Introductory remarks

Joao Guimaraes da Costa (Beijing)

April 17th 2017

中國科學院高能物理研究所

Institute of High Energy Physics
Chinese Academy of Sciences

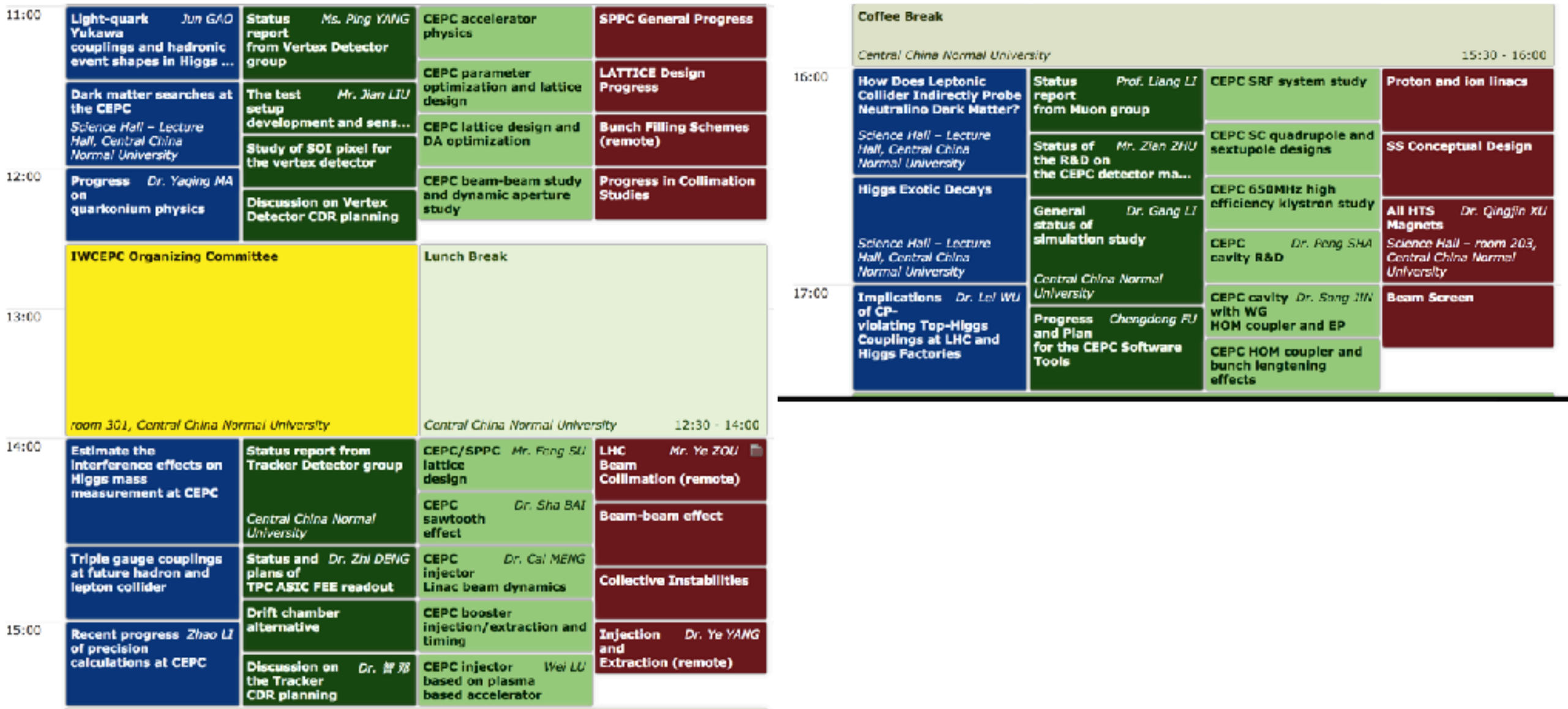
Wuhan Workshop

- Two plenary talks:
  - Introduction (20 min): Joao;
  - Summary (30 min): Yuanning
- Five parallel sessions
  - Vertex (Wed)
  - Tracker (Wed)
  - Muons and simulation (Wed)
  - Hadronic calorimeter (Thursday)
  - Electronic calorimeter (Thursday)
- Two joint parallel sessions
  - Physics and simulation — joint with theory (Thursday)
  - MDI — joint with accelerator (Thursday)
- Plenary CDR discussion — led by Yuanning (Friday)

} CDR discussions by project

Wuhan Workshop

Wednesday parallel sessions



Wuhan Workshop

Thursday parallel sessions

09:00

- **CEPC Precision of Electroweak Oblique Parameters and Weakly Interacting Dark Matt...**
- **Testing the electroweak phase transition and electroweak baryogenesis at the LHC and a circular electron...**

10:00

- **Testing CP-Violation in the Scalar Sector at Future e+e- Colliders**
- **Singlet charged scalar and CEPC**

Status of HCAL based on GEM

Status of HCAL based on THGEM and Scintillator

Status of SDHCAL based on RPC *Dr. Bing LIU*

Dual readout calorimeter

CEPC injector R&D

CEPC booster *Dr. Wen KANG*
low field magnet R&D

CEPC electrostatic seperator and power sources

CEPC vacuum chamber R&D

CEPC Instrumentation R&D

Discussions on future SPPC energy upgrade

Discussions on cryogenic temperature

Science Hall – room 203, Central China Normal University

Coffee Break

Central China Normal University 10:40 - 11:00

11:00

- **Multi-Higgs final state and new physics** *Dr. Qi-shu YAN*
- **Charged Lepton Flavor Violations at CEPC** *Mr. Qin QIN*

12:00

- **WW Threshold**
- **The CP-violation phenomena and implications to future coll...** *Ning CHEN*

Status of ECAL R&D from IHEP *Dr. Zhigang WANG*

Status of ECAL R&D from USTC

Discussion on Calorimeter CDR planning *Prof. Tao HU*

Science Hall – room 201, Central China Normal University

e-p collision at CEPC-SPPC *Dr. Yuhong ZHANG*

Central China Normal University

Compatible arc regions between CEPC and SPPC *Mr. Feng SU*

Central China Normal University

Compatible straight sections between CEPC and SPPC *Dr. Yukai CHEN*

14:00

Validation of Delphes Card for the CEPC Fast Simulation *Mr. Zhenwei CUI*
Central China Normal University 14:00 - 14:15

Energy Calibration *Dr. Guangyi TANG*
Central China Normal University 14:15 - 14:30

dE/dx measurement in TPC *Ms. Fenfen AN*
Central China Normal University 14:30 - 14:45

15:00

Status and Plans of the CEPC Physics Analysis towards the CDR plus discussion *Yu BAI*
Central China Normal University 14:45 - 15:30

Coffee Break
Central China Normal University 15:30 - 16:00

16:00

Introduction to CEPC MDI *Dr. Sha BAI*
Central China Normal University 15:00 - 16:15

Introduction to CEPC Beam Background *Mr. Qinglei XIU*

Discussion on MDI *Dr. Hongbo ZHU*

17:00

Central China Normal University 15:30 - 17:30

EB Meeting

Room 201, Central China Normal University

CDR timeline (aggressive)

- **April 30:**
  - Decide on editors and timescale
  - Establish SVN/git repository area
  - Establish communication platform
- **September 30:**
  - Text for all subsections finalized and committed to repository
- **October 31:**
  - Harmonization of text across chapters
  - Finalize introduction and other common aspects (references, authors, etc)
  - Version for internal review finalized
- **December 20:**
  - Version for external review ready

CDR Organization

- Possibility 1: One detector concept
  - This detector needs to "work" at high-luminosity for Z physics
  - TPC or full Silicon?
  - Consider options:
    - TPC, full silicon and drift chamber
    - Particle Flow and Dual readout calorimeter
- Possibility 2: Two detector concepts in equal footing
  - TPC-based, full silicon-based and drift-chamber detectors
  - Requires 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 September 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

Possible CDR outline

1. CEPC Physics Potential
    1. Higgs physics
    2. Electroweak precision physics
    3. Searches for physics beyond the Standard Model
    4. Flavor physics
2. Experimental conditions and detector requirements
    1. The CEPC experimental environment
        1. Beam backgrounds, polarization, etc
    2. Detector requirements for $e^+ e^-$ physics
        1. Track momentum and jet energy resolution, flavor tagging, particle identification
    3. Basic description of Detector Concepts
3. Vertex detectors
4. Tracking system
    1. Tracker concepts
        1. The TPC tracking system
        2. The All-Silicon tracking system
        3. The Drift Chamber tracking system
    2. Beam induced backgrounds in tracking system
    3. Performance

Possible CDR outline

5. Calorimetry
    1. Particle flow calorimeter
        1. Hadronic calorimeter
        2. Electromagnetic calorimeter
    2. Dual readout calorimeter
    3. Calorimeter performance
6. Detector magnet system
7. Muon system
    1. Conceptual design of muon system
    2. Muon reconstruction algorithm and system performance
8. Readout electronics and data acquisition (?)
9. CEPC interaction region and detector integration
10. Physics performance
    1. Simulation and reconstruction
    2. Luminosity measurement
    3. Energy measurement
    4. Performance of low-level physics observables
    5. Detector benchmark processes
11. Future plans and R&D prospects

Agenda

CEPC Physics and detector regular meeting

Monday, 17 April 2017 from **15:00** to **18:00** (Asia/Shanghai)
at **B410**

Vidyo Info	Room Name	physicsanddetector
	Link	http://vidyo.ihep.ac.cn/flex.html?roomdirect.html&key=wbvN1gQbDx5XJ4ZGk
	Extension	00201704 1100

Monday, 17 April 2017

15:00 - 15:20 **Introduction** *20'*
Speaker: Joao Guimaraes Costa

15:20 - 15:40 **MDI** *20'*
Speaker: Dr. Hongbo ZHU (IHEP)

15:40 - 16:00 **Vertex** *20'*
Speaker: Prof. Qun OUYANG (IHEP)

16:00 - 16:20 **Tracker** *20'*
Speaker: Dr. Huirong Qi (Institute of High Energy Physics, CAS)

16:20 - 16:40 **Calo** *20'*
Speakers: Haijun Yang (Shanghai Jiao Tong University), Prof. Tao HU (IHEP)

16:40 - 17:00 **Muon** *20'*
Speaker: Prof. Liang Li (Shanghai Jiao Tong University)

17:00 - 17:20 **Magnet** *20'*
Speakers: Mr. Zian ZHU (高能所), Dr. Feipeng NING (高能所)
Material: **Minutes**

17:20 - 17:40 **Simulation** *20'*
Speakers: Mr. Manqi Ruan (IHEP), Dr. Gang LI (Experimental Physics Division, Institute of H

Extra slides

Detector Pre-CDR Outline

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Organizational Matters

- SVN/git repository for CDR

CLIC Detector CDR - an example

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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