

Questions from the TDIS Technical Review

mTPC:

the structural design of the mTPC sound?

inner tube strong enough to support the lateral loads of the individual cells keeping them aligned? **Build cylindrical prototype - underway: engineering design addresses these questions**
(To do: timeline for completion - Eric Christy)

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Is the diffusion of the Helium gas into the target cell understood and within the tolerances of the experiment?
Done: There is no helium gas in the new setup.

What is the double peak timing resolution in a readout cell? How far do two pulses have to be apart to be detected as individual hits in the same pad?

Data collection completed, analysis in progress: (To do, numbers and make show plots - Aruni/Eric C.)
Get number from digitization simulation as well: (To do, numbers and plots -Rachel/Eric F.)

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Solenoid/SBS Magnet:

What is the interaction between the solenoid field and the SBS Dipole iron?

What are the forces between these magnets?

Are additional support structures required to mitigate the forces on the magnets?

Status: Engineering design drawing of magnet not available. Therefore structural integrity of the solenoid in the presence of SBS iron cannot be determined non-destructively.

This is a potential show stopper.

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Tracking:

How can tracks be identified and reconstructed, given the expected high occupancy, in particular in the first few layers/rings of a single detector module?

Done: feasibility demonstrated with simulation data tracked in ACTS framework.

To do: make show plots that demonstrate this feasibility well. (Aruni/Dmitry)

Demonstrate feasibility with GNN and make show plots (Shujie)

What is the yield of “false”/“fake” tracks given the high hit multiplicity?

To do: make show plots that show fraction of fake tracks (Aruni/Dmitry)

make show plots for the same using GNN (Shujie)

Can either algorithm be run from the outer ring in, reducing the effect of the inner ring occupancy?

To do: make an occupancy plot to demonstrate that this is not needed.

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Target:

It is strongly recommended that a JLAB Design Authority be assigned to this system.

What are the safety margins regarding target operation (pressures/temperatures)?

What safety mitigations are planned if the pressure margin requirements cannot be met?

What is the impact of the downstream flange material on the scattered electron trajectory?

What is the impact of beam-heating on the aluminum entrance and exit windows?

Is active cooling required?

What is the impact of the heat and radiation environment on the target flange seal o-rings? Are special/dedicated materials needed?

Done: ALERT target demonstrates feasibility.

To do: get preliminary parameters from the target group or get design authority assigned(DD)