

Minutes: CEPC Reference Detector TDR Meeting in Nov 19, 2024

- Participants Present in the meeting room (M.B. 122): Xinchou Lou, Mingshui Chen, Tianchi Zhao, Jinyu Fu, Linghui Wu, Yiming Li, Sen Qian, Feipeng Ning, Yong Liu, Weidong Li, Jingzhou Zhao, Huirong Qi, Haoyu Shi, Gang Li, Qi Yan, Boping Chen, Zhaoru Zhang
- Remote: XiaoLong Wang, Fangyi Guo, Fei Li, Haijun Yang, Hengne Li, HOU.suen, Jun Guo, Lei Zhang, Mei Zhao, Shanzhen Chen, Shengsen Sun, Tao LIN, Wei Wei, Xiaolu Ji, Xiaoting Li, Xiongbo Yan, Yunyun Fan, Zhijun Liang, Chengguang Zhu

MDI – Haoyu:

- Beam Backgrounds:
 - Higgs parameters/lattice slightly updated. Simulation on going.
 - Results will be provided soon, including the inputs file and parameter, and the output(simulation) results. A summary table including the hit density/occupancy/TID/NIEL will also be provided.
 - Time Window: 1BX/3BX(1us).
 - Writing on going. The results of no shielding will be included in MDI Chapter.
- Beampipe: Writing on going. Focused on single part, double pipe will be ref to acc TDR.
- LumiCal: Writing on going. First version will be finished this week.

Vertex – Zhijun:

- Attending Pixel 2024, possible collaboration with France.
- TDR is in editing

Discussion:

- Weidong: the time window needs to be discussed and defined by trigger group. The value is larger than a theoretical value from sub-detectors

Silicon tracker – Qi Yan:

- MPW Submission Plan for HVCMOS Pixels
- To demonstrate part of key performance by ref-TDR release (June 2025):
 - – 1st submission in January: all basic functions except DAC
 - – 2nd submission in April or later 2025: DAC included, all other modules optimized
 - Function test is expected to done before TDR release. Beam test need more time and preparation.

TPC – Huirong:

- Status of TDR editing

- Linghui: 1.4.2 is only for TPC performance
- Mingshui: make sure the standalone simulation is consistent with the parameter in CEPCSW

ECAL – Yong:

- Front-end electronics: linearity specifications and studies (for feedback to IDRC)
 - Implementing ASIC Integrated Non-Linearity (INL) into ECAL digitization
- Beam induced backgrounds: impacts to EM performance
 - Larger time window, worse resolution
- Granularity 10mm vs 15mm
 - Need discussion and make decision soon
 - Shengsen: need to know physics requirement for pion₀ efficiency

HCAL – Sen Qian:

- Haijun: need discussion whether need 1 p.e. for calibration
 - Sen: it depends on calibration method (cosmic ray or led..)
 - Everyone: suggests to use real events for calibration
 - Sen: suggests to collaborate with universities to firstly build calibration system

Muon – Xiaolong:

- Study of LLP performance cannot be finished before TDR release, briefly describing the plan

Magnet – Feipeng:

- Status of TDR editing

Electronics – Wei Wei:

- Discussion on Ref-TDR chapters
 - Related chapters were allocated to the responsible people
- Discussion with TDAQ about the clock distribution in Ref-TDR
 - Detail design including ChiTu chip, BEE to FEE, are in Electronics
 - Global architecture of the clock system in TDAQ

TDAQ – Jingzhou:

- Status of TDR editing
- Discussed trigger and clock distribution schema
- New physics trigger requirements

Software – Weidong:

- Calorimeter: end-cap geometry(done), performance validation and optimization
- Muon Detector: The digitization for end-caps is under development (done) the reconstruction algorithm is being implemented.

- Analysis: The RDataFrame-based analysis framework is being released (ready)
- Tracking with ACTS: The new TDR geometry has been integrated, and the reconstruction efficiency is fine; however, there is a discrepancy in the phi direction. It's found the material distribution does not match between Geant4 and ACTS. (solved)
- To be done:
 - 1) event mixing within a time window (Tao Lin)
 - 2) event display (Zhengyun's student)
- Discussion:
 - Lack of manpower:
 - ◆ Xinchou: put people in Henan, using Henan funding, give Mingshui a name list

Performance – Mingshui:

- physics object performance study and comparison with previous results
- study of vertex reconstruction