

Full Silicon Tracker Option for CEPC Detector

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* http://cepc.ihep.ac.cn/~cepc/cepc_twiki/index.php/Pure_Silicon_Detector

* <http://atlaswww.hep.anl.gov/hepsim/detectorinfo.php?id=sidcc3>

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What's in CDR for Full Silicon Tracker

- Full-silicon tracker detector: motivation
- Layout
- Toy simulation
- Detector simulation and reconstruction
- Tracking performances
 - Single muon
 - $ZH \rightarrow \nu\nu\mu\mu$
 - $ZH \rightarrow \nu\nu\text{GluonGluon}$
- Conclusion

What's Missing

- Silicon tracking needs an improvement
 - Issues are identified in the ILD silicon tracking algorithm.
 - Try conformal tracking from Clic.
- PFA performance with all-silicon
- Design issues:
 - Should we use the same length of barrel layers ? similar to ATLAS ITK
 - Single vs double-sided Strip layers
 - Sensor technologies
 - Active cooling
- List of important R & D items

Full Silicon Tracker Concepts

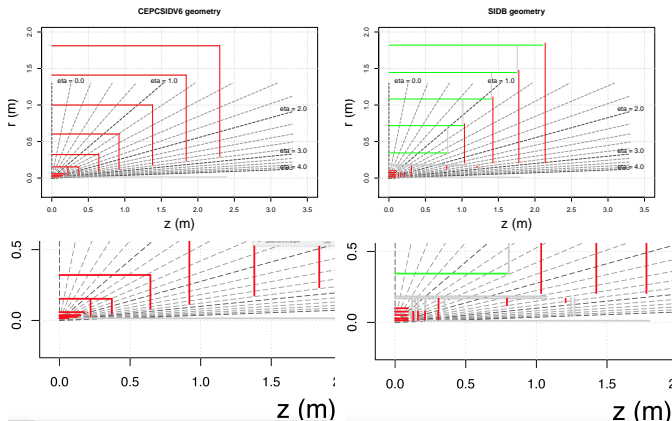


Figure: Full silicon tracker: CEPCSIDV6 and zoomed (left); SIDB and zoomed (right).

Conclusion

- The concepts of full silicon tracker have been implemented and seem working.
- Its single particle performances are comparable to CEPC V4, meeting the physics requirements.
- There are rooms for improvement and new ideas from LHC upgraded detectors.
- The results are summarized in CDR as one of tracking options for CEPC.
- Silicon usages (double strip layer counted twice):

Area m^2	Pixel	Strip	Total
CEPC V4	1.3	154.2	155.6
CEPCSID	1.3	307.3	308.6
CEPCSID/CEPC	1.0	2.0	1.96