Introductory remarks

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News

- **CDR posted on archive:**
  - Physics and detector: https://arxiv.org/abs/1811.10545
  - Accelerator: https://arxiv.org/abs/1809.00285
- **International Advisory Committee Meeting**
  - Nov 14-16: https://indico.ihep.ac.cn/event/7390/overview
  - Report released to be discussed today
- **Hong Kong Program, January 2019**
  - Detector Workshop: January 17-18
  - Accelerator Workshop: January 17-18
  - Theory Workshop: January 10-11
  - Conference: January 21-24
- **Calorimeter Workshop, Beijing, March 2019**
- **CEPC Workshop European Edition 2019**
  - Oxford, April 15-17, 2019
- **2019 International Workshop on CEPC**
  - Beijing, November 18-20

IAC Report

- Comments:
  - The scientific goals presented in the CDR are well motivated and aligned with the priorities of the international particle physics community. The IAC believes that the studies reported in the CDR fully achieved the goals appropriate at this stage of the project and the team is positioned to begin the designs of the technical components and R&D of the critical technologies related to the CEPC.
  - The IAC is impressed with the activities of the CEPC **Industrial Promotion Consortium** membership (CIPC) and its engagement at the 2018 November workshop. With 13 companies joining in the past year, the total number of the CIPC members has reached 67.
    - My comment: These are all companies related to the accelerator technologies. We should strive to find partner companies interested in detector work to be added to CIPC.
  - The IAC acknowledges that much progress has been made with the **internationalization** ….The IAC commends the CEPC team's efforts in strengthening its cooperation with CERN (…), its interactions with SuperKEKB/Belle II to get familiar with the Machine- Detector Interface challenges, and its connection to the international detector community by joining the CALICE, LCTPC and other R&D collaborations.

IAC Report - Recommendations

- Comments on timeline:
  - The IAC believes that now is too early to start preparing the TDR for the experiments.
  - Rather, collaborative R&D work on each of subdetector systems (e.g., silicon detectors, gas trackers, calorimeters, muon systems, trigger and DAQ, magnets, and detector simulation) should be the immediate focus.
  - The 31 MRMB grant from the MOST will help detector R&D between 2018 and 2023.
  - However, in order for international participants to make meaningful contributions, they would need funds from their funding agencies. One mechanism to help the community in this regard is for the CEPC project team to establish a **Detector R&D Committee** which reviews detector R&D proposals submitted by the international community. The international community could use the report of this committee to requests funds from their agencies.
  - The **TDRs for detectors** should be prepared only after the CEPC is chosen to go into the "preparatory stage" around **2020** at the earliest. The process should begin with a call for Letters of Intent that will foster international collaborations of potential experiments.
  - An **experimental committee** (similar to LHCC) which could be evolved from the Detector R&D Committee could review the submitted LOIs and select the experiments. After this process, **TDRs could be produced by international experimental collaborations**.

IAC Report - Recommendations

- Management Recommendations:
  - 1) Establish an Accelerator Review Committee which advises on all matters related to CEPC accelerator design and R&D including the **Machine-Detector Interface** and compatibility with operation at energies above the tt-bar production threshold
  - 2) Produce a **near-term organization chart** that includes the Accelerator Review Committee and the Detector R&D Committee and reflects the participation of the international community.
  - 3) Produce a **rough timeline** and a process from now to the call for Letters of Intent and the formation of CEPC experimental collaborations, and communicate this to the international community.
  - 4) The IAC considers that **the next step** should concentrate on **peer-reviewed focused and coherent R&D,** continuing still in an overall detector community, but also with a view that this environment may well incubate future concrete experimental proposals.
- Physics and Detector Recommendations
  - 1) Establish an expert **Detector R&D Committee,** set up with input from the international community, which should oversee detector-related R&D activities. Once established, this committee could become recognized by the international authorities (e.g. funding agencies). Such a committee could evolve in due time to become the body reviewing, and recommending for approval, of the **CEPC detector collaborations**. This committee should be established expeditiously.
  - 2) Prepare **comprehensive progress reports** on detector development work (R&D of technologies, engineering and integration studies, software and computing, and physics performance) **in due time (2-3 years)**, preceding Letters of Intent, to be reviewed by the Detector R&D Committee.
  - 3) Strengthen the **theoretical physics effort from Chinese institutions** for the CEPC.
  - 4) Incorporate in the physics studies the implications of a run at collision energies at and above the **tt-bar threshold**. This will have an impact not only on the determination of the top quark properties (mass, EW couplings, and indirect sensitivity to the ttH vertex), but also on Higgs measurements, via the vector boson fusion process.

Summary on IAC

- Re-organize structure to include international colleagues in the leadership structure
- Plan for a detector progress report (Pre-TDR) by ~2021 (2-3 years from now)
- Focus on detector R&D and try to attract international participation to these activities

Physics topics in need of further exploration

- tt-bar threshold physics.
  - top quark properties (mass, EW couplings, and indirect sensitivity to the ttH vertex)
  - Higgs measurements, via the vector boson fusion process.
- From CDR international review report:
  - We encourage the CEPC study group to continue and extend the effort to explore the potential of CEPC beyond the established Higgs/electroweak programme.
    - Expand flavor physics studies
    - Expand QCD physics studies
  - Further recommendations for New Physics Searches, EW precision measurements and Higgs
  - Document synergy of HL-LHC

Further points

- Compare sub-detector options on equal footing
  - Requires an extend MC simulation framework to be shared
  - Need for detector R&D people to get involved in the simulation of their own detectors
- Check detector operability at the highest luminosities possible at the Z-pole
  - Make careful studies of background effects on all detectors
- Develop a common power management structure taking into account the specificity of CEPC
  - Provide solid power consumption estimates for all sub-systems

Re-organization of the Physics and Detector Working Group

Proposal

International conveners for all groups —> seek international nominations now

Support all detector concepts equally —> common framework

Physics and Detector Working Group (an example)

- **Silicon Detectors**
  - Vertex
  - Si Tracker
- **Gas Trackers**
  - TPC
  - Drift Chamber
- **Calorimeters**
  - PFA
  - Dual readout
  - Others
- **MDI**
- **Muons**
- **Magnet**
- **Detector Simulation and software**
- **Trigger and DAQ**
- **Services and Integration**
- **Physics Analysis**
  - QCD
  - Flavor
  - Electroweak
  - Higgs

Subgroups need to attend to all technology options

Need engineering support for design

Discussion

- Steering group: TDR + detector-software-physics plan and organization
- Suggestions:
  - Collect nominations for subgroups leadership by ~end of year
    - Aim at one chinese and one international person per subgroup
- Start new organization in February
- Aim for a Preliminary Technical Report by end of 2021