Notes and Findings from ePIC TIC Meeting 10/23/23:

The TIC meeting focused on brief reports from the DSC's on two topics (a) Test beam needs, with a focus on 2024 in light of limited FTBF availability and (b) Threshold settings in simulations. Note that there was no report from the Luminosity DSC, and a verbal report from the FB High Rate Tracker (no slides on Indico).

Test Beam Needs:

(1) Four DSC's reported a need for the FTBF in 2024:
- pfRICH: HRPPD tests, assessment of HRPPD timing performance (1 week), pfRICH prototype (2 weeks)
- Far-Forward: AC-LGAD + EICROC0 ASIC (NOTE: only needs MIPs, could be provided in STAR?)
- Barrel EMCal: Three stages of AstroPix testing with GlueX prototype (1 week each stage, w/ATLAS Telescope program)
- AC-LGAD TOF: 2+ weeks with prototype AC-LGAD sensor and ASIC

(2) It is difficult to see how even a limited schedule of ePIC participation at FTBF could be accommodated with a reasonable assurance that it would actually happen. Alternatives need to be balanced against the cost to ship equipment and the overhead the groups face in operating effectively at a new facility.
(3) The STAR hall in 2024 offers an opportunity for detectors that require MIPs for testing. However, STAR is an operating experiment and NOT a test beam. While in principle particles will be available for a longer period of time, access to the test beam setup will be limited.
(4) For the Far-Forward and TOF AC-LGAD tests, the proponents should work together to see if a proposal for a combined setup could be made to STAR and if this makes sense for their needs. Cooperation with the forward HCAL insert groups (which has already submitted a proposal to STAR) could be beneficial.
(5) Establishing the performance of the HRPPD's could be complicated and would likely be hampered trying to accomplish this outside of an established setup at FTBF. Similarly, the existing setup at the FTBF and the proximity of ANL personnel argue that a move for the 2024 tests could be counterproductive. It seems unlikely that sufficient time would be available for a test of the pfRICH prototype and measurements of e/pi separation with the BECal test setup. Priority should be given to demonstrating HRPPD performance and operating the AstroPix sensors with the GlueX prototype, with additional measurements only as available beam time permits. If the FTBF is not available in spring 2024, contingency plans will have to be pursued for summer/fall 2024.
(6) In the future 2025+ access to the FTBF will continue to be important, especially where identified particles pi/K/p are required.
(7) Many groups have plans for at DESY/Mainz/CERN for 2024+

Threshold Settings in Simulations:

(1) The request from the Simulations group is both for a threshold on summed energy and pedestal position and cut on sigma of pedestal width, for those detectors for which this is appropriate, mainly calorimeters. In principle these

two are connected – a given ADC range and pedestal ADC cut corresponds to a cut on the energy threshold. The Simulations WG is requesting both sets of information as a check on consistency. Some systems are configured so the pedestal cut is lower than the threshold summed energy, which will be fine for the background and rate studies, but may prove confusing when people examine the code later on. Kolja will clarify the relationship between the two and the request in the upcoming Pull Requests.

(2) The current digitization model does need to be extended. The S&C group expects that each DSC will update the digitization model to better reflect their detector as the readout and electronics chain develops. In particular, there is room for a common model to be developed for H2GCROC readout detectors that incorporates both the ADC and TOT measures of energy, that could be shared between multiple detector systems.

(3) There is an inconsistency between the threshold energy cutoff reported by the Far-Forward AC-LGAD detectors (1 keV) and the AC-LGAD TOF (6 keV). Discussions are ongoing between Zhenyu and Alex to settle on the correct values.

(4) The SVT DSC is verifying a change in the cut on the individual hit threshold from 0.65 keV to 0.54 keV, to be confirmed by end of the week.

(5) The Backwards HCAL is working with the barrel HCAL DSC to verify the digitization model, should be completed by end of week.

(6) The Luminosity DSC has yet to report (to be followed up)

(7) All other DSC’s reported “ready” with thresholds and digitization parameters in simulation. Kolja confirmed in closed session that information presented met requirements.