

Opening Comments

2019/09/26

Keisuke Fujii

WG Objectives

- On July 4, 2012, ATLAS and CMS announced the discovery of a Higgs-like boson with a mass of about 125GeV and the data that followed strongly indicates that it is a Higgs boson indeed. The world has changed since then. The discovery has vaulted the question of its properties on the top of the list of questions in HEP. The 125GeV boson is a window to BSM physics and ILC is the best machine to use it.

So far no additional new particles or new phenomena have been found in the LHC Run 2, suggesting that there seem to be no easily discoverable new particles, which enhanced the importance of the precision measurements of H125 and loophole-less searches at ILC more than ever. There can be a zoo of new uncolored particles or new phenomena that are difficult to find at LHC but can be discovered and studied in detail at ILC.

We need to demonstrate that ILC will advance our understanding of particle physics qualitatively beyond the information that will be available from the results expected from the future stages of the LHC. The MEXT ILC Advisory Panel says "it is necessary to closely monitor, analyze and examine the development of LHC experiments". We did and proposed ILC250 as a JAHEP agreement on July 22, 2017.

- With the LCB and ICFA statements on the ILC250, together with the LCC physics case report on ILC250, the MEXT re-reviewed ILC physics case and cost/technological readiness and finally finished their review process. The SCTJ, being asked by the MEXT, reviewed it and produced their assessment of ILC250, pointing out remaining issues and concluding that they could not support ILC250 at this point while appreciating its academic significance. The MEXT showed its position on March 7, which was discussed at the Lausanne meeting on April 8-9. The LC community attended the Granada meeting on May 13-16 together with a Lausanne statement and a set of new inputs. The next important event for us is LCWS2019 in Sendai on Oct.28 to Nov.1.

Situation in Japan

MEXT's view in regard to the ILC project

Executive Summary

March 7, 2019

Research Promotion Bureau, MEXT

- Following the opinion of the SCJ, **MEXT has not yet reached declaration for hosting the ILC at this moment.** The ILC project requires further discussion in **formal academic decision making processes such as the SCJ Master Plan**, where it has to be clarified whether the ILC project can gain understanding and support from the domestic academic community.
- MEXT will pay close attention to the progress of the discussions at the **European Strategy for Particle Physics Update.**
- The ILC project has certain scientific significance in particle physics particularly in the precision measurements of the Higgs boson, and also has possibility in the technological advancement and in its effect on the local community, although the SCJ pointed out some concerns with the ILC project. Therefore, considering the above points, **MEXT will continue to discuss the ILC project with other governments while having an interest in the ILC project.**

highlight in red by KF

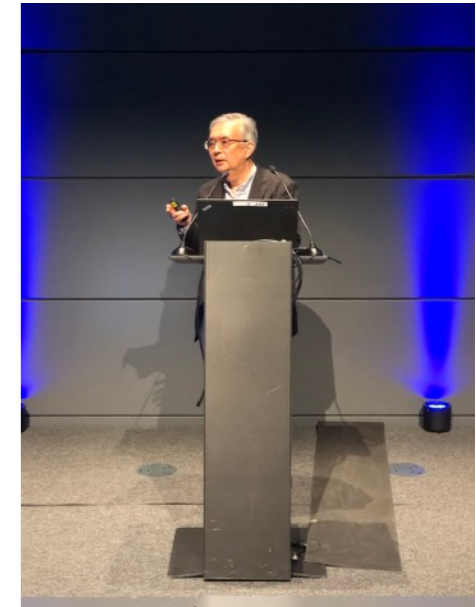
KEK presented its plan for the ILC project in Lausanne

2019/04/12

<https://www.kek.jp/en/newsroom/2019/04/12/1700/>

Masanori Yamauchi, Director General of KEK, made a presentation regarding KEK's plan for the ILC, at the international conference held on **8-9 April 2019** in Lausanne, Switzerland.

About 100 scientists from around the world who aim for the realization of electron-positron linear colliders gathered at the Linear Collider Community Meeting, to discuss the future linear collider activities.



Masa explaining his plan in a Lausanne session

In the conference, Yamauchi presented KEK's plan for the ILC for the upcoming year, summarized as follows:

- **Organize the *international working group* with close consultation with the Ministry of Education, Culture, Sports, Science and Technology (MEXT).**
- **Promote activities to gain a better understanding of the broader academic community in Japan (Propose the ILC project to *the Science Council of Japan's Master Plan*; Organize a symposium)**
- **Cooperate with MEXT to establish the *governmental level discussion groups with France and Germany*. Also, strengthen the discussion group with the US DOE.**
- **Conduct *technical preparation program at ATF, STF and CFF facilities* collaborating with the international teams**

.....

KEK's plan is in accord with the ICFA statement and MEXT's view, and illustrates the specific steps that will be taken by KEK toward an early realization of the ILC. The result of the discussions at the Lausanne conference will be used as an input for the discussions of the Update of the European Strategy for Particle Physics.

Current Status

- **The KEK International WG (IWG) had its last meeting two weeks ago.**
 - **The IWG report is expected to be public within a week.**
- **Preparation on-going for starting governmental level Discussion Groups with France and Germany. The IWG report is expected to be used for their discussions.**
- **SCJ Master Plan Process on-going.**
 - July 8:** a prioritized list to the upper committee
 - Late July:** list of projects to go to the hearing stage
 - Sep. 14-16:** hearing to make the short list
 - ==== We are here ====**
 - Jan. 2020?:** the final approval of the long and short lists
- **The IWG Report includes technical preparation plan.**
- **KEK has setup an Expert Panel for “Strategic Environmental Assessment”. The Panel hold its first meeting on Sep. 4 at KEK, expected to produce its report in December.**
- **As for ESU, Physics Briefing Book expected to be finalized very soon.**

MEXT's view in regard to the ILC project

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March 7, 2019

Research Promotion Bureau, MEXT

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- MEXT will pay close attention to the progress of the discussions at the **European Strategy for Particle Physics Update.** *ESU in Feb. 2020, to be approved by CERN Council in May 2020*
- The ILC project has certain scientific significance in particular particularly in the precision measurements of the Higgs boson, and also has possibility in the technological advancement and in its effect on the local community, although the SCJ pointed out some concerns about the project. Therefore, considering the above points, **MEXT will discuss the ILC project with other governments and express its interest in the ILC project.** *IWG report in Oct. 2019 G-J. F-J Discussion Groups in addition to US-J.*

LCC Physics WG

An arXiv paper combining the three letters to ESU PPG in preparation

DESY 19-146
KEK Preprint 2019-22
SLAC-PUB-17467
August, 2019

Tests of the Standard Model at the
International Linear Collider

LCC PHYSICS WORKING GROUP

KEISUKE FUJII¹, CHRISTOPHE GROJEAN^{2,3}, MICHAEL E. PESKIN⁴
(CONVENERS); TIM BARKLOW⁴, YAUNNING GAO⁵, SHINYA KANEMURA⁶,
HYUNGDO KIM⁷, JENNY LIST², MIHOKO NOJIRI^{1,8}, MAXIM PERELSTEIN⁹,
ROMAN PÖSCHL¹⁰, JÜRGEN REUTER², FRANK SIMON¹¹, TOMOHIKO TANABE¹²,
JAMES D. WELLS¹³, JAEHOON YU¹⁴; JUNPING TIAN¹², TAIKAN SUEHARA¹⁵,
MARCEL VOS¹⁶, GRAHAM WILSON¹⁷; JAMES BRAU¹⁸, HITOSHI MURAYAMA^{8,19,20}
(EX OFFICIO)

Now available as [arXiv:1908.11299](https://arxiv.org/abs/1908.11299)

Our Group's Activities

Status & Next Step

Symmetry Breaking & Mass Generation Physics

- ZH : $H \rightarrow bb, cc, gg$ → EPJ C (2013) 73:2343, now working on $m_h=125$ GeV case: Ono+Miyamoto
 $H \rightarrow WW^*$ anomalous coupling: publication: Takubo → P.R.D88,013010(2013)
→ $H \rightarrow WW^*$ to be reexamined: Liao Libo, Mila, Uli
 $H \rightarrow$ other modes (AA, $\mu^+\mu^-$) + Kawada/Tanabe/Suehara/Daniel, ($\tau^+\tau^-$) → publication → EPJC (2015) 75:617., $H \rightarrow Z\gamma$: Kazuki Fujii
- Recoil mass: Jacqueline → P.R.D94,113002(2016), Suehara (qq), CP mixing in $h \rightarrow \tau^+\tau^-$: Daniel
→ accepted for publication in PRD, HVV couplings: Ogawa, Yumi Aoki (Hgamma)
direct mH reconstruction: Junping
- EFT: EFT vs BSM, EFT fit on top EW couplings: Junping
- Zgamma: Takahiro Mizuno
- ZHH : full simulation of the $H \rightarrow bb$ & $Z \rightarrow$ all modes, fast simulation of $nnuHH$: finished: Junping + Takubo (Ph.D thesis: done) → New analysis with improved analysis tools: Junping + Claude + Suehara + Tanabe, Jet-clustering: Kurata, Shaofeng Ge, LCFIPlus: Suehara, Yonamine
New analysis: $ZHH \rightarrow ZbbWW^*$: dE/dx: Kurata, Systematic Error: Tim, EFT: Junping, ZHH paper draft: Junping, Masakazu, Claude
- nnHH : full simulation @ 1TeV, done for DBD: Junping → publication
- nnH, eeH : precision measurements of HVV couplings, $m_h=125$ GeV: Junping
BR measurements: Ono, Christian
- TTH : quick simulation studies with NRQCD corrections
→ P.R.D84,014033(2011) → full sim. @ 0.5 & 1 TeV: (Yonamine left) Tanabe + Sudo
- TT Threshold : Top Yukawa measurement: Horiguchi + Ishikawa + Tanabe, Theory: Kiyo + Sumino → publication? (cf. a recent significant theoretical development!): Ozawa → Yuto Eda
- W mass (m_W) : Koya Tsuchimoto → Kotera (controlling systematic uncertainties) → Kotera
- AA → HH : quick simulation studies, so far $H \rightarrow bb$ and WW BG
→ P.R.D85,113009(2012) : Kawada, Theory: Harada

Status & Next Step

Beyond the Standard Model

- SUSY : full simulation studies for LOI → publication
 - **EWkino** (Compressed Spectrum Case): Jacqueline→Tomohiko →analysis finished.
- Extra U(1) (Z' tail), Compositeness, Extra Dimensions, etc.
 - **TT** : full simulation studies for LOI → **New study with MELA**: Yo Sato, **vertex charge**: Okugawa
 - **tau tau** : full simulation studies (benchmark process) → **Keita Yumino**
 - **2f: full simulation study**: Hiroaki Yamashiro → Yuto Deguchi, Uesugi
- Hidden Sector / XD : **P.R.D78, 015008 (2008)**
- LHT : **P.R.D79, 075013 (2009)**
- Model discrimination: Saito + Suehara .. : **P.R.D84, 115003 (2011)**
- R-handed neutrinos: Saito : **P.R.D82, 093004 (2010)**
- LHT: Kato (exp) + Harigaya (th): ZHZH finished, working on eHeH, nHnH, ..: Draft (n-1)?
- Very light gravitino: Katayama (Master's thesis), Tanabe (exp) + Matsumoto (th)
--> 1st Draft --> Takuaki Mori (Tokyo) → ?
- Quasi stable stau: Yamaura (Master's thesis) + Kotera + Kasama → reactivated?
- **Higgs portal/h→Invisible**: Honda → Yamamoto → Ishikawa, Ogawa, Junping → Yu Kato
- W-H+/W+H-: (Shinzaki), Ishikawa (exp) + Kanemura, yagy (th)
- **Generic DM search (mono-photon)**: Tanabe → **Yonamine**
(exotic higgs decay): Kurata, **Special theory guest**: Shigeki Matsumoto
- Other projects
 - Heavier Higgs bosons?: Yokoya, (Abhinav) → Christian Drews
 - X(750) : Junping → published in PRD (**Phys.Rev. D94 (2016) no.9, 095015**)
 - Correlation btw h→gamma gamma & h→gg in mSUGRA: Hidaka
 - **Kinematical Fitter** : **kajiwara**

Short Term Schedule

- Weekly Meeting
 - Every Fri. at 14:00 (conf. ID: to be announced)
- General Meeting
 - 10:30 on **Thu. Dec. 5, 2019 ?**
- **LCWS 2019 in Sendai, Oct. 28 - Nov. 1, 2019**

LCWS 2019 to be held in Sendai

Oct. 28 - Nov. 1, 2019
at Sendai International Center

<http://epx.phys.tohoku.ac.jp/LCWS2019/>

Home

Timetable

Registration

Participant List

Booth List

WG conveners

Committees

Venue and Access

Accommodation

WiFi and LAN

File Upload

Report

International Workshop on Future Linear Colliders

LCWS2019 Sendai
October 28 - November 1

Welcome to LCWS2019!

This year, the International Workshop on Future Linear Colliders (LCWS 2019) will be held in Sendai, Japan, from October 28 (Monday) to November 1 (Friday) at [the Sendai International Center](#). While the workshop will be dealing with the physics, detectors, and accelerator issues of CLIC and ILC as the previous meetings in the series, the timing is critical in terms of the European Particle Physics Strategy Update in its final phase, and also since the Japanese government will be coming close to its decision regarding the ILC. There will be presentations and exhibitions by relevant industries as well. The meeting also coincides with the peak of autumn foliage with many popular spots in the surrounding area. Looking forward to see you in Sendai!

Hitoshi Yamamoto
Chair, Local Organization Committee

