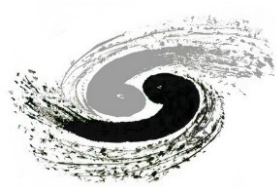


CEPC calorimetry status and updates

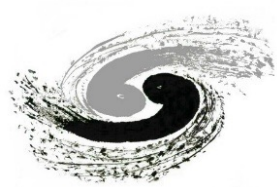
Haijun Yang (SJTU), Jianbei Liu (USTC), Yong Liu (IHEP)

July 16, 2024



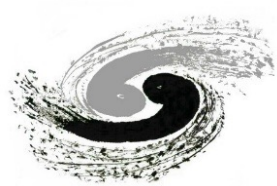
Status and updates in July 16

- CEPC calorimeter TDR meeting in July 12, 2024 ([minutes](#))
 - Agenda: <https://indico.ihep.ac.cn/event/22870/>
- Major updates
 - Simulation of beam backgrounds for crystal calorimeter
 - Updates for regions within +/- 7m from IP
 - Signal integration time window: needs better modeling in simulation (experiences from BES3)
 - Cooling for crystal calorimeter
 - Ongoing FEA; temperature difference to be within 3°C (a first target for given space constraints)
 - HCAL mechanics designs
 - Barrel module inter-connection; tile geometry in endcap, will focus on trapezoid shape
 - HCAL in CEPCSW
 - Barrel geometry completed, crosschecks done for insensitive area ratio (<1%)
 - Endcap sensitive volume (tile geometry) implemented; endcap absorber to be done
 - Digitization implemented and first crosschecks done (based on experiences of AHCAL beamtests)



Status and updates in July 9

- CEPC calorimeter TDR meetings: in recent two weeks
 - June 28, 2024: <https://indico.ihep.ac.cn/event/22868/> ([minutes](#))
 - July 5, 2024: <https://indico.ihep.ac.cn/event/22869/> ([minutes](#))
- Major updates
 - Beam backgrounds
 - First simulation results on beam backgrounds in barrel crystal ECAL: occupancy, rate
 - Mechanics
 - Crystal ECAL: FEA results on BGO stress and deformation, simulation with active cooling
 - HCAL barrel: inter-connection of modules, supporting structures
 - HCAL endcap: first mechanical design, FEA results on absorber stress/deformation
 - Software (CEPCSW)
 - Crystal ECAL endcap geometry implemented, crosschecks
 - HCAL barrel geometry and digitisation implemented, ongoing crosschecks
 - HCAL endcap geometry: a first design proposed, to be optimised and implemented
 - PFA performance checks (with a focus on tracking performance)



CEPC RefDet TDR: outline of calorimetry parts (July 9)

- General introduction: motivations, requirements, particle-flow-oriented calorimeters
- Calorimeter option selection for CEPC reference detector
 - Brief overview of existing technology options including prototypes and beamtests
 - ECAL: silicon-tungsten (SiW), scintillator-tungsten (ScW), segmented crystals
 - HCAL: plastic scintillator (AHCAL), glass scintillator (GSHCAL), RPC based (SDHCAL)
 - Criteria in 3 major aspects (performance, cost and technical readiness level → comparisons of existing options on the table (→ review under a dedicated mini-workshop)
 - Conclusion on baseline options for ECAL and HCAL, respectively (with arguments and discussions)
- ECAL/HCAL baseline option
 - Detector design and technical specifications for physics requirements
 - Detector modules and units; front-end and back-end electronics, trigger logics (→ crossref to related chapters)
 - Mechanics: system integration of modules, active cooling system
 - Simulation: EM/had. performance of single particles, performance of selected phys. benchmarks
 - Prototype and beamtests: key issues that have been already addressed
 - Further discussions: critical issues to be addressed in near and long future R&D activities
 - (Open)critical issues: e.g. calibration schemes, radiation damage and mitigation schemes