
CEPC vertex detector status

Zhijun Liang,

On behalf of CEPC vertex working group

Introduction

- Group Meeting every Thursday afternoon (first meeting last Thursday)
 - <https://indico.ihep.ac.cn/event/21543/>
- Discussion about the choice of technology
 - Discussion with L3 Stitching (Mingyi) and SOI (Yunpeng)
 - Agree to focus CMOS pixel for reference TDR baseline

System	Technologies		
Vertex	CMOS Pixel	SOI	CMOS+Stitching

Key parameters

- Single-point spatial resolution (now and in the next 5 years)
- Time stamp precision requirement (to be discussed with Shengsun Sun)
- Material budget
- Cost estimation
- Occupancy
- Max data rate that can be handled by this technology (now, and in the next 5 years)
- Radiation hardness (now, and in the next 5 years)
- Power dissipation (now, and in the next 5 years)
- Expected Technology availability in the future
- Technology Readiness

Plan

- Expect to get final background input from MDI group by the end of Feb 2024
- End of March: Plan to work with electronics group to finalize the design
- April: finalize the detector geometry and mechanical design

Backup: Minute of last meeting (Feb 1st)

- **Vertex Detector Meeting Minutes**

- Date: 2024/2/1

- Time: 14:30 – 16:00

- Participants: Zhijun Liang, Mingyi Dong, Wei Wei, Ying Zhang, Jun Hu, Hongyu Zhang, Ouyang Qun, Yang Zhou, Jinyu Fu, Tianya Wu, Manqi Ruan, Miao He

- Minutes: Zhijun Liang

- Report on the R&D status of sub-detectors

- Zhijun: Introduction to the CEPC reference TDR project and updates on the TDR key parameters from the accelerator TDR related to the Vertex detector

- Discussions:

- Mingyi: Meng Wang assigned Mingyi to be the acting L3 contact for Stitching technology
- Mingyi: Stitching does not contradict with SOI or CMOS pixel. Propose to mention Stitching technology as one option in the reference TDR, but it is not competing for the baseline design for this TDR study
- Weiwei: Propose to add Ying Zhang as the frontend electronics L3 contact in this TDR project
- Zhijun: In TDR, we should mention the key parameters for now and in the next 5 years when the CEPC detector is going to be built. Cooling design will be based on the expected Power dissipation in 5 years.
- Discuss the key parameters for justifying the choice of technology:
 - Single-point spatial resolution (now and in the next 5 years)
 - Time stamp precision requirement (to be discussed with Shengsun Sun from the reconstruction group)
 - Material budget
 - Cost estimation
 - Max data rate that can be handled by this technology (now, and in the next 5 years)
 - Radiation hardness (now, and in the next 5 years)
 - Power dissipation (now, and in the next 5 years)
 - Expected Technology availability in the future
 - Technology Readiness

- Discuss about including more people from Universities, will do from next meeting.

- Discussion about the timeline (draft):

- By early March: finalizing the selection of technology
- By early April: first version of vertex layout geometry

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- **Discussion with Yunpeng @ Feb 5th**

- Minutes: Zhijun Liang

- Yunpeng propose to focus on CMOS pixel technology, He propose to work on L3 CMOS related topic.

- Agree on focusing on CMOS pixel technology as baseline for reference TDR