Subject: TIC meeting , September 23, 2024 (ZDC) - main outcome and recommendation
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Dear Colleagues,

this e-mail is to underline the main outcomes of the September 23 TIC meeting, dedicated to the ZDC. The two reports, extremely informative, have been greatly appreciated.

Communications on September 23:
- from TC-office: Reduced availability of testbeam at FNAL in 2025. Reminder of the preTDR draft Version0 on Sept. 29.
- From DSCs: enlargement of the management team for MPGD Tracking DSC to better reflect in the management the actual work sharing; added DSTCs: Francesco Bossu' and Annalisa D'Angelo.

ZDC

Physics case
The physics case has been revisited underlining the requirements, that now are more mature respect to those in the YR. In particular, the measurement of the Lambda_0 decay in the neutral final state is taken as benchmark.
While the energy resolution requirements in the YR are substantially confirmed, it is demonstrated that a more fine angular resolution is key. This cannot be obtained with the current detector baseline,
where the first portion is by long lead tungstate crystals.

Layout and simulation results
The proposed layout is recalled: a 162 cm- long calorimeter with the same architecture as the insert in the forward hadronic calorimeter, namely by fine granularity SiPM-on-tile technology,
preceded by 7cm-long LYSO crystals.
All the result presented are relative to high energy cases (including the Lambda_0 decay in the neutral final state) obtained without including the LYSO layer, with ideal detector response
(no SiPM noise) and without physical background. It is recall that
some results relative to the detection of low energy gammas using the LYSO crystal layer had been recently presented.

Recommendations

The adoption of the 162 cm-long SiPM-on-tile calorimeter is confirmed.
It is requested to continue to assess the performance in more realistic simulations,
including SiPM dark noise and physical backgrounds and in particular beam gas interaction.

It is clear that while long crystals in front of the SiPM-on-tile section will degrade the ability to reconstruct
the vector direction for EM showers, a short crystal solution has not been simulated or optimized. A possible path
is to configure the EM section of the ZDC for the physics focus of an EIC running period by including it for eA running
where the detection of low-energy photons is important to tag incoherent interactions, and removing it for ep running.
This places a premium on reserving space for low-energy photon crystal section, but an argument cannot be made
at this time to replace the existing baseline using long PbW04 crystals.

To advance the case of short LYSO crystals, the proponents need to address the following items:
- Implement in the simulation a reasonably realistic LYSO response;
- Optimize the crystal length for the detection of low-energy photons;
- Select the most adequate sensors for the LYSO crystals (SiPM versus APV).

Best greetings, Silvia

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