

**Subject:** [Eic-projdet-tic-l] TIC meeting 4/29, 2024 (TC priorities for simulation studies; TDR effort, progress (far forward); detector DB requirements) - main outcome

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**Date:** 4/30/2024, 2:01 PM

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Dear Colleagues,

this e-mail is to underline the main outcomes of the April 29 TIC meeting, dedicated to (i) TIC priorities for simulation studies, (ii) TDR effort, progress (far forward, first part) and (iii) detector DB requirements.

The careful reports by the speakers have been appreciated.

In the initial communications, a slide kindly provided by Markus Diefenthaler was shown. This slides recall about the Remaining Tasks on PID LUTs, the Remaining Task on Integration in Large-Scale Simulation Campaigns and the Remaining Tasks on EICrecon. In the e-mail accompanying the slide , Markus indicates that "The deadline for the software release is next Monday, May 6." A discussion followed about the combination of ToF LUTs and Cherenkov device LUTs. A simplified approach has been suggested and agreed upon for this initial implementation: when hadron momentum is below 2.5 GeV/c, the ToF LUP are used; Cherenkov LUTs when above this momentum threshold.

(i) TIC priorities for simulation studies

This is the list presented.

- To be included in standard simulation plots: the acceptance of the various detector to follow its evolution with layout modifications.
- This following list includes studies for subsystems where there are technical aspects still open:
  - simulations dedicated to soft gamma and to vector meson production in order to optimize the ZDC configuration (work already very advanced);
  - motivation and requirements for the backward HCal;
  - needs in term of space resolution for the outer MPGD (work already ongoing );
  - impact on physics of dRICH with single vessel vs dRICH with split vessel;
  - B0 calorimetry performance: LYSO vs PbWO4 .

(ii) TDR effort, progress (far forward, first part)

Updates about B0 devices are postponed to the following week.  
RPs, OMDs and ZDC updates have been presented.

RPs and OMDs:

FEE ASIC - EICROCO presents several limitations, that prevent a true evaluation of the performance; the new version EICROCOA/1 is expected in Fall; there is also the need to understand the timing performance versus temperature and radiation dose;  
Reconstruction software: Working on global solution to handle beam effects and crossing angle in analysis; these effects are major in FF observables; the integration of machine learning method into EICrecon (especially important for OFDs) is progressing;  
integration: some progress registered in vacuum system, detector moving stages and cooling systems.

ZDC, crystals:

the comparison LYSO vs PWO requires dedicated simulations;  
the choice of photosensors (APD vs SiPM) also includes irradiation studies foreseen at the Neutron irradiation test in RIKEN/RANS;  
ongoing simulation efforts: Lambda identification by Alex, Low-E photon identification by Miguel;  
plans in Asian groups (Sejong Univ. group, Academia Sinica): Lambda identification, pi/K structure function by Sullivan process for pi/K DIS, Mass/GPD by pi/K DVCS/DVMP.

ZDC, SiPM on tile:

relevant improvements in energy and space resolution using GNN-based reconstruction algorithms;  
also multiple neutron response is satisfactory and highly linear;  
a prototype with SiPMs is under test at STAR, while a more extended calorimeter (30 x 30 cm<sup>2</sup>) will be tested in Fall 24 at JLab;  
physics studies coupling the hadronic section with 7 cm long crystals by LYSO are ongoing using standard physics benchmarks (Lambda0, vector mesons);  
new: the capability to detect down to the first line of U238 (45 keV), which shows up at ~10 MeV in the lab frame; these studies are relevant to separate coherent and quasi-coherent scattering.

(iii) detector DB requirements

A draft of the requirements is presented in detail with limited reactions from the attendance, indicating that the document is already substantially mature.  
The DSCs are invited to include further comments and suggestions in the living document at:

<https://docs.google.com/document/d/1ow1nfy8dsr1CfTBkG6kUJ0Oy2MZONhAktLy-zevJ1E/edit> .

Deadline for the comments: May 12. Then, the document will be finalized.

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

Best greetings, Silvia

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