Introductory remarks

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中國科學院高能物理研究所
Institute of High Energy Physics
Chinese Academy of Sciences

Hong Kong Conference

- High-Energy Physics, IAS, HKUST: 9-26 Jan 2017
  - Conference: 23-26 Jan 2017
  - http://iasprogram.ust.hk/hep/2017/conf.html
  - Talks from Super KEKB, ILC, CEPC, SppC, FCC-ee, FCC-pp, CLIC
  - Major point of discussion:
    - CEPC new size (100 km) and dual-ring design → similar to FCC-ee
  - Good participation of international physicists
    - INFN delegation interested in collaborating in CEPC R&D towards CDR
  - Physics discussion summary: towards CDR today
  - Detector summary: Xin Shi at next meeting

Hong Kong Conference - Experiment/Detector Sessions

24 Jan 2017 (Tue)

Time	Event	Venue
	Chair: Charles Young (SLAC National Accelerator Laboratory)	
09:00-09:45	**ILC Technical Status and Readiness** Akira Yamamoto (Kō Enerugī Kasokuki Kenkyū Kikō)	IAS Lecture Theater, G/F
09:45-10:30	**FCC-ee** Michael Koratzinos (CERN)	
10:30-11:00	Coffee break & Group-photo taking	Lobby, G/F
11:00-11:45	**CLIC Status** Philip Burrows (University of Oxford)	IAS Lecture Theater, G/F
11:45-12:30	**Physics at e+e- Colliders** Lian Tao Wang (University of Chicago)	
12:30-14:00	Lunch (Self-arranged)	
14:00-15:40	**Parallel Session (Accelerator Physics - Part III)** **Chair: Akira Yamamoto KEK (Kō Enerugī Kasokuki Kenkyū Kikō)**	
14:00-14:20	**SC Cavity Industrialization** Carlo Pagani (University of Milan and Italian Institute of Nuclear Physics)	IAS Lecture Theater, G/F
14:20-14:40	**Accelerator RF System** Robert Rimmer (Thomas Jefferson National Accelerator Facility)	
14:40-15:00	**Super KEKB RF System** Tetsuya Kobayashi (Kō Enerugī Kasokuki Kenkyū Kikō)	
15:00-15:20	**CEPC rf System** Jiyuan Zhai (Institute of High Energy Physics, Chinese Academy of Sciences)	
15:20-15:40	**Rf Power Source System** Shigeki Fukuda (Kō Enerugī Kasokuki Kenkyū Kikō)	
14:00-15:40	**Parallel Session (Experiment / Detector - Part I)** **Chair: Joao Guimaraes da Costa (Institute of High Energy Physics, Chinese Academy of Sciences)**	
14:00-14:20	**Detector Optimization and Physics Simulation Toward the CEPC CDR** Manqi Ruan (Institute of High Energy Physics, Chinese Academy of Sciences)	IAS2042, 2/F
14:20-14:40	**Status of CEPC Calorimeters R&D** Haijun Yang (Shanghai Jiaotong University)	
14:40-15:00	**Status of CEPC Software** Geng Li (Institute of High Energy Physics, Chinese Academy of Sciences)	
15:00-15:20	**ILC Software & Grid Usage** Jan Strube (Pacific Northwest National Laboratory)	
15:00-15:40	**SUSY Searches at LHC and Beyond** Xuai Zhuang (Institute of High Energy Physics, Chinese Academy of Sciences)	

25 Jan 2017 (Wed)

Time	Event	Venue
	Chair: Weiren Chou (Fermi National Accelerator Laboratory)	
09:00-09:45	**Summary of High Temperature Magnet Workshop** Soren Prestemon (Lawrence Berkeley National Laboratory) (Click here for presentation file)	IAS Lecture Theater, G/F
09:45-10:30	**Review of ep Colliders** Yuhong Zhang (Thomas Jefferson National Accelerator Facility) (Click here for presentation file)	
10:30-11:00	Coffee break	Lobby, G/F
11:00-11:45	**Overview of Composite Higgs at Future Collider** Ian Low (Northwestern University) (Click here for presentation file)	IAS Lecture Theater, G/F
11:45-12:30	**Physics at FCC** Michelangelo Mangano (CERN) (Click here for presentation file)	
12:30-14:00	Lunch (Self-arranged)	
14:00-15:40	**Parallel Session (Theory - Part III)** **Chair: Ian Low (Northwestern University)**	
14:00-14:20	**Electroweak Phase Transition** Patrick Meade (Stony Brook University) (Click here for presentation file)	IAS Lecture Theater, G/F
14:20-14:40	**Probing Higgs Self-coupling at the LHC and Future Colliders** King Man Cheung (National Tsing Hua University) (Click here for presentation file)	
14:40-15:00	**Double Higgs Production at the 14 TeV LHC and the 100 TeV pp-collider** Geng Li (Peking University) (Click here for presentation file)	
15:00-15:20	**Higgs Pair Production in CPV 2HDM** Ligong Bian (Chongqing University) (Click here for presentation file)	
15:20-15:40	**Vector Z' and Anomaly Cancellation** Wai Yee Keung (University of Illinois at Chicago) (Click here for presentation file)	
14:00-15:40	**Parallel Session (Experiment / Detector - Part II)** **Chair: Joao Guimaraes da Costa (Institute of High Energy Physics, Chinese Academy of Sciences)**	
14:00-14:20	**CEPC TPC** Huirong Qi (Institute of High Energy Physics, Chinese Academy of Sciences) (Click here for presentation file)	IAS2042, 2/F
14:20-14:40	**A Second Detector Concept for CEPC** Franco Bedeschi (Italian Institute of Nuclear Physics) (Click here for presentation file)	
14:40-15:00	**Test Beam Results of a Silicon Photomultiplier Based Dual Readout Calorimeter Module** Massimo Caccia (Italian Institute of Nuclear Physics) (Click here for presentation file)	
15:00-15:20	**MPGDs: A Tool for Progress in HEP** Silvia Dalla Torre (Italian Institute of Nuclear Physics) (Click here for presentation file)	
15:20-15:40	**Machine Detector Interface for CEPC** Qinglei Xiu (Institute of High Energy Physics, Chinese Academy of Sciences) (Click here for presentation file)	
15:40-16:10	Coffee break	Lobby, G/F
16:10-17:50	**Parallel Session (Accelerator Physics IV)** **Chair: Weiren Chou (Fermi National Accelerator Laboratory)**	
16:10-16:30	**CEPC R&D** Yunlong Chi (Institute of High Energy Physics, Chinese Academy of Sciences)	IAS Lecture Theater, G/F
16:30-16:50	**CEPC Power Source** Zusheng Zhou (Institute of High Energy Physics, Chinese Academy of Sciences)	
16:50-17:10	**Superconducting Quadrupole for Final Focus** Ivan Okunev (Budker Institute of Nuclear Physics)	
17:10-17:30	**Polarized Electrons Source for BINP c-tau Factory** Ivan Koop (Budker Institute of Nuclear Physics)	
17:30-17:50	**Discussions**	
16:10-17:50	**Parallel Talks (Experiment / Detector - Part III)** **Chair: Joao Guimaraes da Costa (Institute of High Energy Physics, Chinese Academy of Sciences)**	
16:10-16:30	**CEPC Vertex Detector** Ping Yang (Central China Normal University)	IAS2042, 2/F
16:30-16:50	**SiD - An All-silicon Detector for the ILC** Marcel Stanitzki (Deutsches Elektronen-Synchroton)	
16:50-17:10	**HV-CMOS Status and Prospects** Daniela Bortoletto (University of Oxford)	
17:10-17:30	**A Drift Chamber Option for the CEPC** Franco Grancagnolo (Italian Institute of Nuclear Physics)	
17:30-17:50	**Discussions**	

International Collaboration

- **INFN, Italy**
  - Possible new detector components
    - Full tracker concept, drift chamber tracker, dual readout calorimeter, muon detector
  - Electroweak physics studies
- **Taiwan Collaboration**
  - Interested in software and physics studies (https://indico.cern.ch/event/579684/overview)
    - Lumical, EW measurements (Sinica), Jet energy scale studies (NCU) and ECAL Studies (Taiwan U)
- **Vinca Institute, Belgrade, Serbia**
  - MOU signed with IHEP
- **University of Chicago, USA**
  - Young Kee-Kim
    - Chicago/Beijing Workshop, June 5-17 (tentative)
- **Monash University, Australia**
  - Tong Li (李佟)
- **University of Liverpool, UK**
  - Yanyan Gao, Lecturer
- **Others**,
  - Barcelona, Iowa State, Univ. of Geneva, SLAC, Weizmann Institute, Mainz U

Chicago/Beijing Workshop

- **Date: June 5-17 (tentative)**
  - Visiting graduate students (~6) from Chicago University
  - Fulvio Piccinini (INFN theorist) — expert in electroweak physics
  - Will invite Lian Tao (Chicago)
  - Explore physics issues that can be tackled in 2 weeks!
    - Needs careful preparation
    - Fast simulation using Delphes card
  - Finish with 1-day workshop at Chicago/Beijing Center with students presenting their results

CDR Organization

- Deadline: end of 2017 → Dec. 15, 2017
- Possibility 1: One detector concept
  - This detector needs to "work" at high-luminosity for Z physics
  - ILD-like (preferable given our pre-CDR) or full Silicon?
  - Consider options:
    - Full silicon (or ILD) and drift chamber (see Grancagnolo's talk)
    - Dual readout calorimeter
- Possibility 2: Two detector concepts
  - ILD- and SiD-like detectors
  - Would require manpower for full simulation in equal footing of the two concepts
  - Very difficult to achieve within the timescale of 2017

CDR Challenges

- Manpower for making simulation and studies of different options by end of 2017
  - Need help from international partners
- Technical design challenges:
  - TPC operation at large rates
  - MDI design and compensating magnets
  - Beam energy measurement
  - Luminosity measurement
  - Alignment
- Benchmarks:
  - Higgs physics
  - Electroweak physics at Z pole and WW threshold

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Detector Pre-CDR Outline

CONTENTS

CLIC Detector CDR - and example

Contents

CLIC Detector CDR - and example

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CLIC Detector CDR - and example

IAS Recommendations

- **Second Meeting of CEPC-SppC International Advisory Committee, Nov. 7-8**
  - http://indico.ihep.ac.cn/event/6440/
  - **Final report recommendations:**
    - The detector design and technology choices will profit substantially from experience with state-of-the art **detectors currently in operation** and their upgrades (e.g. LHC and HL- LHC) as well as from ongoing detector developments for **future e+e- colliders** (e.g. ILC, CLIC, and FCC-ee).
      - Exploit synergies with such existing efforts through targeted Chinese contributions to these projects as well as by attracting CEPC participation from these communities.
    - Set up **working groups** for the detector optimization and physics benchmark studies with regular meetings that welcome international participants (create mailing lists and use the indico site for remote participation).
      - Where feasible, working groups should be co-chaired by a Chinese and a foreign expert.
    - **International participation** can evolve from informal individual contributions to a formal non-engaging MOU with individual institutes or alternatively to an MOU describing tasks and deliverables.
    - International involvement can be stimulated by allocating **CDR/TDR editorial roles** (main co-editor or chapters co-editor) to foreign participants.
    - No need to repeat full-detector simulation studies for many sub-detector technology options. Once the requirements are understood, specifics of **alternative sub-detector technologies** can be addressed individually.
      - CDR and the physics benchmarks can generally focus **on one detector concept**, while alternative technology options can be mentioned in the sub-detector chapters of the CDR.
    - Limit the investment in detector technology **R&D to critical elements** where CEPC requirements are challenging and not yet proven in existing prototypes.
    - The **TPC technology** may not meet the requirements for detector operation at the Z-peak (in view of the expected high rates and ion feedback issues).
      - Assess this issue at an early stage and taking a timely decision on whether the TPC is an optimal choice for the CEPC tracker.

Organizational Matters

- CEPC detector/physics website update
  - Internal and external version
- Social communication tool
- Speakers/talk review committee
- Project management software

Agenda

- **Today**
  - Physics & simulation issues towards the CDR

Monday, 6 February 2017	
15:00 - 15:25	Introduction (15 + 10 min) *25'* Speaker: Joao Guimaraes da Costa (IHEP)
15:25 - 15:50	Physics & Simulation -- Status and CDR preparation (15 + 10 min) *25'* Speaker: Mr. Manqi Ruan (IHEP)
15:50 - 16:15	Electroweak Physics Towards the CDR (15 + 10 min) *25'* Speaker: Prof. Zhijun Liang (IHEP)
16:15 - 16:40	Physics Higgs Towards the CDR (15 + 10 min) *25'* Speaker: Dr. Gang LI (Experimental Physics Division, Institute of High Energy Physics)
16:40 - 17:00	Discussion *20'*

- **Next meeting, February 20,** 3? pm (Beijing time)
  - Is 3 pm OK for future meeting?
  - Detector issues toward the CDR
    - Summary of detector presentations from Hong Kong — Xin Shi