Summary of Working Groups (theory)

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Contents

- Main goals
- History of working groups
- Working groups and their highlights
- Discussions on future activities

Main goals

- Dig physics potential of CEPC/SPPC based on worldwide endeavor
- Form a written report
- ……

Where are we (theory organization)

- 2012/11/7, the theory working group formed
- 2012/12/20, first group meeting at Tsinghua U
- 2013/8/25, small scale meeting at Dalian (TeV working group workshop)
- 2013/9/14, Kick-off meeting, adding “flavor” and “TeV cosmology” working groups
- 2013/11, second group meeting at Peking U
- 2013/12/16, preliminary report
- 2014/1, adding “heavy ion” working group

General remarks for the theory workgroups

- Everyone are welcome to join and contribute!
- New results are encouraged to be published at journals. Hope to stimulate new projects and collaborations.

Clear Physics goal for CEPC/SPPC

- Is the X(125) the SM Higgs boson, by measuring its properties, mass/spin/CP nature/couplings with fermions/gauge bosons/itself…?
- Is there new physics, by discovering deviations from SM prediction/new decay modes of X(125) and possible new particles….?

7working groups

- SM tests (conveners: Qing-hong Cao/Li-lin Yang/Zhao Li/Chong Sheng Li)
- Higgs Physics (Hong-jian He/Shou-hua Zhu/Tao Liu)
- BSM: SUSY(Tianjun Li/Jin-min Yang)
- BSM: Non-SUSY(Qi-shu Yan/Jing Shu/Wen-Gan Ma/Yi Liao/Wei Liao)
- Flavor Physics(Cai-Dian Lu/Zong-Guo Si)
- TeV Cosmology(Xiao-jun Bi/Yu-Feng Zhou)
- MC tools(Qi-shu Yan)
- Heavy Ion(Xin-nian Wang/Qun Wang)

Physics at Circular Electron-Positron Collider (CEPC) and Super Proton-Proton Collider (SPPC)

Shou-Shan Bao,[a] Xiao-jun Bi,[b] Jun-Jie Cao,[c] Qing-hong Cao,[d,e] Ning Chen,[f] Bo Feng,[g] Lei Guo,[h] Hong-Jian He (convenor),[f] Chong Sheng Li,[d,e] Hong-Lei Li,[i] Tianjun Li,[j] Ying Li,[k] Zhao Li,[b] Wei Liao,[l] Yi Liao,[m] Chun Liu[j] Ji-Yuan Liu,[n] Tao Liu,[o] Cai-dian Lu,[b] Ming-xin Luo,[g] Wen-gan Ma,[h] Cong-Feng Qiao,[p] Hua-sheng Shao,[d] Jing Shu,[j] Zong-Guo Si,[a] Jian-Xiong Wang,[b] Kai Wang,[g] Xiao-Hong Wu,[l] Qi-shu Yan,[p] Jinmin Yang,[j] Li-lin Yang,[d,e] Shuo Yang,[q] Peng-fei Yin,[b] Chong-Xing Yue,[r] Ren-you Zhang,[h] Xin-min Zhang,[b] Yu-Feng Zhou,[j] Guo-huai Zhu,[g] Shou-hua Zhu (convenor),[d,e] more authors to be added[xxx]

~40 authors, more to be added

Contents

~200 pages

Talks from sub groups

- Yesterday: Neutrino Physics (Yi Liao, Nankai University)
- 9:00 - 9:30 Higgs (Tao Liu, Hong Kong Univ. of Science and Technology)
- 9:30 - 10:00 BSM: SUSY (Jin Min Yang, ITP)
- 10:30 -11:00 BSM: non-SUSY (Jing Shu, ITP)
- 11:00 - 11:30 SM tests (Qing-Hong Cao, Peking Univ.)
- 11:30 - 12:00 Cosmology(Xiao-Jun Bi, IHEP)
- 2:00- 2:30 Flavor (Zhenjun Xiao, Nanjing Normal Univ.)
- 2:30 - 3:00 Top Physics (Zong-guo Si, Shandong Univ.)
- 3:00 - 3:30 MC tools (Qi-Shu Yan, UCAS)

Highlights of WG (1)

- Higgs: Precise measurements on Higgs boson/rare decay of Higgs boson/new Higgs bosons…
- SUSY: Possible light SUSY particle and virtual effects at CEPC/high reach for higher energy SPPC
- NON-SUSY BSM: dynamical EW symmetry breaking/ED/Neutrino and its underlying mechanism at colliders….

Highlights of WG (2)

- SM test: Untouched regime (Ztt coupling etc), multiple W/Z physics….
- Flavor: Top charge asymmetry/top spin correlation…
- TeV cosmology: DM/baryon-genesis
- Heavy Ion: Property of QGP differs, J/Psi suppression…
- MC tools: at least NLO precision…

Summary

- Great effort, great progress!
- Still lots, lots of works to do. A challenging task!
- Count on contributions from everyone, especially conveners of subgroups

Proposed deadline

- 1st WG workshop in May(or June), and the version 1.0 report?
- 2nd WG workshop in July (or August), and the version 2.0 report?
- Subgroup final report, Sept. 1(or Oct. 1), 2014
- Submitted report, Dec.1, 2014!