

CEPC Reference Detector TDR Meeting (May 21, 2024)

09:00 - 11:40 (Beijing Time)

Meeting agenda and minutes

- indico page: <https://indico.ihep.ac.cn/event/22547/>
- Participants
 - Present in the meeting room (M.B. 112)
 - Jie Gao, Guang Zhao, Weidong Li, Miao He, Feipeng Ning, Haoyu Shi, Zhijun Liang, Joao, Yifang Wang, Quan Ji, Mingyi Dong, Zhaoru Zhang, Jianchun Wang, Mingshui Chen, Jingbo Ye, Tianchi Zhao, Huirong Qi, Manqi Ruan, Yunyun Fan, Jingyu Fu
 - Online at ZOOM
 - Wei Wei, Mei Zhao, Chengdong Fu, Shang Xia, Suen Hou, Hengne Li, Haijun Yang, Tao Lin, Boping Chen, Meng Wang, Fei Li, Ying Zhang, Quan Ji, Fangyi Guo, Xiongbo Yan, Xiaolong Wang, Shaojing Hou, Kun Liu, Qiongyao Liu, Haoyu Shi, Chengguang Zhang, Zijun Xu, Feipeng Ning, Lei Zhang, Xian Shu, Zheng Wang, Xin Shi, Jingbo Zhao, Wenxing Fang

CEPC Accelerator TDR Review Processes and Some Experiences: Jie Gao

- Talk: [slides](#)
- Key points of the talk
 - Review includes technical review, cost review and civil review
 - Preparation guideline
 - Firstly decide outline of each chapter, in case missing items
 - Report content should reflect latest design and R&D status.
 - Cost estimation considers component quantity, technology development, cost target, and automatic mass production methods.
 - Quality control
 - length of chapters are defined at beginning
 - Weekly meeting discussion + CEPC day
 - Timeline: six months before technical review, and to the cost review about 9 months
 - An example of cost estimate of magnet system
- Discussions
 - Jianchun/Meng: How to deal with multipul technology options for sub-detector?
 - Jie: record option choosing process with detailed explanation to justify the choice, which may be used for review
 - Jingbo: question about contingency of cost estimation?

- Jie: add one global contingency, and cost is based on mass production with many other factors or future possibility
 - Yifang:
 - The time for detector TDR is limited, comparing with the success of accelerator TDR, more effective and deeper efforts are needed from detector side.
 - **converge option selection ASAP**
 - **focus on one option, work out all details with optimization.** Before June 30, preliminary design should be ready to be reviewed, and need to optimize all key parameters, such as number of channels, cost per channel** ...
 - Manqi: start writing TDR now
 - Jianchun: **within next two weeks, sub-detector groups should come up with outline of TDR chapter**

Mechanics: Quan Ji

- Status report: [slides](#)
 - Updates on dimensions: Yoke modified, 7 layers, clearance 50 mm->40 mm, very challenge, 1240 mm thickness in total.
 - Vertex requirement on temperature and vibration very difficult. Need multi-professional and multi-system joint discussion.
- Discussions
 - Yifang: **need detailed cost estimation, 50-100 items for each subsystem.** Cost estimation should be matched with technical design

Electronics: Wei Wei

- Status report: [slides](#)
 - try triggerless for vertex, considering upgrade scheme.
 - SiPM for LumiCal, pile-up issue.
 - Power transistor rad-test: GaN is possible.
 - wireless communication: multi-layers, axial and radial direction.
- Discussions:
 - Yifang: international review for the readout scheme

MDI: Haoyu Shi

- Oral status update
 - first version in end of May, event rate to be optimized
 - SiPM radiation issue under study.
 - Geometry in cepcsw is ready
- Discussions:
 - Yifang: reported results need clarity software version

Magnet: Feipeng Ning

- Oral status update
 - mechanical test at low temperature
 - design of magnetic field at different interval
- Discussions:
 - Manqi: want to see yoke scan results

Muon: Xiaolong Wang

- Status report: [slides](#)
 - production of scintillator strip, design of aluminum frame, simulation in cepcsw, FEE design for detector module, R&D for BEE, Purchase CAEN equipment for DAQ for prototype testing, design of a time calibration (optional).
 - PRC R&D ongoing by SJTU.
- Discussions:
 - Yifang:
 - report detector design plan on Tuesday meeting, detailed technical progress can be shown on Wednesday meeting.
 - determine design (detector and electronics) in 1-2 weeks
 - waveform readout is not considered

Tracker: Meng Wang

- Status report: [slides](#)
 - Z resolution as a function of polar angle, only barrel, full setup with vertex and inner tracker and outer tracker
- Discussions
 - Yifang:
 - show results with full study
 - **Endcap design has priority (most urgent task for tracking system)**
 - Jianchun: further optimize thickness of outer tracker, need 3D drawing ready very soon

Software: Weidong Li

- Oral status update
 - will add non-sensitive material in the geometry for tracking performance study

Physics: Manqi Ruan

- Oral status update

AOB:

- Jianchun:
 - Miao helps to collect all parameters into a table
 - on Wednesday meeting, firstly has a summary of Tuesday meeting
- Yifang: Jianchun focus on Tuesday meeting and Joao for Wednesday meeting. Wednesday meeting is more for technical part, longterm R&D