

Tracker Meeting Minutes

Time: 2024/2/2 10:00 – 12:00

Participants: WANG Meng, LI Yiming, SHI Xin, FAN Yunyun, QI Huirong, DONG Mingyi, LI Gang, FU Chengdong, ZHAO Mei, GENG Qinglin, LIANG Zhijun, LI Mengzhao, ZHAO Guang, WU Linghui

Minutes: WANG Meng

- L3s report R&D status of sub-detectors
 - LYM: Silicon Pixel Detector (SPD) has been working on ATLASPix3, based on the HVCMOS 180 nm technology, of which the foundry TSI stops service for HEP recently. Development with SMIC 55 nm HVCMOS is ongoing. A full-functioning chip could be realized in about 3 years.
 - SX: Silicon Strip Detector (SSD) for outer tracker is mostly based on the baseline in CDR. The breakdown of cost estimation is based on the ATLAS ITk Strip. The total cost for 127 m² area is about 350 MRMB (47 MCHF).
 - FYY: LGAD based ToF and outer tracker is potentially possible with the development of strip AC-LGAD, which provides both temporal and 1-D spatial measurements. The total cost for 70 m² area is about 81 MRMB.
 - QHR: TPC with the pad readout can fulfill requirements of Higgs run. The pixelated readout for Z pole run is under investigation. The cost estimation for pad TPC is about 180 MRMB.
 - DMY: PID Drift Chamber (DC) is on design optimization and performance study.
- Discussions
 - WM: The tracking requirements are on a full track, possibly spanning from Vertex to Outer Tracker. Hence, the same momentum requirement, for instance, may demand different spatial resolutions for different sub-detectors. We need SIMULATION with all relevant tracking detectors to clarify requirements. The key parameters with respect to positions (radius and polar angle) are:
 - ◆ single-point spatial resolution
 - ◆ hit density, or area per hit
 - ◆ hit flux, or the number of hits per unit area and time

→ Li Gang
 - DMY, etc.: Figure out a list of key requirements for justifying the choice of technology in the future: momentum resolution, PID, coverage, material budget, cost.
 - Considering serialized readout per one or a few chips and low hit occupancy at outer tracker, CMOS sensors may be applied to SET and ETD as well.

→ LYM will work on it.
 - Is ToF necessary?

The question is raised and will be addressed by simulation.

- FYY: If occupancy at SET is not too high, LGAD strip could be also a candidate there.
- The next meeting will be held on Feb. 16th.