

08-21-24 NPS RG1a analysis meeting minutes

Attending:

H. Huang, C. Hyde, C. Munoz, A. Camsonne, C. Morean, H. Mkrtchyan, J. Crafts, P. Anderson, T. Song, V. Tadevosyan, W. Hamdi, Y. Zhang and J. Roche

Recording:

https://jlab-org.zoomgov.com/rec/share/wnSocgPWui1MxFuYai__5FvXLhpMNR9CBSR-fNkHj287uUcuw9eFmgYltp0Huyk.YOriPraZdo2uv0gx

Passcode: ask Julie

Thanks to Yaopeng, Hao, and Mark for summarizing their presentations in the ELOG. It made putting together these minutes a breeze.

New meeting time starting next week

Starting next week, we will meet on Tuesday at 11 a.m. EDT. No more alternating day and time. We will use this time until December, unless we have reason to change the meeting time earlier.

Yaopeng: Drift Chamber (DC) calibration

<https://hallcweb.jlab.org/elogs/NPS-RG1a-Analysis/30>

Yaopeng showed some prep work he has been doing to perform the HMS DC calibration for the second half of the runs. Avnish will do the first half.

- Decided run list for DC calibration and the run list for testing
- Modified the calibration scripts for swif2 jobs and created a new macro "Make_Plots.C" to make DC related plots
- DC calibration for the chosen runs has been finished and the 50k replay for those testing runs have been submitted

Casey and Yaopeng had a short discussion about managing the resulting parameter files. They will meet offline to develop a standard procedure and report to the group once they settle.

Hao: NPS calorimeter block health

<https://hallcweb.jlab.org/elogs/NPS-RG1a-Analysis/31>

Different cuts and selections are applied to eliminate the effects of background. The most useful selection is event selections using HMS variable and applying cut on energy and timing

(select events with electrons in HMS, reduce low energy background and accidental events)

Blocks away from the beamline may have problems with low statistics.

From Charles: When checking run by run, look at the average of central blocks to eliminate the problem with low statistics in certain blocks

From Julie: Compare the blocks around to check each block.

Mark: DIS Yields Over Time

<https://hallcweb.jlab.org/elogs/NPS-RG1a-Analysis/32>

Completed an analysis of the DIS yield for the hydrogen and deuterium targets over the course of the experiment. For each kinematic I have at least 2 data points comparing the yield from our data to MC simulation, generally one or two points between October 2023 and April 2024, and one point from during the "refurbishment" of the hydrogen target and DIS scans in May 2024. I've taken the ratios of the data yield to the MC predicted yield and plotted them against time. The results show that the hydrogen target had a low yield from the start of the experiment (or at least from when we started taking ps4 runs), and seemed to decrease slowly but definitively over time, with about a 10% decrease over 8 months. The deuterium seems to have been in good condition throughout the run.

Compared the hydrogen yields to the deuterium yields directly. In the spring, Peter Bosted supplied me with some fits for the expected ratio of hydrogen DIS yield to deuterium DIS yield, so I also took the h/d yield ratio for our data and compared it to the expected values over time. This shows similar results to comparing the hydrogen data to MC, although the decrease over time is not as pronounced in the h/d ratio.

I haven't done an error analysis on these results yet, so that's the next thing I want to work on. There are also small corrections that I still need to add in (pion contamination) or update for our run period (HMS acceptance correction, detector efficiencies).