run doesn't bifurcate as you go back in time

  - Rw misalignment is in opposite direction

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Simple Track Selection

HPS_Run2021Pass1_v4_hh

HPS_Run2021Pass1_v5_hh
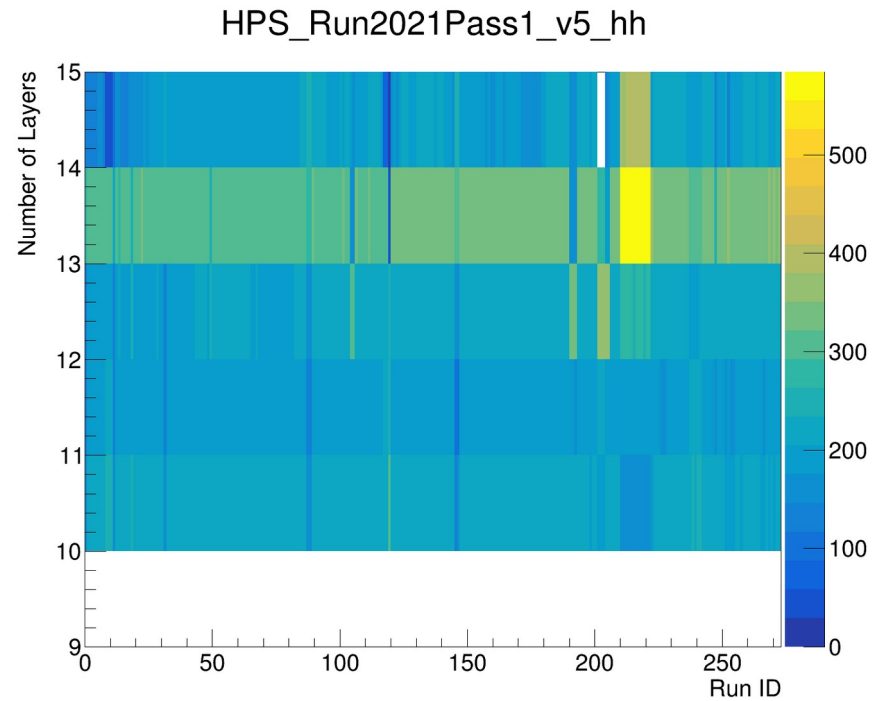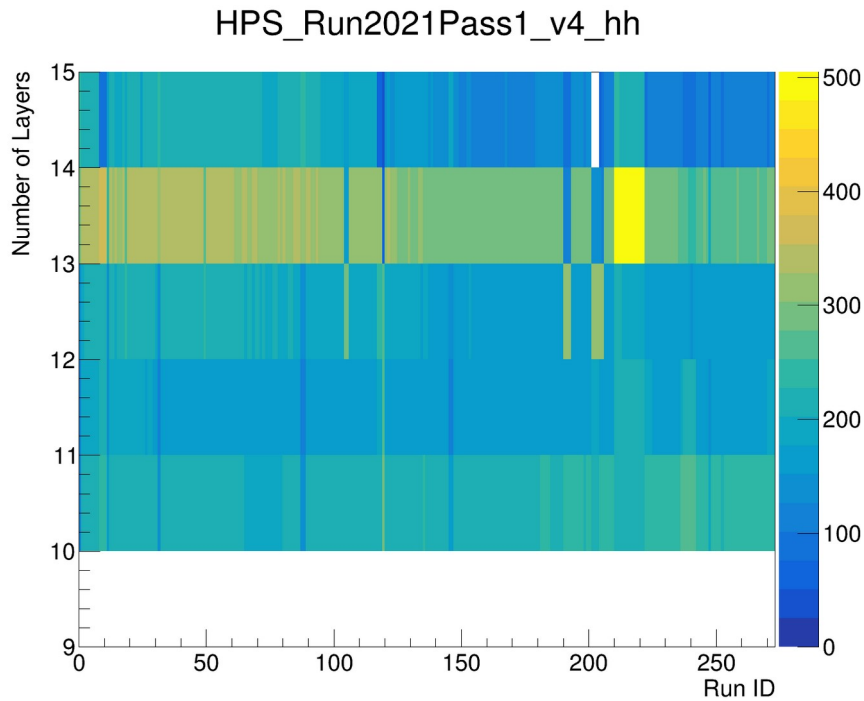
- Both detectors show same rough behavior as we start to look for runs with sync issues that have missing Si layers

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Simple Track Selection

HPS_Run2021Pass1_v5_hh   Top e-

HPS_Run2021Pass1_v5_hh   bot e-
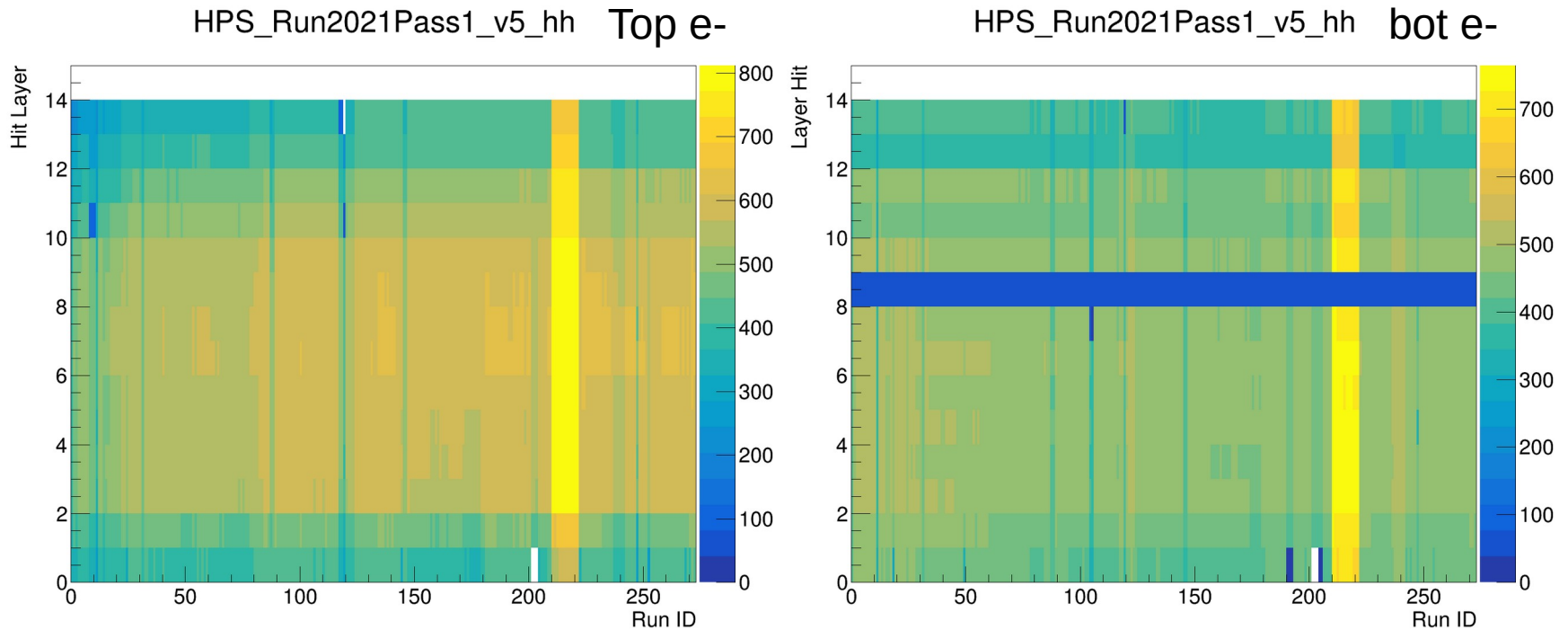
- This gives a more clear picture of the state of the SVT run-by-run

- Have some clear Run ID targets to remove for having poor SVT condition

  - Run IDs: 18, 49, 104, 105, 117,118, 119, 190, 191, 192, 201, 202, 203, 247, 252

  - 14226, 14312, 14416, 14417, 14441, 14442, 14443, 14577, 14578, 14579, 14608, 14609, 14610, 14727, 14732

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Discussion

- Starting to dig into looking at plots summarizing the change of reconstructed parameters over all the runs

- Helps understand state of alignment through the entire 2021 run

  - Starting to get a picture of how many alignment states we need

- Identified 15 runs we potentially way to remove from the golden list because it seems the SVT conditions are missing sensors

  - Need to look into this list of runs a bit more before making the decision to chop them

  - Maybe someone has some time to look through these a bit more while I am on vacation

- I am going on vacation for the next ~2 weeks, first going to Texas to see the total solar eclipse (hopefully the weather cooperates), then heading to southern california for a while

- Bottom of SVT needs another pass too, probably best to do that now before starting to deep dive into fixing the top for several different states throughout the run (since the bottoms doesn't seem to move like the top does)