Phase 1 Review of the CEPC Technical Design Report
June 12-16, 2023, HKUST, Hong Kong

Charge

The CEPC Study Group, hosted by the Institute of High Energy Physics (IHEP), has been working on the design and development of a forefront e^+e^- collider as a Higgs factory that can extend to energies corresponding to the Z, WW and the top quark pairs, with the upgrade potential to a high energy pp collider. The CEPC represents a grand plan proposed, studied, and to be constructed by Chinese scientists in close collaboration with international partners. Since the release of the CEPC Conceptual Design Report in 2018, the CEPC Study Group has devoted significant effort to the design optimization, the R&D of key technologies and the study of the technical systems of the CEPC.

The CEPC Study Group has produced a draft Technical Design Report (TDR). The International Review Committee, chaired by Dr. Frank Zimmermann (CERN) is asked to conduct the first phase review[#] of this TDR draft. This first phase review shall cover all but the cost and site aspects of the CEPC. The Committee is specifically asked to review and comment on the following aspects:

1. Are the accelerator system design goals well defined? Have the goals been reached in the TDR?
2. Are the accelerator physics issues adequately addressed?
3. Are the accelerator complex design, the key technologies adopted, and the conventional facilities effective for achieving the performance goals?
4. Are the CEPC operation modes and upgrade plans well defined?
5. Is the CEPC design compatible with the future upgrade to the SppC?
6. Regarding the key technology research and development, are critical technologies and components of the CEPC accelerator ready or will they be ready before 2026, through the R&D program being carried out, or achieved with the Light Source project undertaken by IHEP, for the eventual realization of the CEPC?
7. What are the primary technical risks and their potential impacts on the CEPC? What are the mitigation measures that should be taken?
8. Will the CEPC accelerator be ready for construction, after the completion of the outlined R&D program, and industrial and engineering preparation, as well as issues identified in item 7 above be properly addressed in due time?
9. Any other issues you notice or any improvements you may suggest.

A draft of the relevant chapters of the TDR draft has been made available to the Committee. In-person meetings at HKUST will take place over the period of June 12-16, 2023, where presentations, Q&A and discussion will help the committee examine the TDR draft material. The Review Committee is invited to evaluate the report and make comments or suggestions

on the TDR. The CEPC Study Group plans to incorporate the changes recommended by the Committee, to improve and finalize the TDR document in 2023.

It is requested that a Committee report responding to this charge be forwarded to the IHEP Director, Professor Yifang Wang by July 15 2023.

[#] The cost and the site aspects of the CEPC TDR draft shall be reviewed by a separate group of experts. This second phase of the review of the TDR has been scheduled to take place in September 2023, also at HKUST.