

Subject: TIC meeting 18/3, 2024 (planning for TDR effort (calorimetry, second pass); ZDC simulation studies, update) - main outcome

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Date: 3/18/2024, 7:57 PM

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Dear Colleagues,

this e-mail is to underline the main outcomes of the March 18 TIC meeting, dedicated (i) to complete the panorama of the planning for the TDR effort and (ii) to an update about ZDC simulation studies.

The careful reports by the speakers have been appreciated.

(i) Planning for the TDR effort, Calorimetry

The effort of the different calorimeter subsystems for pre-TDR is analyzed in detail, dividing the items in 4 categories: (1) from previous work, (2) ready to write, (3) partially ready to write, (4) lots to do. The goal is the completion by the end of 2024. No intermediate timelines are provided and they will be requested to the DSCs for the most demanding items, namely category (4). The backward HCal is regarded as the subsystem where reaching the preTDR level by the end of 2024 is more critical due to the limited workforce available and aspects of novelty in the role of this detector. Substantial work is needed to polish the physics case and related requirements. Also the subsystem design would required a larger team, even if several technological aspects can be derived from other calorimeters in ePIC.

(ii) ZDC simulation studies, an update

ZDC resolution for $\Lambda 0$ reconstruction has been studied and presented by simulating the channel $\Lambda 0 \rightarrow n + \pi 0 \rightarrow \gamma \gamma$ (BR:~ 33%) and using the resolution in $\Lambda 0$ pT as figure of merit. The performance for neutron reconstruction plays the dominant role in $\Lambda 0$ reconstruction, in particular, the angular resolution, while a good $\pi 0$ reconstruction helps if compared to a simple $\pi 0$ tagger. These studies suggest that an electromagnetic section by long crystal is not beneficial because it can destroy the angular information, while the comparison between short crystals or no crystal configurations would required a full simulation. It has been commented that, beyond the $\Lambda 0$ channel, also simulations dedicated to soft gamma and to vector meson production are needed for the optimization of the ZDC configuration. They require the contribution of the physics WGs.

If this notes need corrections/integration, please, write me back.

Thank you.

Best greetings, Silvia

On 3/6/2024 10:33 PM, Silvia Dalla Torre wrote:

Dear Colleagues,

this e-mail is to underline the main outcomes of the March 4 TIC meeting, dedicated (i) to complete the panorama of the planning for the TDR effort and (ii) to a report for a proposed modification of the LFHCAL absorber. The careful reports by the speakers have been appreciated.

(i) Planning for the TDR effort

PID

The excellent report has presented the planning for the 4 PID DSCs dedicated to pFRICH, HPDIRC, dRICH and ToF by AC-LGADs.

Thanks to the punctual contribution from the DSCs and to two preparatory meetings of the PIC CC WG, the report has detailed the activities foreseen in 2024, carefully illustrated with the corresponding timelines, while some overview of the timelines after 2025

has also been provided.

The main support requested by the different DSCs is summarized here:

- pFRICH: laboratory and project support for integration and services;
- dRICH: project help for mechanics, safety and infrastructure, interaction tagger, component QA in USA, further workforce for reconstruction and global PID;
- hpDIRC: recuperation of BaBar bars, FEE studies, integration of software in EICRecon;
- ToF: global support and cooling, design of the read-out chain, simulations.

A question has been raised and remains open: what the impact of the physical background is on the PID devices

and how it can be estimated in case of standalone softwares.

Far Forward

The planning for the different subsystem of the far forward region has been presented, including tracking for RPs, OMDs and B0, calorimetry for B0 and ZDC.

Further studies about the response of the ECal portion in the ZDC are ongoing and will be presented at TIC in two weeks.

The main support requested by the different subsystems is summarized here:

- for RPs and OMDs: engineering support needed (cooling, support/insertion system);
- for B0: engineering support needed (cooling, installation concept).

(ii)

The proposal of modifying the absorber of the LFHCAL replacing the tungsten layers with ion layers

has been presented, illustrating the effect on the performance for single particle as obtained from simulation.

No relevant differences in energy, space and angle resolution are put in evidence.

The construction is made easier when tungsten is not used and the cost is reduced.

This information is complemented by another element, not presented at the TIC meeting:
- the strength due to the solenoid magnetic field is reduced in the configuration where the tungsten is replaced with iron
(news from Valerio Calvelli communication by Elke).

On the basis of the report and complementary information, TIC recommends the adoption of the absorber configuration with tungsten replaced by iron.

If this notes need corrections/integration, please, write me back.
Thank you.

Best greetings, Silvia

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